กลุ่มที่ 1

บทความระดับนานาชาติ

(International Papers)

Room 1:

Education, Liberal Arts

INVESTIGATING THE USE OF VOCABULARY LEARNING STRATEGIES AMONG THAI EFL FRESHMEN STUDENTS

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ABSTRACT

This study aimed to investigate the use of vocabulary learning strategies (VLS) by first -year students of the Faculty of Humanities and Social Sciences at Nakhon Ratchasima Rajabhat University, Thailand. Precisely, it tried to examine Thai EFL learners' use of metacognitive strategies including determination strategies. To achieve this purpose, an adapted version of a five-point Likert-scale questionnaire was adapted from Rahimy and Shams (2012) was categorized into 9 different determination strategies. The sample groups consisted of 52 first-year Thai undergraduate students purposively selected from across academic majors–Science and Technology major, Management major, Medical major, Engineering major and Humanities and Social Sciences major. The study focuses on strategies used by freshmen students, who were enrolled in the first semester at NRRU in the academic year 2022. The statistics methods used for analyzing the collected data were descriptive statistics of mean $(\bar{x})$, standard deviation (SD), and frequencies. The results of data analysis show that students tend to use "I guess the meaning of the word from the textual context in reading" as the most frequently used strategy, and "I think of a Thai word that looks or sounds like the English word, and I think about how the meanings are related." as the least used strategies than other strategies. Importantly, teaching such strategies had significant effects on the English language of first-year students.

Keywords: Vocabulary Learning, Vocabulary Learning Strategies

1. Introduction

With regard to vocabulary instruction, Boonkongsaen (2012) points out that in Asian countries, most university curriculums do not pay attention to vocabulary instruction. Generally, the situation in Thailand, English teaching in universities is emphasized on the four language skills but the vocabulary is given little emphasis by English teachers (Komol & Sripetpun, 2014). Actually, in some universities, the students have to take an English foundation courses for all their levels as core courses and having passed the Foundation English courses, they have to get involved with more advanced academic courses including grammatical structure, and vocabulary for their follow-up courses. In the context of Rajabhat Universities, English as a fundamental course in part of general

education is apparent that plays a dominant part in the education of all students both English major students and non-English major students (Siriwan, 2007).

Generally, Thai students can be neglect learning English because they do not have enough vocabulary knowledge, they can meet negative attitudes toward English study. From the fact, most studies indicates that students encounter vocabulary problem as well (Imamee, 2016). At present, most of students still lack efficient knowledge of vocabulary. Thus, students still need to assistance in terms of teaching strategies to deal with unknown academic or technical vocabulary (Boonnoon, 2019). Moreover, the teachers negligent to find out effective methods to help students to make sense of the words in English courses but they teach in traditional styles. Consequently, students cannot recall the words meaning and cannot memorize vocabulary. Hence, the researcher try to investigate what vocabulary learning strategies were most or least frequently used by the students. Furthermore, the researcher believes that there is a need to find out suitable ways to increase vocabulary knowledge and develop English language skills for all learners.

2. Literature and Theory

2.1 The role of learning vocabulary through four skills

Vocabulary is associated with every skill of learning the English language. When reading and listening, students will be concerned with the understanding of particular vocabulary and expressions. When speaking and writing, in contrast, they will need to recall and produce some of this language (Nation, 2001). For example, in reading, it can be obvious that vocabulary is important for reading comprehension because the readers must understand what the word means and makes sense of what they read in print. In writing, when we write a letter or book, the writer will have knowledge of spelling and grammar that is very important for writing and it might be clear for the readers. In speaking, vocabulary is important for speaking skills because we must use it when we talk in daily life and also communicate with foreigners. In listening, the audience have to understand the sentence from what people said that are associated with pronunciation and utterance.

Carter and McCarthy (1998) believed that the students had to understand the process of learning vocabulary which is quite a complex process of vocabulary acquisition. To illustrate, this view is supported by similar findings (Higa, 1963; Tinkham, 1993; Waring, 1997 & Nation, 1990; cited in Schmitt, 2002) who discovered that students could learn the form and meaning of words but they had a major problem of how to make sense of a cross-association in semantic groupings of words such as synonym or antonym. Officially, the learners have the process of organizing words to store in their minds in terms of a mental lexicon of second language learning (Drucker, 2003). However, second language learners have to gain more understanding of new words the same as in their first language learning (Nation, 2007). Most EFL learners seem to use their dictionaries to help them get actual meaning of words (Pikulski & Templeton, 2004). Nevertheless, to understand the context, the use of a dictionary is one of the least effective methods of vocabulary instruction because it is quite boring and takes a long time to catch up with the precise meaning or information of words (Campillo, 1995).

Due to education in the era of the 21st century, Wagner and Muse (2007) have indicated that the varieties of vocabulary instruction can be helpful to build up students' knowledge of vocabulary. But, there are not the best trends in vocabulary teaching methods naturally. Drucker (2003) stated that the teachers could not teach all vocabularies in the text but the students needed to become autonomous leaner who finds out the definition of unfamiliar words across provided glossary in their textbooks. To be successful in English language teaching, it is needed to find students' vocabulary learning strategies, help them to utilize strategies, and instruct them on strategies to develop language effectively. There are several factors for example cultures, experiences, social and economic statuses, intellectual abilities, relevance, knowledge, styles of learning and students' learning strategies for learning (BASKIN, İŞCAN, KARAGÖZ & BİROL, 2017).

From the notion of Schmitt (2000), determination strategies are utilized when students discover the meaning of an unknown word without asking another person. According to this strategy, students try to guess and discover the meaning of the unfamiliar words with the assistance of context, knowledge structure and reference material. It means that students find the meaning of unfamiliar words to their abilities.

Schmitt (2000, p. 135) explained Vocabulary Learning Strategies Taxonomy comprises two vocabulary strategies:

- Discovery Strategies, there are nine determination strategies (for example analysis parts of speech, analysis affixes or roots) and there are five social Strategies (for example asking teacher for an L1 translation, asking teacher for paraphrase or synonym of new words)

- Consolidation Strategies, there are nine cognitive strategies (for instance verbal repetition, written repetition), twenty-seven memory strategies (for instance studying a word with pictorial representation of its meaning, image word's meaning), five metacognitive strategies (for instance using English-language media: songs, movies, and newscasts, testing oneself with word tests) and three social strategies (e.g. study and practice meaning in a group, teachers checking students' flash cards or word lists for accuracy).

3. Objectives of the Study

The main purpose of this study is to determine the vocabulary strategy usage of freshmen students.

4. Methodology

4.1 Research instruments

In this present study, the vocabulary learning strategies questionnaire taken from Rahimy and Shams (2012) was adapted by many researchers such as Ming Wei (2007), Gu, Johnson (1996), and Fan (2003) who used it in many studies in some universities in the U.S.A. The questionnaire is based on Schmitt's five categories of vocabulary learning strategy. The questionnaire vocabulary used in the study was to elicit what types of vocabulary learning strategies were used by the participants The questionnaire was translated to Thai and was designed using the Five Point Likert Scale. It was designed as close-ended questions items.

4.2 Participant

The sample groups consisted of 52 both male and female first-year freshmen students purposively selected from across academic majors–Science and Technology major, Management major, Medical major, Engineering major, and Humanities and Social Sciences major. The study focuses on strategies used by first-year students, who study English based on foundation courses and academic courses prescribed in the first semester at NRRU in the academic year 2022.

5. Data Collection Procedures

The data collection was carried out without a specific time to respond to the questionnaire. It was a self-report questionnaire, therefore, students were asked to answer the questionnaire and return them as soon as they were completed. The researcher collected the questionnaire via a google form.

Accordingly, the data obtained from the questionnaire were students' opinions about learning vocabulary which was analyzed in terms of mean scores and standard deviation as shown in Table 1 below (See Table 1).

5.1 Results

Table 1: Statistical Description of Determination Strategies

No.	Items	Level of opinion		Level of strategy use
		($\overline{X}$)	S.D.	
Determination Strategies				
1.	I think of a Thai word that looks or sounds like an English word, and I think about how the meanings are related.	2.73	0.88	Medium
2.	I look for structural rules (prefixes, suffixes, roots, etc.) that give clues to the word's meaning.	3.06	0.93	Medium
3.	I guess the meaning of the word from the textual context of reading.	3.73	0.92	High
4.	I carry a pocket dictionary (including an electronic dictionary) to look up the words I don't know.	3.52	1.34	High
5.	I pay attention to the grammatical patterns (e.g. parts of speech, countable/uncountable) of a new word.	3.10	0.97	Medium
6.	When I look up a word in the dictionary, I read all the meanings of new words.	3.46	0.95	Medium
7.	I check to see if my guesses about the words are right or wrong.	3.69	0.91	High
8.	I look up new words in an English-Thai dictionary.	3.33	0.83	Medium
9.	I look up new words in a Thai -English dictionary.	3.13	0.92	Medium
	Total	3.13	0.15	Medium

Table 1 presents the overall strategy use among the first-year students, with a mean of 3.13, indicating that they were medium strategy users. As indicated in Table 1, in the nine categories, the most frequently used strategy was "I guess the meaning of the word from the textual context in reading" ($\overline{X}$: 3.73), followed by I check to see if my guesses about the words are right or wrong. ($\overline{X}$: 3.69) "I carry a pocket dictionary (including an electronic dictionary) to look up the words I don't know" ($\overline{X}$: 3.52), When I look up a word in the dictionary, I read all the meanings of new words ($\overline{X}$: 3.46), I look up new words in an English-Thai dictionary ($\overline{X}$: 3.33). I look up new words in a Thai -English dictionary ($\overline{X}$: 3.13) and I pay attention to the grammatical patterns (e.g. parts of speech, countable/uncountable) of a new word. ($\overline{X}$: 3.10), I look for structural rules (prefixes, suffixes, roots, etc.) that give clues to the word's meaning. ($\overline{X}$: 3.06), respectively. The least frequently used strategy was "I think of a Thai word that looks or sounds like the English word, and I think about how the meanings are related." ($\overline{X}$: 2.73).

The descriptive statistics indicate that the vocabulary learning strategies most frequently used by the first-year students at Nakhon Ratchasima Rajabhat University were "I guess the meaning of the word from the textual context in reading." ($\overline{X}$: 3.73). The following is the conclusion that students are concerned about learning vocabulary they encounter.

6. Conclusion

This present study, it was aimed to verify the overall use of vocabulary learning strategies of students learning at Nakon Ratchasima Rajabhat University, Thailand. A questionnaire consisting of 9 items was presented to the participants to collect data. The questionnaire was adapted from Rahimy and Shams (2012).

Accordingly, the results revealed that the most used vocabulary strategies are "I guess the meaning of the word from the textual context in reading". The reason for this is that the students are freshmen. As students have just begun learning the language at the university level, they do not know exactly how to use a strategy as they have just started learning the English language at the university level.

This study, it is focused on determination strategies, there are many activities, such as guessing meaning in the context, using a bilingual or monolingual dictionary, and analyzing the word's prefixes, suffixes, and roots. In determination strategies, the results indicate that they utilize "I guess the meaning of the word from the textual context in reading" at the forefront. From this point of view, Carter and McCarthy (1988) suggested that to teach the English language effectively, teachers should encourage their students to guess some meaning of difficult words when they discover new words in the text because there is no need to know every meaning of words in reading for comprehension.

7. Limitations of the Study

The sample of the study, which is restricted to the first-year students in Nakhon Ratchasima Rajabhat University, might not be considered to be generalizable representing the overall freshmen students in Nakhon Ratchasima, Thailand. The categories of vocabulary learning strategies (9 determination strategies), as a

limitation, might not adequately represent the overall vocabulary learning strategies. Additionally, the 9-question items of determination strategies are also a limitation, and might not be adequate to represent all the vocabulary learning strategies.

8. Suggestions and recommendations

The following suggestions and recommendations can be made about the vocabulary learning strategies utilized by students:

Teachers should emphasize to students how to utilize vocabulary learning strategies effectively and give useful information about how they should apply meaningful strategies in their classrooms.

All academic courses should have the content of vocabulary learning strategies in the course materials and textbooks for teaching students.

Moreover, the teacher should provide teaching on how to use "guessing meaning from context clue" as a way to enhance the progress of vocabulary teaching. Moreover, in reading, it could save time to refer to the meaning of words by using a guessing the meaning of word and the reader could enjoy reading without interruption, in this way it builds up reading efficiency (Clarke & Nation, 1980).

Finally, the researcher believes that the result of this research will be useful for the reader. The researcher hopes that the readers will have more information about determination strategies "the use of guessing meaning from context" with some clues. This research also can be one of the meaningful sources for the next researchers.

References

BASKIN, S., İŞCAN, A., KARAGÖZ, B., & BİROL, G. (2017). The Use of Vocabulary Learning Strategies in Teaching Turkish as a Second Language. *Journal of Education and Practice, 8*(9), 126-134.

Boonkongsaen, N. (2012). Factors affecting vocabulary learning strategies: A synthesized study. *Naresuan University Journal, 20*(2), 45-53.

Boonnon, S. (2019). Vocabulary Learning Strategies Employed by Thai University Students across Four Academic Profiles. *Theory and Practice in Language Studies, 9*(8), 902-910.

Campillo, R. L. (1995). *Teaching and learning vocabulary: An introduction for English students.* Retrieved October 22, 2012, from www.uclm.es/ab /educacion /ensayos/ pdf/.../10_6.pdf

Carter, R., & McCarthy, M. (1988). *Vocabulary and language teaching.* London: Longman.

Clarke, D. F., & Nation, I. S. P. (1980). *Guessing the meanings of words from context: strategy and techniques.* System 8.3, 211–220.CrossRef Google Scholar

Drucker, M. J. (2003). What reading teachers should know about EFL learners. *The Reading Teacher, 57*(1): 22-28.

Imamee, W. (2016). *Investigating Thai EFL Students English Vocabulary Learning Strategies at A Private University.* Master's Thesis, Thammasat University

Komol, T., & Sripetpun, W. (2014). *Vocabulary learning strategies employed by undergraduate students and its relationship to their vocabulary knowledge.* Paper presented at The 3rd International Conference on Humanities and Social Sciences, Faculty of Liberal Arts, Prince of Songkla University. Retrieved from http://tar. Thailis.or.th/handle/123456789/667

McCarthy, M. (1990). *Vocabulary.* Oxford: Oxford University Press.

Nation, I. S. P. (2001). *Learning Vocabulary in Another Language.* Cambridge: Cambridge University Press.

Oxford, R. L. (1990). *Language learning strategy: What brings teacher should know.* Boston: Newbury House.

Rahimy, R., & Shams, K. (2012). An Investigation of the Effectiveness of Vocabulary Learning Strategies on Iranian EFL Learners' Vocabulary Test Score. *International Education Studies, 5*(5), 141-152.

Siriwan, M. (2007). *English vocabulary learning strategies employed by Rajabhat University students.* Unpublished Ph.D., Suranaree University of Technology Nakhoratchasima, Thailand.

Schmitt, N. (2000). *Vocabulary in language teaching.* Cambridge: Cambridge University Press.

Schmitt, N. (2002). *An introduction to applied linguistics.* London: Oxford University Press.

Wagner, R. K., & Muse, A. E. (2007). *Vocabulary acquisition implications for reading comprehension.* New York: The Guildford Press.

THE STUDY OF UNIVERSITY STUDENTS' ATTITUDES TOWARDS THE IMPLEMENTATION OF MOTHER TONGUE-BASED LANGUAGE EDUCATION IN ENGLISH LANGUAGE LEARNING

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ABSTRACT

The implementation of mother tongue‑based language education (MTBLE) has been discussed in a number of research as a consequence of its various benefits. Since it is necessary to find the suitable educational tool for students, MTBLE is helpful for enhancing students' English language learning success. The purpose of this study was to explore students' attitudes towards the implementation of MTBLE in English language learning. The participants in this study were 50 undergraduates at a private university in Chiang Mai, Thailand. The research instrument were a questionnaire and a semi-structured interview asking about students' attitudes towards MTBLE. The findings revealed that the majority of the students admitted various benefits of MTBLE and supported the use of MTBLE in English classrooms. Students suggested L1 use in explaining grammar rules and clarifying the meaning of the words. Moreover, students indicated that language learners in all levels can benefit from using MTBLE especially the beginner to pre‑intermediate levels.

Keywords: English language learning, mother tongue-based language education, university students' attitudes

1. Introduction

Mother tongue‑based language education employs students' first language as a medium of instruction to teach students in accordance with academic content. The advantages of using mother tongue are various since students are given opportunities to start learning language through their familiar language, then transfer knowledge and skills learned to the unfamiliar language. Thus, they can gradually acquire knowledge and success in language acquisition (Bachore, 2014). However, there has been the increase in the awareness towards whether mother tongue‑based language education should be implemented as a language of instruction in English as a foreign language classroom. The potential of educational model using mother tongue has been tested in many cases. (Mahboob & Cruz, 2013; Walter, 2011).

In Thailand, using only English in the learning context might be considered very challenging for them especially when they have different language backgrounds and a complication in communication range (Bureau

of International Cooperation Strategy, 2006). According to Mangubhai (2005), language barrier is one of the most important difficulties in language learning. It is necessary to provide a productive learning environment to the students to decrease difficulties and frustration for students and it is the teachers' and university lecturers' responsibilities to find the best educational tool to help the students to achieve learning success. Mother tongue-based language education might be one effective way that helps contribute to that success due to its various advantages. The research question therefore included: 1. What are the students' attitudes towards mother tongue-based language education? In doing so, it offers the effective way in facilitating English language learning skills that fits with students' preference and learning style to help them overcome difficulties in L2 learning, and to provide a guideline for teachers and instructors to successfully use mother tongue to help facilitate students' language acquisition in language classroom.

2. Research Objective

1. To explore students' attitudes towards the implementation of mother tongue-based language education in English language learning

3. Literature Review

3.1 Mother Tongue-Based Language Education

Mother tongue-based language education refers to the use of students' L1, which they acquired at a very young age and have continually used in their daily life, in their classroom activities. Nowadays, English-only classroom policy supports and encourages teachers and language learners to use L2 in the English classroom as much as possible, nevertheless, the issue advocating the use of students' L1 in EFL classroom has become debatable over the years in the field of second language acquisition since the importance of using students' mother tongue in second language teaching has been acknowledged by many organizations and governments around the world (UNESCO, 2003).

3.2 Advantages of L1 use in language learning

The United Nations Educational, Scientific and Cultural organization (UNESCO) recommended that mother tongue-based language education should be promoted since UNESCO acknowledges the importance of teaching students in their own mother tongue (UNESCO, 2003). According to Nation (2003), using mother tongue-based instruction allows the students to participate more in the classroom activities and get involved in the teaching materials. Students, especially those who have a lower level of language proficiency, tend to feel highly motivated due to the use of L1. Tang (2002) also supported in his study that the use of L1 is beneficial and it does not obstruct students' achievement in second language learning. It does not reduce the chance that students will be exposed to the target language; conversely, it supports foreign language learning. Atkinson (1987) and Piasecka (1988) recommend many possible occasions for using L1 in the foreign language classroom such as for classroom management, for presenting and describing the rules of grammar, pronunciation or other language

uses, for the discussion in the classroom and providing the cooperation between students, and for giving instructions, the methodology or the directions of the activities in the classroom.

Nyika（2015）revealed in her study that students whose mother tongue is used in the university outperformed those whose mother tongue is not used as a language of instruction in the university. In the university context, one of the factors contributing to English as a foreign language students' poor performance in the English language could be the use of English as a medium of instruction and the restriction of using mother tongue in the EFL classroom. That is why the policy about using mother tongue language as a language of instruction in the educational institution has been promoted and used in many developing countries. Since university has an important role to produce potential graduates to the countries and societies, the policy of university educational system should be carefully considered. The quality of graduates is essential to both national and global development. Apart from the students' performance, using English only also affects students' attitudes and motivation as Burden（2000）reports that from his experience as an English teacher in Okayama Shoka University, Japan, the teachers who use English only in the classroom tend to use references or examples from English context or English culture and banish the references or examples from students' own culture. These directly affect students' low level of motivation and interest in the classroom since they are not familiar with and understand what the teachers said (Burden, 2000).

3.3 Challenges and concerns of the L1 use in language learning

According to Prodromou（2002）, the students basically need a sufficient amount of L2 input in the classroom. Those who have a high level of language proficiency perceived that using only L2 can help them be exposed to the target language straightforwardly. In addition to this, Salem and Foo（2013）also investigated the problems in learning writing among EFL students in Jordan. The findings revealed that when the teachers were employing the mother tongue language, which is Arabic, in EFL writing class, the students perceived that it would decrease their confidence in writing if they used more Arabic in learning and practicing.

4. Research Methods

4.1 Research design

The research design in this present study is survey research. The population for this study comprised 50 undergraduates at Payap University, Chiang Mai, Thailand. They were first‑year and second‑year students majoring in English, Communication Arts, Business Management, and Accounting. The purposive sampling method was applied to select the participants. Those who enrolled in GE135 English for Cross‑cultural Communication Course participated in the study. All of them had to pass GE130 English for Daily Life Course before enrolled to GE135 Course.

4.2 Research instruments

The research instruments used to explore students' attitudes towards mother tongue‑based language education was a questionnaire and a semi‑structured interview form. The questionnaire was adapted from Kim and Petraki's the study of Korean students' and teachers' use of and attitudes to L1 in the EFL classroom (2009).

The questionnaire included 3 items asking about general and demographic information which are gender, age, and field of study and 13 items asking about the students' attitudes towards mother tongue‑based language education. The semi‑structured interview questions were prepared by the researcher. There were 3 questions in the interview. The content validity of the questionnaires and the interview questions were assessed by three experts in the field. The Item‑Objective Congruence Index (IOC) was employed to calculate the validity of the questionnaire and the interview questions. The Item-Objective Congruence Index (IOC) is □ 0.5. It is indicative that the items can answer the research questions and the research objectives.

4.3 Data collection

The questionnaire was first administered to the participants in an attempt to explore their attitudes towards mother tongue‑based language education. Then, the interview was conducted with the participants who were randomly selected to gain different insights into students' attitudes towards mother tongue‑based language education.

4.4 Data analysis

A statistical program was used to analyze the quantitative data from the questionnaire. Mean scores, standard deviation, and level of interpretation were used in order to display the research results. Coding was used to analyze the data from the semi‑structured interview. The responses from the participants were first coded and then categorized by the researcher. Main themes were derived from the literature review and the data obtained to address research question.

5. Results

Regarding students' attitudes towards the use of native language (Thai) in English classes, the results from the questionnaire revealed that 74% of the respondents answered that native language (Thai) should be used in an English classroom while 26% thought that native language (Thai) should not be used in an English classroom. The respondents were asked about the reasons why they answered native language (Thai) should be used in English classrooms. The results from the questionnaire revealed that students' mother tongue should be employed in the classroom to help enhance students' understanding of the academic content and meaningful communication. The fact that some students have limited vocabulary knowledge results in misunderstanding and confusion if teachers use only English in class. The respondents suggested that teachers should always monitor whether students understand the English sentences and vocabulary or not. If not, teachers should use Thai to clarify those sentences or at least give the meaning of the vocabulary in Thai. Using students' first language is another effective way in facilitating English language teaching to be more successful. Moreover, some students mentioned about the difference in their language background. If students, especially who are low‑achiever students can use the language they know well and feel familiar with, they are more willing to participate in the activities in the classroom and completing the task. These can lead to the effectiveness in learning language.
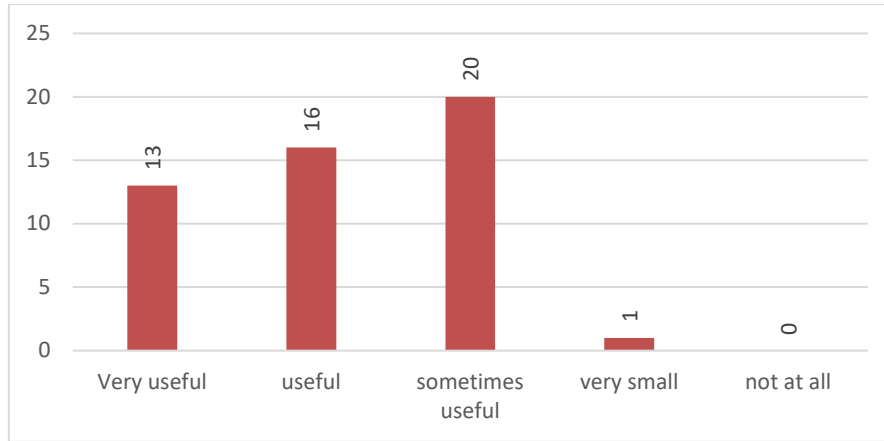
Figure 1 Students' attitudes towards the usefulness of Thai in helping learning English

Concerning the usefulness of Thai in helping learning English, the majority of the students reported that employing Thai is sometimes useful (40%), useful (32%) while 26% of them perceived that the use of Thai is considered very useful to help students in learning English. Interestingly, no respondent answers that using Thai is not helpful at all.
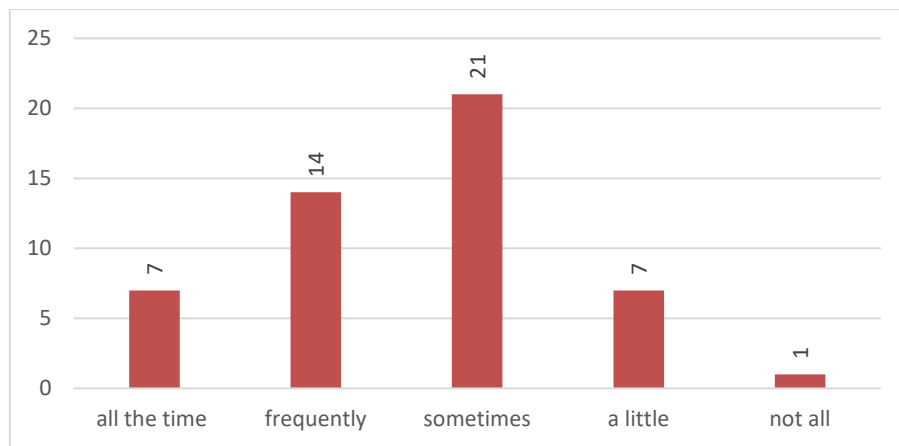

Figure 2 Students' attitudes towards to what extent teachers should use Thai in an English classroom

The respondents were requested to rate to what extent teachers should use L1 (Thai) in an English classroom, Figure 2 reports that most of the respondents pointed out that teachers should sometimes use Thai in an English classroom (42%), teachers should frequently use Thai in an English classroom (28%) while 14% of them stated that teachers should use Thai in an English classroom all the time and another 14% of them thought that teachers should use Thai in an English classroom a little. Only 2% suggested that teachers should not use Thai at all.
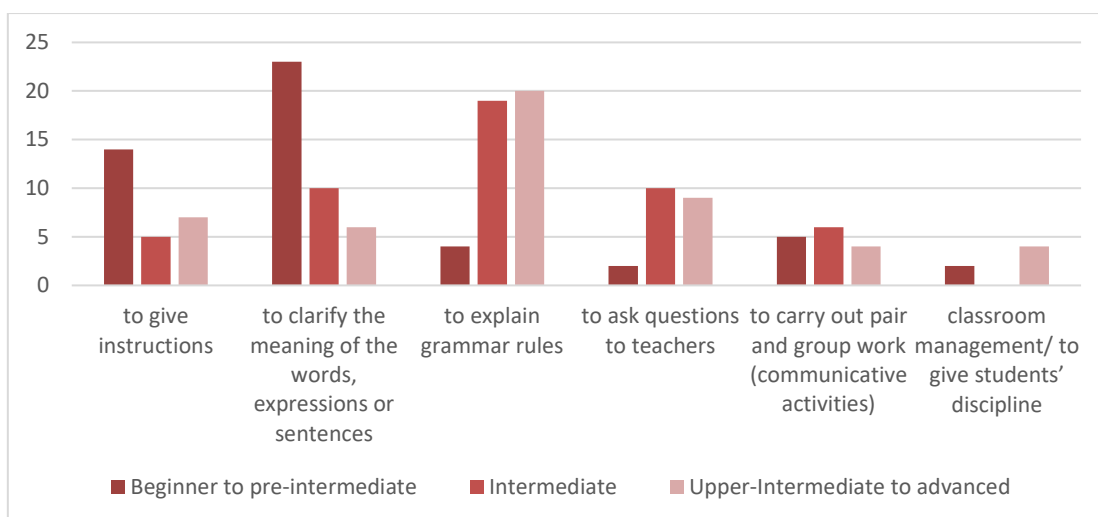
Figure 3 Classroom activities in which the students think it is useful to use

Thai in English classrooms for students in each level

Concerning the advantages of using L1 (Thai) in various classroom activities, Figure 3 shows the frequency of each activity chosen by the respondents. Generally, students perceived that the most useful activities regarding the implementation of L1 for beginner to pre-intermediate students is to clarify the meaning of the words, expressions or sentences. The most useful activities regarding the implementation of L1 for intermediate students and advanced students is to explain grammar rules.

Table 1: Students' attitudes towards how much students in each level can benefit from using Thai in an English classroom

Statements	Mean	S.D	Level of Interpretation
1. Students in a beginner to pre-intermediate level	4.10	.839	High
2. Students in an intermediate level	3.70	.814	High
3. Students in an upper-intermediate level	3.32	1.039	Moderate

Table 1 reports the students' attitudes towards how much students in each level benefit from using Thai in an English classroom, the results revealed that the respondents perceived that students in all levels of proficiency can benefit from using Thai. Focusing on each level, the level agreed among the respondents that can benefit from using Thai in an English classroom the most was students in a beginner to pre-intermediate level. Students in the beginner to pre-intermediate levels can benefit from using Thai at the high level as the mean score was considered to be at the high level of interpretation (mean score = 4.10), to be followed by students in the intermediate level. Students in the intermediate level can also benefit from using Thai at the high level as the mean score was considered to be at the high level of interpretation (mean score = 3.70). And students in the upper-intermediate level can benefit from using Thai at the moderate level as the mean score was considered to be at the moderate level of interpretation (mean score = 3.32).

Table 2: Students' attitudes towards how much students can benefit from using Thai in an English classroom in each skill

Statements	Mean	S.D	Level of Interpretation
1. Speaking skill	3.44	.993	Moderate
2. Listening skill	3.54	1.054	High
3. Reading skill	3.44	.972	Moderate
4. Writing skill	3.54	.930	High

Regarding students' attitudes towards how much students can benefit from using Thai in an English classroom in each skill, Table 2 shows that the respondents perceived that using Thai in an English classroom is beneficial for all 4 skills in a high and moderate level as the mean score were all considered to be at the high and a moderate level of interpretation. When focusing on each skill separately, it was found that the skill agreed among the respondents that students can benefit from using Thai in an English classroom the most was listening skill and writing skill (mean score = 3.54), followed by the reading skill and speaking skill (mean score = 3.44) respectively.

The results from the interview support the benefits of employing mother tongue-based education in an English classroom. The interviewees also suggested the suitable situations and skills that L1 (Thai) should be used for. Below are quotations that shown empirical evidences to support and suggest the implementation of mother tongue-based education in an English classroom from the semi-structured interview.

"I think it is very helpful when teacher helps clarifying difficult language rules and grammar in Thai."

(Interviewee 002)

"L1 (Thai) should be used because sometimes students don't understand about what teacher says, and when we couldn't understand, we will miss some points of what the teacher tries to convey."

(Interviewee 003)

"Teacher can use L1 to describe more details in the lesson. It is better to help student understand more what the teacher teaches in the classroom."

(Interviewee 001)

"In my opinion, L1 (Thai) should be used when teacher have to explain something that is very difficult or have to use the technical terms."

(Interviewee 001)

"For some difficult words, giving the definition in Thai will help learners understand faster."

(Interviewee 004)

6. Discussion

Based on students' responses in the questionnaire, the majority of the students stated that mother tongue should be employed in English classrooms and there was no respondent who stated that L1 (Thai) should not be used since they perceived the benefits of employing mother tongue-based language education. Such responses are in line with the comments from the study of Tang (2002). Tang (2002) found that mother tongue-based language education could be considered as another effective one that helps improve learners' language proficiency and facilitates their second language learning. The study of Bozorgian and Fallahpour (2015) also stated that teachers should not exclude the use of L1 from the classroom. Conversely, L1 is a supportive tool in facilitating students' language progress rather than the problem. According to Vygotsky's (1976) theory of psycholinguistics, implementing L1 in L2 classroom can enhance students' cognitive development during language learning and gradually lead to their success in language learning (Schweers, 1999; Tang, 2002). Macaro (2001) also stated that L1 use was useful in explaining the content of the course and make it more comprehensible for the students. In addition to this, the investigation by Lin (2013) emphasized the benefits of L1 use on conveying, translating, and explaining the meaning of the words. Such comments are in line with the findings of this current study, which indicated that two classroom activities mentioned by most of the students that they are suitable for L1 use were to explain grammar rules and to clarify the meaning of the words, expressions or sentences.

In regard to this current research, from students' perspectives, the level that can benefit from using Thai in an English classroom the most was students in a beginner to pre-intermediate level. A position supported by Nilubol (2020) who reported in his study that low-achiever students felt more relaxed and comfortable if they were allowed to use their first language in English classrooms. This will directly result in their language learning accomplishment. According to Bozorgian and Fallahpour (2015), friendly classroom environment can enhance effective learning of the learners. These results are in agreement with Cole (1998)'s statement. Cole (1998) suggested that the amount of L1 use should be based on the level of students' language proficiency. L1 should be used with learners in the beginning level to advanced level on a decreasing scale.

Focusing on the effects of implementing mother tongue-based instruction on each skill, the students thought that mother tongue should be used with listening skill the most, followed by writing skill, reading skill, and speaking skill respectively. The finding of this study is aligned with the study conducted by Kim and Petraki (2009) which presented that students perceived the great benefits of L1 use in listening because the use of L1 is helpful for the development of listening and speaking fluency. Hopkins (2003) also found that students feel uncomfortable and pressure if they do not understand what native teachers said. In this case, using L1 to explain might be helpful for them.

7. Recommendations

7.1 Recommendations for pedagogical implication

Pedagogical implication of the research is proposed as the reflection of the research findings. The results of the study prove that most of the students prefer the use of mother tongue as a medium of the instruction due to the fact that it helps them to understand, to be more participating and to be motivated in the classroom. Hence, using mother‑tongue based education might be an effective way to contribute to students' achievement in language learning. Besides, in order to employ mother‑tongue based education in the classroom effectively, teachers and educators should be offered opportunities to attend trainings and seminars regarding the implementation of mother tongue as a medium of instruction in the classroom since understanding and mastering the teaching method will provide teachers an effective teaching in the classroom as well as enhancing the process of students' language acquisition to run successfully.

7.2 Recommendations for further research

Further study can be conducted with students in other levels such as students in the primary school to determine the similarities and differences of the results. Besides, future study can investigate the effectiveness of the implementation of mother tongue-based language education in a group of students in different or broader area to enable generalization. Moreover, nowadays, students in schools and universities are from various nationalities and ethnicities. Further research might be conducted on the topic concerning the mother tongue‑ based multilingual education (MTB-MLE).

8. References

Atkinson, D. (1987). The mother tongue in the classroom: A neglected resource? *ELT Journal, 44*(4), 241-247.

Bachore, M. M. (2014). Learners' success in mother tongue-based classroom instruction and the attitudes and perceptions of school communities. *International Journal of Sociology of Education, 3*(2), 118-135. doi: 10.4471/rise.2014.09

Bozorgian, H., & Fallahpour, S. (2015). Teachers' and students' amount and purpose of L1 use: English as foreign language (EFL) classrooms in Iran. *Iranian Journal of Language Teaching Research, 3*(2), 67-81.

Burden, P. (2000). The use of the students' mother tongue in monolingual English "conversation" classes at Japanese universities. *The Language Teacher, 24*(6). Retrieved from http://www.jaltpublications.org/tlt/articles/2000/06/burden

Bureau of International Cooperation Strategy (2006). International program in Thai higher education institutions. Retrieved from http://www.inter.mua.go.th.

Cole, S. (1998). The language teacher: The use of L1 in communicative English classrooms. *The Language Teacher ,22*(12).

Hopkins, D. (2003). *Evaluation for school development*. Berkshire: Open University Press.

Kim, Y., & Petraki, E. (2009). Students' and teachers' use of and attitudes to L1 in the EFL classrooms. *Asian EFL Journal, 11*(4), 58-89.

Lin, A. M. Y. (2013). Classroom code-switching: Three decades of research. *Applied Linguistics Review, 4*(1), 195-218.

Macaro, E. (2001). Analyzing student teachers' code-switching in foreign language classrooms: Theories and decision making. *Modern Language Journal, 85*(4), 531-548. doi: 10.1111/0026-7902.00124.

Mahboob, A., & Cruz, P. (2013). English and mother-tongue-based multilingual education: Language attitudes in the Philippines. *Asian Journal of English Language Studies, 1*, 1-19.

Mangubhai, F. (2005). What can EFL teachers learn from immersion language teaching? *Asian EFL Journal, 7*(4), 203-212.

Nation, P. (2003). The role of the first language in foreign language learning. *Asian EFL Journal, 5*(2). Retrieved from http://www.asian-efl-journal.com/june_2003_PN.php

Nyika A. (2015). Mother tongue as the medium of instruction at developing country universities in a global context. *The South African Journal of Science, 111*(1/2), 1-5.

Piasecka, K. (1988). The bilingual teacher in the ESL classroom. In S. Nicholls & E. HoadleyMaidment (Eds.), *Current issues in teaching English as a second language to adults* (pp. 97-103).

Prodromou, L. (2002). From mother tongue to other tongue. *TESOL Greece Newsletter, 67*, 7-8.

Salem, L. M., & Foo, T. V. (2013). Mother tongue influence on writing apprehension of Jordanian student studying English language: Case study. *International Journal of English and Education, 2*(1), 46-51.

UNESCO. (2003). Education in a multilingual world: UNESCO education position paper Retrieved from http://unesdoc.unesco.org/images/0012/001297/129728e.pdf

Vygotsky, L. S. (1976). Play and its role in the mental development of the child. In J. Bruner, A. Jolly, & K. Sylva (Eds.), *Play: Its role in development and evolution*. New York: Basic Books.

Tang, J. (2002). Using L1 in the English classroom. *English Teaching Forum, 40*(1), 36-43.

Schweers, C. W., Jr. (1999). Using L1 in the L2 classroom. *English Teaching Forum, 37*(2), 6-9.

Walter, S. L. (2011). *Mother tongue-based education in developing countries: Some emerging insights.* http://www.educationfasttrack.org/media/library/blog/Steve-Walter-Mother-TongueInsights.pdf.

ONLINE ACADEMIC CLINIC ENHANCING MATHEMATICS PROBLEM SOLVING OF JUNIOR HIGH SCHOOL STUDENTS

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ABSTRACT

This research was to 1) to compare and develop an online academic clinic that encourages junior high school students in math problem‑solving, 2) to compare the ability of junior high school students for math problem-solving, before and after using an online academic clinic, 3) to compare the ability of junior high school students for math problem‑solving after using an online academic clinic to 75% criteria, and 4) to compare the ability of students in a strong, moderate and weak skilled group for math problem‑solving after using an online academic clinic. Sixty‑two grade 8 students of the demonstration school of Muban Chombueng Rajabhat University, the year 2021, were sampled. They were randomized from all junior high school students by simple random sampling. The instruments were used for collecting data were the basic questionnaire, conformity assessment, and competency assessment form of the junior high school students for math problem-solving before and after using an online academic clinic. The statistics was used for data analysis were mean, standard deviation, t‑test for a sample group, and ANOVA single factor. The research result was as follows; 1) There are two main components of an online academic clinic: a screening process to determine the student's level of math problem-solving ability and a process to train the learner's math problem‑solving ability. 2) The student's ability to solve math problems before and after using an online academic clinic; the most significant increase in picture problem-solving ability at level .05 and the least increase in symbolic problem-solving ability at level .05 3) The student's ability to solve math problems after using an online academic clinic was 75% above the threshold, and for students in a strong, moderate, and weak skilled group for math problems‑solving after using an online academic clinic, the ability to solve math problems at the same level with statistical significance at the level .05

Keywords: Mathematic Problem‑Solving, Junior High School Students, Distance Education,

Online Academic Clinic

1. Introduction

In the 21st century, Thailand has developed for every human being to acquire skills in life. Problem-solving skills are one of the most important skills that every human being has to deal with daily. Some people can solve the problem, and some people cannot. The solution is a process in which every student should be trained. In addition, Thailand has participated in the assessment of learners' competency from the Organization for Economic Co‑operation and developed (OECD) the main objective of the assessment is to prepare young people to have the basic potential and essential competence for life. In the 21st century, Program for International Student Assessment (PISA) assesses learners who are 15 years of age, which is the age of completing compulsory education. According to a follow-up to the PISA 2018 assessment of Thailand, it was found that in mathematics, 2.3% of Thai students had a high level of mathematics proficiency. The average OECD member country has 11% of students with this level of competence. At this high level, students can assess appropriate problem‑solving strategies (The Institute for the Promotion of Teaching Science and Technology (IPST), Ministry of Education, 2018). From the above, educational institutions are responsible for promoting and supporting Thai youth to develop skills in solving math problems because solving math problems is an important skill to develop the ability of Thai youth to live fully in the 21st century. The model in learning management for students to have a problem-solving process is very important students. However, the spread of the coronavirus cannot be managed in schools. Therefore, it is a problem that teachers need to find a solution to for students to learn the process of solving problems. Online learning is a form of distance education where educators need to create online classrooms to provide students with a space that they can use to exchange knowledge between teachers and students (Patchara Kongmoh, 2017). Learning management amid the coronavirus epidemic has made it difficult for educational institutions to effectively manage their learning to achieve the intended outcomes. The teaching style has been changed in distance learning or online learning. Therefore, teaching and learning to train students to solve math problems has been transformed into a distance learning or online format. Therefore, the researcher has studied and developed an online academic clinic that promotes solving math problems of junior high school students as a guideline for the development of distance learning or online format as an alternative to learning to continue to promote solving math problems of junior high school students.

2. Objectives

1) To study and develop an online academic clinic that encourages junior high school students in math problem-solving.

2) To compare the ability of junior high school students for math problem‑solving, before and after using an online academic clinic.

3) To compare the ability of junior high school students for math problem-solving after using an online academic clinic to 75% criteria.

4) To compare the ability of students in a strong, moderate, and weak skilled group for math problem-solving after using an online academic clinic.

3. Literature review

In an online academic clinical study that promotes math problem-solving for junior high school students, the researcher defined variables in this study; dependent variables - the process of managing learning online academic clinics at the junior high school level, and the dependent variable is the ability to solve mathematical problems. The assumptions consist of: (1) the junior high school students had higher math problem-solving ability after using the online academic clinic than before using the online academic clinic, (2) junior high school students had the ability to solve math problems after using the online academic clinic above 75%, and (3) the student's ability to solve problems after learning management using the online academic clinic; the strong group, the moderate group, and the weak group are capable of being at the same level.

4. Methodology

4.1 Population and sample

Scope of this study 1) The demographic scope used to develop an online academic clinic that promotes solving math problems for junior high school students is as follows: educational supervisors, lecturers of the Faculty of Education, and lecturers of the Faculty of Science and Technology, educational institute administrators, teachers of mathematics at the junior high school level and junior high school students. Sample groups were 4 educational supervisors, 4 lecturers of the Faculty of Education, and 4 lecturers of the Faculty of Science and Technology, 10 educational institute administrators, 20 teachers of mathematics at the junior high school level. 2) The population used to study the ability to solve math problems before and after using the online academic clinic were the junior high school students of the demonstration school of Muban Chombueng Rajabhat University. Sample groups were randomized from 62 students of the educational year 2021 of 3 levels of junior high school students - grades 7, 8, and 9.

4.2 Research instrument

1) Basic questionnaire for developing an online academic clinic that promotes math problem-solving for junior high school students

2) Online academic clinic development conformity assessment form that promotes math problem-solving for junior high school students

3) Mathematics problem-solving competence questionnaire before and after using an online academic clinic that promotes math problem-solving for junior high school students

4.3 Data collection

Step 1 Study an online academic clinic that promotes math problem-solving for junior high school students consists of 1) To study the information from the context theory of the management of education abroad and in the country by collecting data from research, website, and documents then summarize the issues from the study as a basic questionnaire for the development of online academic clinics. 2) To study guidelines for developing an online academic clinic by using a basic questionnaire the development of online academic clinic by questioning the sample group used in the study. When the researcher has studied and analyzed the basic

components of the online academic clinic, prepares a preliminary survey and leads to the next step of the development of the online academic clinic.

Step 2 The development of an online academic clinic that promotes math problem‑solving for junior high school students includes 1) Using the data obtained from the questionnaire to analyze and synthesize to develop an online academic clinic. 2) Lead an online academic clinic developed for 5 experts to determine conformance with a consistency assessment by analyzing the results of the accuracy using the Index of Item-Objective Congruence (IOC). 3) Bring the assessment results to improve and summarize the model of using a complete online academic clinic for further use. 4) Ask for the opinions of teachers, and administrators of various educational institutions in Ratchaburi province, regarding the suitability of using online academic clinics. And 5) Use the results from asking for opinions to improve and develop further. When the researcher analyzes, synthesizes, and improves the online academic clinical components, it creates an innovative online academic clinical model. Therefore, the researcher applied the online academic clinic to the students and studied the quality of the online academic clinic in the next step.

Step 3 A study of the ability to solve math problems before and after using an online academic clinic that promotes math problem-solving for junior high school students, consisting of

1) Assessed the sample group of students used to study their ability to solve math problems before using the online academic clinic with an assessment of their ability to solve math problems. Then record the results of the assessment in the log form.

2) Bring an online academic clinic to a sample group of students who study their ability to solve math problems.

3) Evaluate the sample group used to study the ability to solve math problems after using an online academic clinic with the math problem‑solving ability assessment, the results of the assessment are recorded in the log form.

4) To study the ability to solve math problems before and after using an online academic clinic compared to 75% criteria. The statistics used were mean, standard deviation, and t-test.

5) Study problem-solving abilities of students in the strong group, moderate group, and weak group after learning management by using an online academic clinic. The statistic used was ANOVA single factor.

4.4 Data analysis

From a study to develop an online academic clinic that promotes math problem-solving for junior high school students, it can be shown as follows;

1. An online academic clinical component that promotes math problem‑solving for junior high school students was;

1) study the data from the context theory of education abroad in the United States, England, and in the country by collecting data from research articles, websites, and reports to summarize the issues from the study as a basic information inquiry for the development of online academic clinics. It found that the process of the online academic clinic is consistent with solving students' math problems.

2) Study guidelines for developing online academic clinics by using a basic questionnaire for developing an online academic clinic that promotes math problem-solving for junior high school students. From the questionnaire of the samples used in the study and development of online academic clinics, it was found that there should be a training procedure according to Polya's problem- solving process. The problem- solving screening process of an online academic clinic should consist of a screening form based on Polya's problem-solving procedures. In addition, there should be criteria for assessing the ability to conduct an audit of answers.

2. The development of an online academic clinic that promotes math problem- solving for junior high school students

Analyze and synthesize data obtained from questionnaires to develop an online academic clinic that promotes math problem- solving for junior high school students. The result is an online academic clinical The model that promotes math problem-solving for junior high school students.
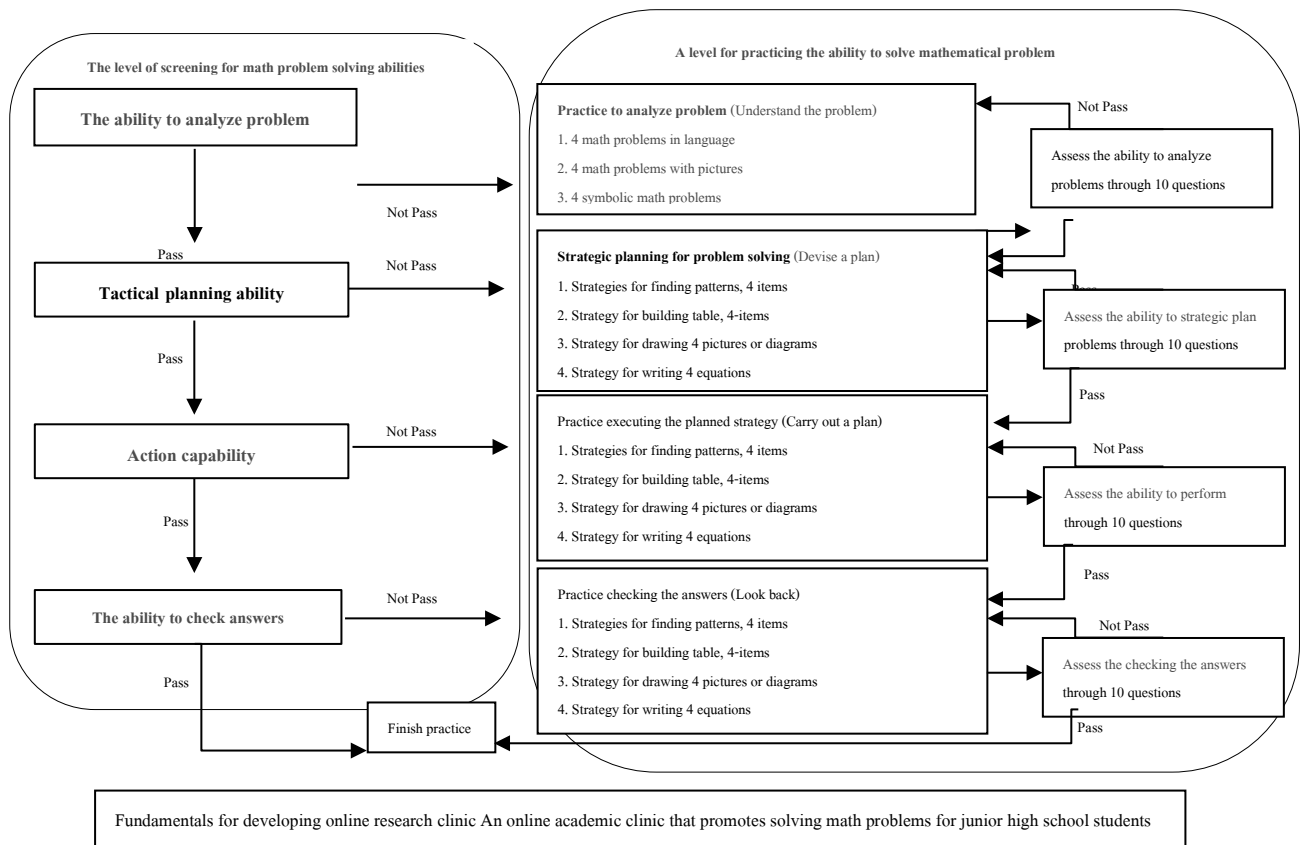
3. Study the ability to solve math problems through the use of an online academic clinic that promotes math problem-solving for junior high school students

The results of an analysis of math problem- solving ability before and after using an online academic clinic promoting math problem-solving among junior high school students are as follows.

Table 1 Comparison of the ability to solve symbolic problems, which has 58 students who did not pass the test.

	Full score	$\overline{X}$	S.D.	t	df	P
Before	20	9.24	40.29	-11.27	57	0.000
After	20	18.00	2.67			

**p<.05

   From Table 1, it was found that the ability to solve symbolic problems after using the online academic clinic was significantly higher than before at the .05 level.

Table 2 Comparison of results of the ability to solve problems with pictures, which has 51 students who did not pass the test.

	Full score	$\overline{X}$	S.D.	t	df	P
Before	20	7.41	28.40	-14.17	50	0.000
After	20	17.19	2.76			

**p<.05

   From Table 2, it was found that the ability to solve picture problems after using an online academic clinic was significantly higher than before at the .05 level.

Table 3 Comparison of results of the ability to solve language problems, which has 32 students who did not pass the test.

	Full score	$\overline{X}$	S.D.	t	df	P
Before	20	7.93	31.41	-9.93	31	0.000
After	20	17.34	1.91			

**p<.05

   From Table 3, it was found that the ability to solve language problems After using the online academic clinic, was significantly higher than before at the .05 level.

   4. A study of the ability to solve math problems before and after using an online academic clinic and compared to the 75 percent criteria found that the average score after using the online academic clinic was 75 percent higher

   5. A study comparing the ability to solve math problems after learning management by using online academic clinics classified by competence found that Comparison of the ability of students in the strong group, moderate group, and weak group in solving problems after using the online academic clinic. It is shown in the following table.

Table 4 Comparative results of the student's abilities of the smart group medium group and weak group in solving symbolic problems after using an online academic clinic, which has 58 students who did not pass the test.

Source of variance	SS	Df	MS	F	P-value
Between groups	20.52	2	10.26	4.28	.01
Within the group	129.48	56	2.40		
Total	150.00	58			

**p<.05

From Table 4, it was found that after using the online academic clinic, there was no difference in the symbolic problem-solving abilities of the students in the strong group, the moderate group, and the weak group.

Table 5 Comparison of the abilities of students in the strong group, middle group, and weak group in solving picture problems, which has 51 students who did not pass the test.

Source of variance	SS	Df	MS	F	P-value
Between groups	17.94	2	8.97	3.65	.03
Within the group	120.13	49	2.45		
Total	138.07	51			

**p<.05

From Table 5, it was found that after using the online academic clinic, the picture problem‑solving abilities of the students in the strong group, the moderate group, and the weak group were not different.

Table 6 Comparison of the ability of students in the strong group, moderate group, and weak group in solving language problems, which has 32 students who did not pass the test.

Source of variance	SS	Df	MS	F	P-value
Between groups	9.12	2	4.56	2.46	.10
Within the group	55.42	30	1.84		
Total	64.54	32			

**p<.05

From Table 6, it was found that after using the online academic clinic, there was no difference in the language problem-solving abilities of the students in the strong group, moderate group, and weak group.

5. Conclusion

1) There are two main components of an online academic clinic for the results of an online academic clinical trial that promotes math problem-solving in junior high school students: a screening process to determine the student's level of math problem‑solving ability and a process to train the learner's math problem‑solving

ability. 2) The ability to solve math problems of junior high school students before and after using an online academic clinic that promotes math problem‑solving for symbolic, graphic, and linguistic math problems of people who access online academic clinics has increased statistically significant at the level of .05 3) The math problem‑solving ability of junior high school students after using an online academic clinic promoting math problem-solving was 75% above the threshold. And 4) The ability to solve problems after learning management using online academic clinics of students in the strong group, moderate group, and weak group; after using the online academic clinic, students were statistically significant at the level .05 of the same level of math problem-solving.

6. Discussion

Online academic clinics can improve students' ability to solve math problems because the main component is the screening process to determine learners' proficiency. When an instructor knows a student's level of competence, he or she will be able to find a method or process of training that responds to the learner. The researcher thinks that this two‑step process is important in helping learners come up with a problem‑solving process that meets their purpose. This is consistent with Puntambekar, & Kolodner (1999), who said that an important element of learning is continually diagnosing the learners' level of understanding to be able to manage them properly. The screening process has 4 main components of the solution. Step 1, analyzing the problem. Step 2, planning to solve the problem. Step 3, implementation of the solution plan. Step 4, check the answer. Online academic clinics can develop students' ability to solve math problems after use to be higher than before up to 75% because the training process is a step‑by‑step process. Students can better remember the problem‑solving skills in each step. The researcher thinks that having students practice problem-solving in a way that separates problems into steps can help learners solve the problems in each step clearly and uncomplicated. This is consistent with Wood, Bruner, & Ross (1976), the way that an instructor enhances learning requires the task of minimizing the task to be uncomplicated, minimizing the task to make it easier, with each step having essential and important skills that will be easy to provide feedback to learners. An online academic clinic is a distance learning model that can check students' basic knowledge and improve their ability to solve math problems that the student's ability to solve math problems arises from practice. That is a step‑by‑step approach that corresponds to the learner's ability. In accordance with Wanlapa Areerat (2000) said that the principles of teaching mathematics ‑ teaching should consider differences between individuals. Moreover, teachers should organize lessons by considering the smart children and the slow learners. The online academic clinic has a step‑by‑step problem‑solving practice model where students can practice and check their answers on their own. The researcher thinks that, to form a distance education in solving math problems, teachers should provide online-style quizzes to test learners' abilities in the first place. Then break the training process into steps of problem-solving. So that students can practice and check the answers in each step successfully by themselves. This is consistent with Krulik (1977), teaching an effective problem must follow a sequence of steps. 1) read the problem and understand what the problem asks, and what information is there, and then draw a diagram. 2) Find the relationship between the information given

by the problem and the information that the problem wants to know, by thinking back, have we encountered a problem like this before? and started making several assumptions. 3) Find the right way to test the hypothesis. And 4) check the answers to see how accurate the findings are.

7. Suggestion

7.1 Suggestions for applying the research results

1) Because the online academic clinic is a learning media in the form of distance education. Initially, the teacher should survey the student's devices to whether they are ready to use the media or not.

2) Since the online academic clinic is learning materials in the form of distance education, teachers should design the materials according to the equipment students use. The screening process should be divided into sub‑topics that students can do. Because it will be good for teachers to know the flaw of the learners more precisely. When the teacher knows the flaw of the students at the point, it will help the teacher to design learning that is more responsive to the students.

7.2 Suggestions for future research

1) An online academic clinic should be compared their math problem‑solving abilities with those of the learners in the classroom.

2) An online academic clinic should be monitored learners' feelings during classes to develop more effective learning materials.

3) An online academic clinic should be added more problems, with each student being given a different problem for a more challenging problem.

4) An online academic clinic should have steps for students to create problems from their surroundings.

8. Acknowledgments

9. Reference

Areerat, W. (2000). *Teaching mathematics at the elementary level.* Khon Kaen University.

Khongmoh, P. (2017). *Guidelines for developing online classrooms for teachers of the Rajamangala University of Technology Thanyaburi*. Office of Academic Resources and Information Technology, Rajamangala University of Technology Thanyaburi.

Krulik, S., & Rudnick, J. A. (1995). *The new sourcebook for teaching reasoning and problem solving in elementary school.* Allyn & Bacon.

Program for International Student Assessment (PISA). (2019). *The Institute for the Promotion of Teaching Science and Technology (IPST). 2021. PISA Assessment Results 2018; Reading, Mathematics, and Science*. https://pisathailand.ipst.ac.th/pisa/reports/

Puntamberkar, S., & Kolodner, J. L. (1999). Toward implementing distributed scaffolding: Helping students learn science from design. *Journal of Research in Science Teaching, 42*(2)*,* 189.

Wood, D., Bruner, J. S., & Ross, G. (1976). The role of tutoring in problem solving. *Child Psychology & Psychiatry & Allied Disciplines, 17*(2)*,* 89–100*.* https://doi.org/10.1111/j.1469-7610.1976.tb00381.x

A CORRELATIONAL STUDY ON TEACHERS' PERCEPTIONS OF PRICIPAL'S TRANSFORMATIONAL LEADERSHIP PRACTICES AND SCHOOL CLIMATE WITH THEIR SELF-EFFICACY AT ST. THERESA'S HIGH SCHOOL, MUMBAI, INDIA

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ABSTRACT

The purpose of this study is to determine whether there is a significant relationship among the teachers' perceptions of principal's transformational leadership practices and school climate with their self-efficacy at St. Theresa's high school, Mumbai, India. The study was conducted during the academic year of 2021‑ 2022. A total of 101 teachers participated in this study. The study evaluated teachers' perceptions of principal's transformational leadership practices and school climate with their self-efficacy with the descriptive analysis of means and standard deviations. The relationship among three variables were analyzed by using correlational analysis (Multiple correlation coefficient).

The study utilized three instruments to collect the data with respect to each variable, for principal's transformational leadership practices the Multifactor Leadership Questionnaire (MLQ) form 5X-Short (Bass and Avolio, 1995) was adopted. For school climate variable the Organizational Climate Index (OCI), a short organizational climate descriptive measure for schools developed by Hoy, Smith, and Sweetland (2002) was employed. Self-efficacy for teaching was measured by the use of the Teachers' Self-Efficacy Scale (TSES), comprising of three items (short-form of the whole scale comprised of three subscales: self-efficacy for classroom management, instructional strategies, and student engagement), created and validated by Tschannen-Moran and Woolfolk Hoy (2001). The findings indicated that the teachers' perceptions of principal's transformational leadership practices were very high, averaging 4.80 out of 5.0, and the same for school climate with the mean of 4.23 out of 5.0. For self‑efficacy, the mean was very high, averaging 4.81 out of 5.0. The multiple correlation coefficient of the teachers' perceptions of principal transformational leadership practices and school climate with their self-efficacy the findings showed significantly positive correlation with $r(101) = 92^{**}$, $p < .001$. Results confirmed the initial study hypothesis that there was a significant relationship among variables at the target school.

Keywords: Transformational Leadership, Teachers Self-efficacy, School Climate

1. Introduction

While the world has been dealing with the Covid 19 pandemic, many industries, companies, organizations, and institutions were closed or shut down owing to the lack of effective leadership or timely measures to provide directions and lead the institutions or corporations to tackle the numerous and unexpected problems. Schools, a formal agency of education, serve as one of the prominent pillars – among the political, social and economic aspects in our lives. The principal leadership within this framework is a foremost link with the educational system as a whole and school in particular (Anshu Nard et al., 2020). The success of an organization depends mainly on the quality of its leadership (Kurland et al., 2010). Leadership is a combination of ability and knowledge in bringing a group of people together for a common purpose and galvanizing them into action with a view to realize this purpose (Zembat et al., 2010).

2. Literature Review

Transformational Leadership:

Transformational Leadership as an idea was first proposed in 1978 by James McGregor Burns, later expanded by Bernard Bass. Although they based their works on business executives, army officers and political leaders, the principles of transformational leadership could be extended to schools (Liontois, 1992). In order to forge a new path of growth and prosperity for the organization, transformational leaders look to generate fresh ideas and viewpoints. In order to prepare the organization's members to make fundamental changes to the foundation and basis of the organization and to acquire the necessary capabilities for moving in new directions and achieving higher ideal performance peaks, they mobilize members of the organization by fostering commitment, passion, and loyalty among managers and staff (Mirkamali et al., 2014, p.23). Therefore, in order to achieve an organization that would be beneficial to every shareholder, the people must come together and cooperate on the basis of values, interests and social choice. In schools, transformational leaders dealt with finding a way to become successful in collaboratively defining the essential purposes of teaching and learning and then empowering the entire school community to become energized and focused (Liontois, 1992).

These leaders move organizations toward the future, recognize environmental needs and facilitate appropriate changes. They also create perspectives of potential opportunities for employees and develop commitment to change, culture improvement and the need to design new strategies for efficiently use of energy and sources. Leadership is emerged from the advent of social life. Some people are put together and begin their social life and influence each other. Transformational leadership is achieved when leaders and followers motivate each other for higher motivation and morality (Korejan, M & Shahbazi, Hasan, 2016).

These leaders act as mentors and advisors and pay attention to personal development, learning, and supplying the needs of the employees. They provide challenges, a sense of mission, broader perspectives, respect, and trust for the employees, and they act as role models for their employees. They create an atmosphere of trust and motivate employees to work for the organization beyond their self-interests (Khorshid & Pashazadeh, 2014, p. 7). Transformational leaders let their followers feel as a part of the organization. Such leaders had a strong

inspirational vision to encourage the employees of the organization to care about the company's goals more than their own goals and interests. Such leaders were believed to be enthusiastic and energetic (Dragoni, 2005).

School Climate:

School climate had long been studied in the educational context. However, studies were separately conducted on different levels such as primary (Halpin & Croft, 1962) middle schools (Hoy et al., 1998), high schools (Hoy et al., 1991) and universities and colleges (Pace & Stern, 1958). School climate was described by Daryanto and Tarno (2015) as a set of qualities that gave rise to the atmosphere of each school. It included different factors that were present in the school environment such as its structures, curriculum, principal leadership, social interaction within the school, and the learning environment within it. In addition, it may involve the implementation of tradition, work conduct and morale in the organization. Furthermore, two perceptions on school climate which they described as openness and health were proposed.

A positive school climate refers to one which includes having a caring adult at school and supportive relationships with teachers, norms of respect for diversity, and perceived peer support (Volk, 2020). In contrast, a negative school climate is characterized by students' feelings of alienation from teachers, lack of peer and teacher support, and perceived tolerance of bullying (Ebbert and Luthar, 2021). A negative school climate affects and may worsen the students' social-emotional and psychological welfare which leads to mental health problems in which some might have long-term effects.

A direct influence of school climate has also been proven in student achievement. Aside from the students, the school climate also affected teachers. Some of the school climate aspects that had been studied were found to have resulted in high academic achievement among students as well as the teachers' characteristics such as their self-efficacy and trust among students in setting high but achievable goals (Goddard et al., 2000), teachers' efficacy, effective leadership, and positive inter -relationships among students, teachers and administrators, and school resource allocation (Wang & Degol, 2016). Unsupportive administration, discipline difficulties among students, and decision-making issues were school climate factors associated with reduced retention among teachers (Osterman, 1994).

Teachers' Self-Efficacy:

Bandura (1994) defined self-efficacy as individuals' beliefs about their "capabilities to produce designated levels of performance that exercise influence over events that affect their lives. Self-efficacy beliefs determine how people feel, think, motivate themselves and behave" (p. 78). It was a concept which dealt with people's ability to organize their plans, thoughts, or actions, the efforts they make, and the strategy they use to deal with challenges (Tschannen-Moran & Hoy, 2007). With regard to teaching issues, Teachers' Self- efficacy (SE) includes teachers' beliefs in their ability to increase the rate of their students' learning even when they might face obstacles (Ross & Bruce, 2007).

Self-efficacy beliefs were characterized as the major mediators for our behavior, and importantly, behavioral change. Over the last quarter of the century, Bandura's works continued to defend the proposition that our beliefs in our abilities powerfully affect our behavior, motivation, and ultimately influence our success or failure (Bandura et al., 2003). Bandura (1997) suggested that because self-efficacy beliefs were explicitly self-referent in nature and directed toward perceived abilities given specific tasks, they could be powerful predictors of behavior. The related research literature had ever since supported this proposition. Educationally speaking, self-efficacy beliefs were related to academic performance and self-regulated learning for both teachers and students. In the same vein, Tschannen-Moran and Woolfolk Hoy (2001) defined teacher efficacy as a teacher's "judgment of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated" (Pearce, 1981, p 783).

3. Methodology

For this study, a quantitative method design as defined by Creswell (2013) was chosen. For data collection, the survey instruments were adopted from those validated by previous studies. The quantitative data were collected and analyzed by the use of descriptive statistical analysis. Correlational Analysis (Multiple correlation coefficients) was employed to examine the research hypothesis. The population of this study included 101 fulltime teachers from St. Theresa's high school in Mumbai, India in the academic year of 2021- 2022. The first research objective is to determine teachers' perceptions of principal's transformational leadership practices. The instrument used in this research measured leadership style using the MLQ on a five-point scale (1= not at all to 5 = frequently) with the total population sample size of 101. The MLQ was chosen as it has been validated in numerous studies in identifying transformational leadership (Bass and Avolio, 1995).

The second research objective is to determine the teachers' perceptions of school climate. To measure this, the Organizational Climate Index (OCI) was adopted with the Likert five-point scale (1 = Never Occurs, 2 = Rarely Occurs, 3 = Sometimes Occurs, 4 = Often Occurs, 5 =Always Occurs). The OCI comprised of collegial leadership, professional teacher behavior, achievement press and institutional vulnerability.

The third research objective is to determine teachers' perceptions of their self –efficacy. To measure this variable, the Teachers' Sense of Efficacy Scale questionnaire (short form)- consisting of three subscales: self-efficacy for student engagement, instructional strategies, classroom management was employed with the Likert five–point scale: (1 = Nothing, 2 = Very little, 3 = Some influences, 4 = Quite a bit, 5 =A great deal). The reliability for three variables were identified, the Cronbach's coefficient alpha was computed on all. The Cronbach's alpha values of 0.60-0.70 were to be used as the lower limits of acceptability (Hair et al., 1998). Descriptive statistics of the study was conducted to provide an overview of the distribution of participants. Correlational Analysis (multiple correlation coefficient) was used to determine whether there is a significant relationship of teachers' perceptions of principal's transformational leadership practices and school climate with their self –efficacy.

4. Findings and Results

The aim of this research is to identify whether there is a significant relationship of teachers' perceptions of Principal's transformational leadership practices and school climate with their self-efficacy at St. Theresa's High School, Mumbai, India. The first step to address this objective was to calculate bivariate correlations between teachers' perception of principal transformational leadership practices and school climate (independent variables for this study) and teachers' self- efficacy (dependent variable of this study) at St. Theresa's high school, Mumbai, India.

Table 1 below shows the bivariate correlation among teachers' perception of Principal's transformational leadership practices, school climate and their self- efficacy at St. Theresa's high school, Mumbai, India.

Table 1 Bivariate correlations of teachers' perceptions of Principal's transformational leadership practices and school climate with their self- efficacy

Variables	1	2	3
1.Teachers' perceptions of principal's transformational leadership practices	-	-	-
2. School climate	.88** (<.001)	-	-
3. Self- efficacy	.92** (<.001)	.84** (<.001)	-

It denotes a statistically significant relationship (statistical significance level at p= .05, two-tailed) while p-value appears within parentheses below the correlation coefficients.

After examining the bivariate correlations between independent variables in this study, the teachers' perceptions of the principals' transformational leadership practices were found to be significantly and very strongly correlated with their perceptions of school climate (r = .88, p < .001). As described in Table 1, the teachers' perceptions of the principal's transformational leadership practices were found to be very strongly correlated with their self- efficacy (r =.92, p < .001). Furthermore, the teachers' perceptions of school climate were found to be very strongly correlated with their self- efficacy (r = .84, p <.001).

The findings revealed that there was a significant relationship of teachers' perceptions of principal's transformational leadership practices and school climate with their self- efficacy at St. Theresa's High School, Mumbai, India at .05 level. The findings suggested that there was a significant relationship among teachers' perceptions of principal's transformational leadership practices and school climate with their self- efficacy at St. Theresa's High School, Mumbai, India. Based on the current research findings, though the responses from the teachers about the principal's transformational leadership practices were very healthy, it is recommended that school principals and administrators find ways to improve their leadership practices. Particularly under the

idealized influence behavior component, the findings specified that the importance of having a strong sense of purpose was ranked at low score among the five components items.

5. Conclusion

This study was to identify if there was a significant relationship of teachers' perceptions of principal's transformational leadership practices and school climate with their self- efficacy at St. Theresa's High School, Mumbai, India. For this purpose, a quantitative correlational research design was used to investigate the teachers' perceptions of principal's transformational leadership practices and school climate with their self- efficacy. The total population of this study were the 101 teachers who were working at St. Theresa's High School, Mumbai, India, during the academic year of 2021-2022. Results of this study revealed that teachers whose principals involved them in decision-making concerning school matters were found to be satisfied with their job.

6. Recommendations

1. Based on the current research findings, though the responses from the teachers about principal's transformational leadership practices were very encouraging, school principals and administrators may continue to find ways to improve their leadership practices to be prepared for any unexpected disruptions or challenges in the future.

2. Though the results for teachers' self –efficacy were very encouraging. Teachers may consider continuous improvement of their self-efficacy in terms of student engagement, instructional strategies, and classroom management. There is no place to be lethargic in teaching; they can always try adopting innovative ways in teaching and equipping themselves with a sea of knowledge.

3. Researchers who are keen on similar study may consider conducting their study with the focus on comparative analysis of perceptions between male and female teachers, age groups or teaching time to enrich the research in the area of transformational leadership, school climate and self-efficacy.

7. References

Ashley M. Ebbert & Suniya S. Luthar (2021) Influential domains of school climate fostering resilience in high achieving schools, *International Journal of School & Educational Psychology, 9*(4), 305-317, DOI:10.1080/21683603.2021.1898501

Bandura, A. (1994). Self-Efficacy. In V. S. Ramachaudran (Ed.), Encyclopedia of Human Behavior (Vol. 4, pp. 71-81). *New York: Academic Press*. (Reprinted in H. Friedman (Ed.) (1998). Encyclopedia of Mental Health. *San Diego: Academic Press*). https://doi.org/10.4236/jss.2013.16001

Bandura, A. (1997). *Self-efficacy: The exercise of control.* W H Freeman/Times Books/ Henry Holt & Co.

Bandura, A., Caprara, G. V., Barbaranelli, C., Gerbino, M., & Pastorelli, C. (2003). Role of affective self-regulatory efficacy in diverse spheres of psychosocial functioning. *Child development*, *74*(3), 769–782. https://doi.org/10.1111/1467-8624.00567

Daryanto, & Tarno. (2015). *Pengelolaan Budaya dan Iklim Sekolah*. Jakarta: Gava Media.

Dragoni, L. (2005). Understanding the Emergence of State Goal Orientation in Organizational Work Groups: The Role of Leadership and Multilevel Climate Perceptions. *Journal of Applied Psychology, 90*(6), 1084– 1095. https://doi.org/10.1037/0021-9010.90.6.1084

Goddard, R. D., Hoy, W. K., & Hoy, A. W. (2000). Collective Teacher Efficacy: Its Meaning, Measure, and Impact on Student Achievement. *American Educational Research Journal*, 37(2), 479–507. https://doi.org/10.2307/1163531

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (1998). Multivariate data analysis. Upper Saddle River. *Multivariate Data Analysis (5th ed) Upper Saddle River*, 5(3), 207-219.

Hoy, Wayne & Hannum, John & Tschannen-Moran, Megan. (1998). Organizational Climate and Student Achievement: A Parsimonious and Longitudinal View. *Journal of School Leadership*. 8. 10.1177/105268469800800401.

Korejan, M & Shahbazi, Hasan. (2016). An analysis of the transformational leadership theory. *Journal of Fundamental and Applied Sciences*. 8. 452. 10.4314/jfas.v8i3s.192.

Kurland, Hanna & Peretz, Hilla & Hertz-Lazarowitz, Rachel. (2010). Leadership style and organizational learning: The mediate effect of school vision. *Journal of Educational Administration*. 48. 7-30. https://doi.org/10.1108/09578231011015395

Khorshid, S., & Pashazadeh, A. (2014). The effect of transformational leadership on organizational learning capabilities with respect to the mediating role of organizational intelligence, *Journal of Change Management*, 6(11), p.7 http://dx.doi.org/10.4314/jfas.v8i3s.192

Liontos, L., (1992). Transformational Leadership, ERIC Digest, #72. www.ed.databases/ERIC_Digest/ed347636.html

Mirkamali, M., Shateri, K., & Uzbashi, A. (2013). Explaining the role of transformational leadership in the field of organizational creativity, *Journal of Innovation and Value Creation,* 2, p. 23. https://www.etasr.com/index.php/ETASR/article/view/765

Narad, A., Kaitano, D. N. H., & Lakhanpal, S. (2020). Leadership styles and organizational climate as predictors of teacher effectiveness in secondary schools teachers. *European Journal of Molecular and Clinical Medicine*, 7(7), 3446-3456. https://ejmcm.com/article_5180.html

Osterman, P. (1994). Supervision, discretion, and work organization. *The American Economic Review*, 84(2), 380-384. https://ideas.repec.org/a/aea/aecrev/v84y1994i2p380-84.html

Pearce, J. L. (1981). Bringing some clarity to role ambiguity research. *Academy of Management Review*, 6(4), 665-674. https://doi.org/10.5465/amr.1981.4285727

Ross, J. A., & Bruce, C. (2007). "Professional development effects on teacher efficacy; Results of randomized field trial". *The Journal of Educational Research, 101* (1), 50-66. 101:1, 50-60, DOI: 10.3200/JOER.101.1.50-60

Tschannen-Moran, M., & Woolfolk Hoy, A. (2007). The differential antecedents of self-efficacy beliefs of novice and experienced teachers. *Teaching and Teacher Education*, 23, 944-956. https://doi.org/10.1016/j.tate.2006.05.003

Volk, D. T. (2020). *An examination of the relationship between school climate, self-determined academic motivation, and academic outcomes among middle and high school students*. [Dissertation]. USA: University of Connecticut, 2435. https://opencommons.uconn.edu/dissertations/2435

Wang, M. T., & Degol, J. L. (2016). School climate: A review of the construct, measurement, and impact on student outcomes. *Educational Psychology Review*, 28, 315–352. https://doi.org/10.1007/s10648-015-9319-1

Zembat, Rengin & Koçyiğit, Sinan & Tuğluk, Mehmet & Dogan, Handan. (2010). The relationship between the effectiveness of preschools and leadership styles of school managers. Procedia - *Social and Behavioral Sciences*. 2. 2269-2276. https://doi.org/10.1016/j.sbspro.2010.03.321

DEVELOPMENT OF THE CHILDREN'S COUNCIL FOR A STRONG COMMUNITY OF LOCAL ADMINISTRATIVE ORGANIZATIONS IN CHIANG MAI PROVINCE

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ABSTRACT

This research aimed to 1) study the level of development of the Children's Council for Strong Communities of the local administrative organizations in Chiang Mai Province. 2) study the factors influencing the development of the Children's Council for Strong Communities of the local administrative organizations in Chiang Mai Province. A questionnaire was used as a tool to collect data from the management departments of the local administrative organizations in Chiang Mai province. The sample consisted of 400 children. The statistics used in the data analysis were mean, standard deviation, and multiple regression analysis. The results showed that 1) the development of the Children's Council for a strong community in the Chiang Mai provincial local administrative organization is at a high level. When considering each aspect, it was found that the right to education had the highest average, followed by the right to survival and promotion of life, the right to protection, and the right to use child labor, respectively. 2) factors of executive leadership, government policies, social sector participation, and development promotion projects affecting the development of the Children's Council for strong communities of the local administrative organizations in Chiang Mai province.

Keywords: Children's Council, Local Administrative Organizations Chiang Mai Province

1. Introduction

The development of children's and youth activities is one of the important tasks that the local government organization must realize. It must realize the value of children and youth as important resources that play a role in the development of the locality and country in the future. Because the local government organization is the main agency that is close to the people, it is responsible for providing public services for the benefit of children, youth, and people in the area by virtue of the Child and Youth Development Promotion Act of Thailand. B.E. 2550 and its amendment (No. 2) B.E. 2560, which came into force on 14 June 2017, have set guidelines and

improved methods for promoting child and youth development to be appropriate and consistent with current social conditions By stipulating that there is a sub-district child council, municipal child council, district child council, provincial children's council, Bangkok Children's council, and the Children's Council of Thailand, which have a connected structure, including government agencies, local government organizations, private organizations, and civil society, support the Children's Council to participate in the development of children and youth. And the Ace establishes plans and procedures for decentralization to local administrative organizations, B.E. 2542 (1999), sections 16 and 17 that define the promotion and development of children and youth in all forms. Therefore, the first important task of the local government organization is to establish the Children's Council to be a network of youth groups working in various fields. Children and youth collaborate in a systematic and concrete way to carry out a joint mission to find solutions to children and youth problems at the local level and to jointly organize activities that benefit the community and society. Whereas each group continues to carry out its main mission according to family conditions or occupational guidelines without losing the identity and philosophy of the group. There is a link in the form of establishing an organization that has a clear relationship with each other. (Local Administrative Organization, 2017).

Children's Councils, which consist of the Provincial Administrative Organization, Municipalities, and Sub-District Administrative Organizations, have a primary mission to coordinate with partners in both the public and private sectors to support the creation of children's and youth organizations in the community. The management project of the Children's Council of Thailand has a very interesting format. The implementation of the Children's Council requires support from various network partners, including government agencies, the private sector, community organizations, and other people's networks. Therefore, the parties should support the work of the Council of Children. One of the important network partners is a local government organization, especially municipalities and sub-district administrative organizations, which are local organizations according to the law established to care for and promote the quality of life of people in the area of responsibility, including children and youth. Therefore, local administrative organizations need to allocate budget resources to each location with a plan to benefit the quality of life of children and youth. The local government organization, which is the main party with the duties and resources to promote the activities of the Council of the Children, to maximize the benefits of the operation of the local administrative organization for children, and to resolve the obstacles to the implementation of the Council of the Children in strengthening the Children's Council to create a happy community. (Local Administrative Organization, 2017).

The Chiang Mai Children's Council has an idea set up in accordance with the Child and Youth Development Promotion Act, B.E. 2550, which states that the Children's Council has the following duties: 1) Coordinate between the district children's councils to exchange knowledge and experience of children and youth in the province. 2) It is a center for learning and disseminating science, education, sports, and culture. 3) Promote and support the District Children's Council and educational institutions in the provinces to organize useful activities for children and youth. 4) To be the center for coordinating government agencies and private sectors to carry out activities of the Children's Council in the area, inviting and explaining to children and youth to join

forces to organize activities regularly and continuously 5) Collaborate with the provincial government and non-governmental organizations to develop children and youth by providing opportunities for participation.6) Comments on the development of policies, plans, projects, activities, and government budgets for the development of children and youth. 7) Propose opinions on youth development activities affecting children and youth; report on council implementation to the provincial governor. 8) Comply with the National Child and Youth Development Promotion Act B.E. 2550, and 9) Issue meeting and operation regulations in accordance with their powers and duties. In addition, various projects have been organized to continuously add creative areas for children by driving them into each area in Chiang Mai. There are ongoing projects and activities, such as projects to improve the quality of life and potential of social target groups, activities to promote the participation of children and youth networks; and activities to promote the increase of creative space for children and youth. (Khuanglaon Chiang Mai) (Child and Youth Council Chiang Mai Provincial, 2019).

From the importance of establishing the Council of Children above. The researcher, as an administrator under the local administrative organization, has a mission to be responsible for the Children's Council from planning the project implementation to budgeting and implementing the project or activities of the Children's Council to meet the specified goals. He also realized and recognized the importance of child development in Chiang Mai which relies on the leadership factors of local administrative organizations, government policies, social sector participation, and development promotion projects. Provide children with a good quality of life and a happy environment by strengthening the Children's Council. The researcher is interested in studying "Factors Influencing the Development of the Child Council for a Strong Community of the Chiang Mai Provincial Local Administrative Organization" to apply the findings from the study as a guideline in formulating the Child Council Development Policy to build strong communities in the future and be effective even more.

2. Objectives

(1) To study the level of development of the Children's Council for Strong Communities of the local administrative organizations in Chiang Mai Province.

(2) To study the factors influencing the development of the Children's Council for Strong Communities of the local administrative organizations in Chiang Mai Province.

3. Literature review

3.1 Theory and related research

Concept of establishing the Council of Children and Youth

Thailand has had the idea of developing the youth power of the nation since 1911, when King Rama VI gave birth to the Thai Boy Scouts with the idea and policy on youth. Youths are important members of the family and the nation's society. There is a need to create youth to be quality adults through self-development, group development, and service to others. And on November 22, 1973, the first national youth policy was announced. The goal is to develop youth to the attributes of faith in democracy, discipline, adherence to unity, altruism,

collective, honesty, originality, popularity, and proud in being Thai, as well as having complete health both physically and mentally (Office of Youth Promotion and Protection, 2013).

The Child and Youth Development Plan during the 9th National Economic and Social Development Plan (2002-2006) adopted the concept of national development of the 8th National Economic and Social Development Plan (1997-2001) by putting people at the center of development. As a result, child and youth development activities are systematic activities to meet the needs of each age range and cover all living conditions. Therefore, it has established the main methods for providing services to improve the quality of life of children and youth to their full potential. It covers the basic needs of an international standard for normal child groups as well as hardship and gifted groups so that relevant agencies and organizations can use them as a tool to fulfill their obligations accordingly. In the same direction, which has the same purpose 1) to enable children and youth to develop physically, mentally, and intellectually to their full potential and appropriate for their age. 2) to adjust the service management method from the field of development to provide services according to the development of each age to be an international standard. 3) to adjust the administrative roles of government agencies to promote and encourage families and all parts of society to take responsibility for child and youth development. (National Economic and Social Development Board, 2016).

The 5th National Youth Policy announced on July 19, 2002, defines youth as valuable, dignified, and potential human resources that will be an important force in the development of society and the nation. Therefore, youth development requires appropriate policies under various conditions and guarantees both within and outside the country to enable the development process. The youth of the nation have operated effectively and have had participation from all sectors of society. The Cabinet, therefore, approved the National Youth Policy and the Long-term Child and Youth Development Plan 2002-2011 on January 15, B.E. 2545, with the announcement of national policies as follows: (Office of Welfare Promotion and Protection of Children, Youth, the Underprivileged, the Disabled, and the Elderly (SorThor.), 2016) 1) Promote and support family institutions to play a key role in raising youth to develop their full potential. 2) Support other important organizations in society, such as educational institutions, religious institutions, professional institutions, political institutions, and governments at all levels. In particular, the Tambon Administrative Organization, the organization, the private sector, and the mass media institutions play a role in coordinating seriously and continuously in the development process and in enhancing the youth's life experience in a creative way. 3) Support to provide services to youth both in government and non-government sectors who perform their duties efficiently, without discrimination, work honestly, and can be audited. 4) Support legislation and law enforcement to keep up with the situation and changes that affect youth development. 5) Support for monitoring and evaluation of youth development with systematic indicators. 6) Encourage youth of each age to receive services according to their rights and basic needs according to international standards, both in quantity and quality. 7) Encourage young people to learn, analyze data, have a sense of responsibility, and make decisions based on rational, ethical principles in the process of adapting to a changing society happily. 8) Encourage youth to use knowledge of modern science based on wisdom, religious principles, and sufficiency economic philosophy to benefit their lives and careers. and 9)

Encourage youth of each age to participate in the constructive social promotion in community affairs and strengthen international friendships from the 6th National Youth Day Organizing Committee Meeting, 2004, on September 13, B.E. 2547, with the former Deputy Prime Minister (Professor Purachai Piemsomboon)

The chairman approved the establishment of the Child and Youth Council at the level of 4 provinces of Na Rong, namely Chiang Rai, Surin, Prachin Buri, and Satun Provinces, by giving the Office of Welfare Promotion and Protection of Children, Youth, the Underprivileged, the Disabled, and the Elderly (SorTor.) as the host. As for the operation at the provincial level, the Provincial Administrative Organization (PAO) is the main unit for the establishment of the Provincial Youth Council. When the National Youth Promotion and Coordination Committee (YOT) had been restructured in accordance with the Cabinet resolutions, the Chairman of the YOTC, the Deputy Prime Minister (Mr. Surakiat Sathienthai) held the meeting of the National Youth Promotion and Coordination Committee No. 1/2548 on April 21, 2005, at the Headquarters Building, Government House. The meeting resolved to approve the establishment of a provincial council of children and youth under the principle of "children lead adults to support" and should encourage government agencies, local administrative organizations, the private sector, and youth groups to cooperate in establishing a council for children and youth in every province. This includes supporting the creation of the National Youth Council in the future.
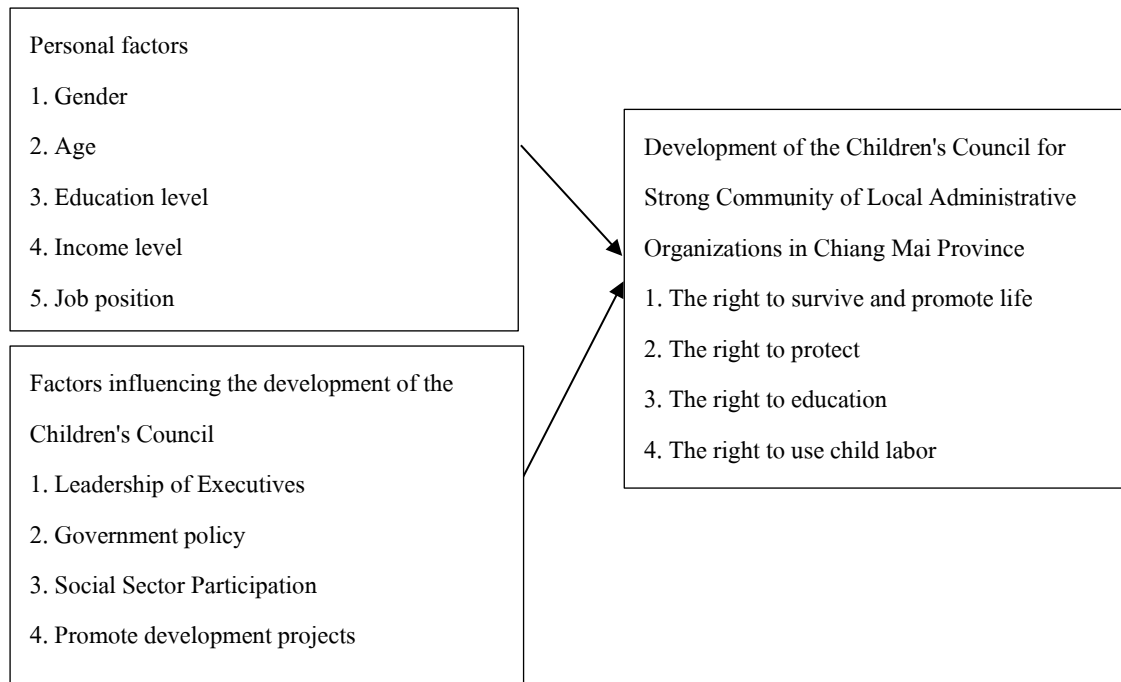
3.2 Conceptual framework

Personal factors
1. Gender
2. Age
3. Education level
4. Income level
5. Job position

Factors influencing the development of the Children's Council
1. Leadership of Executives
2. Government policy
3. Social Sector Participation
4. Promote development projects

Development of the Children's Council for Strong Community of Local Administrative Organizations in Chiang Mai Province
1. The right to survive and promote life
2. The right to protect
3. The right to education
4. The right to use child labor

Diagram 1 Conceptual Framework

3.3 Hypotheses

Leadership of executives, government policies, social sector participation, and development promotion projects affect the development of the Children's Council for Strong Community of the Chiang Mai Provincial Local Administrative Organization.

4. Research methodology

4.1 Research design

This research was quantitative research using questionnaires to collect data.

4.2 Population and samples

The population in this research was 8,320 people from the administration of local government organizations in Chiang Mai. The sample consisted of 400 people from the administration of the local government organization in Chiang Mai Province. It was obtained from the formula for calculating the sample of Taro Yamane (Yamane, 1970) at 95 percent confidence. Using a stratified random sampling method, calculated according to the proportion of sub-district administrative organizations and municipalities classified by each district in Chiang Mai province.

4.3 Research instruments

The tool for this research was a questionnaire consisting of 3 parts as follows:

Part 1 questionnaire on personal factors of respondents include gender, age, education level, income level, and job title. The questionnaire was a multiple choice.

Part 2 questionnaire on factors influencing the development of the Children's Council are as follows: leadership of executives, government policies, social sector participation, and development promotion projects.

The questionnaire was based on a rating scale of 5 levels, i.e., very good, good, fair, poor, very poor.

Part 3 The Child Council development for strong community questionnaire of local administrative organizations in Chiang Mai province. The questionnaire was based on a rating scale of 5 levels, i.e., very good, good, fair, poor, very poor.

Checking the Instruments' Quality

The researcher took the revised questionnaire to the experts to verify the content validity by finding the Index of congruence equal to 0.980. The revised questionnaire as suggested by experts was taken and tried out with a group similar to the sample to be studied, totalling 30 people, and then analysed for reliability by finding Cronbach's alpha coefficient got a reliability value of 0.918.

4.4 Data collection

The researcher's data collection was carried out in the following steps:

1. The researcher requested a letter from the graduate school of Suan Sunandha Rajabhat University to the administration of the Chiang Mai provincial local administrative organization for assistance in data collection.

2. The researcher conducted the data collection on their own and the questionnaire was returned after the respondents filled out the information.

3. The returned questionnaires were used to verify their integrity for data analysis.

4.5 Data analysis

1. Respondents' personal factors classified by gender, age, education level, income level and job position. Frequency and percentage.

2. Data on the development of the Child Council for Strong Community of the Chiang Mai provincial local administrative organization and the factors influencing the development of the Child Council were analyzed by means of and standard deviation, decision criteria and consideration criteria. The researcher determined the interpretation of employee feedback scores. It is divided into 5 levels and uses a 5-level estimation scale as follows:

Average score 4.21 – 5.00 Very good

Average score 3.41 – 4.20 Good

Average score 2.61 – 3.40 Fair

Average score 1.81 – 2.60 Poor

Average score 1.00 –1.80 Very poor

3. Multiple regression analysis by using enter method to determine the influence of factors influencing the development of the Child Council for strong community of the local administrative organization in Chiang Mai province by setting the statistical significance at the 0.05 level.

5. Data conclusion

1. Most of respondents were male at 69.05%. Most of respondents were aged $41-50$ at 68.39 percent. Most of the respondents had a bachelor's degree at 78.19 %. Most of the respondent's had income is 30,001 - 40,000 baht at 57.06 %, and they hold the position of vice president of the local government organization at 65.84%.

2. The results showed that overall, it was found that the development of the Children's Council for strong community of the Chiang Mai provincial local administrative organization was at a high level ($\overline{X}$ = 3.99, S.D.=0.53). When considering each aspect, it was found that the right to education had the highest average ($\overline{X}$ = 4.02, S.D. = 0.46). Followed by the rights to survive and promote life, which are ($\overline{X}$ = 4.00 , S.D. = 0.48) the right to protection ($\overline{X}$ = 3.96, S.D. = 0.55) and the right to use child labor ($\overline{X}$ = 3.87, S.D. = 0.50) respectively, with details in Table 1.

Table 1 Mean and Standard Deviation of the Development of the Children's Council for Strong Communities of the Chiang Mai Provincial Local Administrative Organization.

Field	Name List	$\overline{X}$	S.D.	Result
1.	The right to survive and promote life	4.00	0.48	Good
2.	The right to protection	3.96	0.55	Good
3.	The right to education	4.02	0.46	Good
4.	The right to use child labor	3.87	0.50	Good
	Total	3.99	0.53	Good

3) Executive leadership factors, government policies, social sector participation and development promotion projects affecting the development of the Children's Council for strong communities of the local administrative organizations in Chiang Mai province by 72.11%.

6. Summary and Discussion

1. The development of the Children's Council for a strong community within the Chiang Mai provincial local administrative organization is at a high level. When considering each aspect, it was found that the right to education had the highest average, followed by the right to survival and promotion of life, the right to protection, and the right to use child labor, respectively. The local government has given importance to the development of children and youth so that children can grow up to be the future of the nation with value. The results of the study are consistent with the research results of Piyanan Songsunthornwat (2016), who studied the role of the Council of Children and Youth in driving the activities of Nakhon Ratchasima Municipality. The results showed that the role of the Council of Children and Youth in driving the activities of Nakhon Ratchasima Municipality was at a high level both overall and in each aspect.

2. Executive leadership factors, government policies, social sector participation, and development promotion projects affect the development of the Children's Council for strong communities of the local administrative organizations in Chiang Mai province. This was caused by the leaders of local government organizations to focus on the development of the Children's Council and drive development in accordance with the government's policies. Projects were organized to promote the development of the Children's Council and the participation of the social sector to help support the successful development of the Children's Council, which the results of the study were consistent with the research results of Chanon Komolmal (2016) have studied the assessment of the development of the Council of Children and Youth. The results of the study showed that the development of the Council of Children and Youth would be successful depending on the following factors: executive leadership, government policy driving, social sector involvement, and project or activity implementation.

7. Suggestions

7.1 Suggestions for applying the research results

(1) The Chiang Mai provincial administration organization should place greater emphasis on promoting children's rights to livelihoods by implementing projects or activities to support the quality of life of children in Chiang Mai.

(2) Local government organizations in Chiang Mai should promote and support the establishment of an agency to supervise the rights to protect children to have standards and to push the law to be more implemented.

(3) Local government organizations in Chiang Mai should encourage children in Chiang Mai to receive basic education and continue their education at a higher level in order to develop children to have the quality of the nation in the future.

(4) Local government organizations in Chiang Mai should have standards for child labor protection and more effective enforcement of the law on illegal child labor.

7.2 Suggestions for future research

In the next study, a mixed-use study should be conducted with both qualitative studies and interviews with government agencies that promote policies on child council development and policy-driving of local governments that play an important role in developing the Children's Council to gain insights into guiding or organizing activities or projects to develop the Children's Council to be the most effective.

8. References

Chanon Komolmal. (2016). Child and Youth Council Development Assessment. *Social work journal, 24*(1), 105-134.

Child and Youth Council Chiang Mai Provincial. (2019). Child and Youth Potential Development Project in Chiang Mai Province. [online] Retrieved March 20, 2022, from http://www.bandekcm.com/?page_id=129.

Local government organizations. (2017). *Forms of local councils for children and youth.* [online] Retrieved March 20, 2022, from http://www.dla.go.th/upload/ebook/column/2012/7/2020_5102.pdf.

National Economic and Social Development Board. (2016). *Child and Youth Development Plan during the National Economic and Social Development Plan No. 9.* Bangkok: Skybooks.

Office of Welfare Promotion and Protection of Children, Youth, the Underprivileged, the Disabled and the Elderly (SorTor.) (2016). *Policy on the establishment of the Council of Children and Youth.* Bangkok: Pimluck.

Office of Youth Promotion and Protection. (2013). *Promote the development of national children and youth.* Bangkok: Pimluck.

Piyanan Songsunthornwat (2016). *The role of the Council of Children and Youth in driving the activities of Nakhon Ratchasima Municipality.* Master of Political Science Thammasat University.

Yamane, Taro. (1973). *Statistics: An Introductory Analysis*. (3rdEd). New York. Harper and Row Publications.

A CORRELATION STUDY OF TEACHERS' WORK MOTIVATION AND PRINCIPAL LEADERSHIP BEHAVIORS BASED ON PATH-GOAL THEORY IN KAREN STATE, MYANMAR

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ABSTRACT

The main purpose of this study was to investigate the relationship between teachers' work motivation and principal leadership behaviors based on Path-Goal Theory in a private school in Karen State, Myanmar. The study was conducted in the 2021-2022 academic year with 79 school teachers. The research used descriptive analysis of means and standard deviations to analyze teachers' perceptions of their work motivation and principal leadership behaviors based on the Path-Goal Theory. The relationship between these two variables was analyzed by using Correlational analysis (Pearson product-moment coefficient) was used to examine the relationship between the two variables. The study utilized two questionnaires to correct the data for each variable. The Path-Goal Leadership Questionnaire from Northouse (2018) was adopted for principal leadership behaviors while the Multidimensional Work Motivation Scale (MWMS) developed by Ryan and Deci (2000) was adopted for teachers' work motivation. The study resulted in teachers' perceptions of principal leadership behaviors was a moderate level and their work motivation being at a high level. Moreover, the correlation between teachers' work motivation and principal leadership behaviors based on the Path-Goal Theory finding showed a moderate correlation with r (79) = .428 **, p<.001.

Keywords: Work Motivation, Leadership Behavior, Path-Goal Theory

1. Introduction

The growth of globalization and digitalization, as well as dramatic changes in the workplace and other organizations in the twenty-first century, has raised the need for skilled and effective people to lead organizations to success and support their long-term successful continuation in competitive situations (Zajda, 2015). Every

country's growth and development depend on its citizens' knowledge, skills, and competencies, and the quality of those individuals depends on the country's education system. As a result, schools must provide essential knowledge and skills to students in order for them to succeed in the future with confidence and competence (OECD, 2019).

According to Price (2008), effective school leadership creates excellent schools, whereas weak school leadership creates poor schools. As a result, principals perform an important role in developing working environments that encourage teacher retention. Carson and Chase (2009) stated that teacher motivation is also an essential component to enhance classroom effectiveness. Additionally, a motivated teacher is more enthusiastic about teaching and performs better, which then reflects in the students' achievement (Melecio, 2020).

When reviewing the relationship between teachers and principals in Myanmar schools, top-down management practices were clearly apparent (Lay, 2020). Teachers were hardly given the opportunity to participate in decision-making, and they were expected to accept whatever decisions or plans are made by principals and education leaders. Although education in Myanmar is now undergoing transformation, school principals have been mainly inefficient in applying a variety of leadership practices. According to House's path-goal theory, school leaders should not choose only one style of leadership to deal with the challenging problems that occur inside a school organization. It is most likely necessary to use a variety of leadership styles as it could develop teacher-principal relationships that may have a positive impact on students' academic development. Therefore, the study investigated teachers' perceptions of their work motivation and principal leadership behaviors based on Path-Goal Theory in order to benefit the school, principal, and teachers.

2. Research Objectives

1. To identify principal's leadership behaviors based on Path-Goal Theory perceived by teachers in a private school in Karen State, Myanmar.

2. To identify the levels of teacher's work motivation in a private school in Karen State, Myanmar.

3. To determine whether there is a significant relationship between teachers' perception of their work motivation and principal leadership behaviors based on Path-Goal Theory in a private school in Karen State, Myanmar.

3. Theoretical Framework

The study used two theories which were the Path-Goal Theory (House, 1996) to examine the principal leadership behaviors, and the Self-determination Theory (Ryan & Deci, 2000) to examine the level of teacher work motivation. First, the path-goal theory was developed by Robert House and published in 1971, based on an early version of the leadership theory by M. G. Evans. Path-Goal Theory was utilized to determine the most appropriate leadership style (directive, supportive, participative, and achievement-oriented) for the given situation (subordinate and environment) (Lussier & Achua, 2016). The Self-determination theory of Ryan and Deci (2000)

then provided the theoretical concept for teachers' work motivation which categorized motivation into four dimensions namely external regulation, introjected regulation, identified regulation, and intrinsic regulation.

4. Research Methodology

The target population of this study was 79 full‑time teachers who were currently working in a private school in Karen State from kindergarten to Grade‑11 during the academic year of 2022‑2023. The study was a quantitative and correlational research design. The questionnaires were utilized to gather data for quantitative analysis. The descriptive statistics (frequencies, percentages, mean and Standard Deviation) were applied to identify the levels of teachers' perceptions of their work motivation and principal leadership behaviors. Correlational analysis (Pearson Product‑Moment Correlational Coefficient) was used to determine the relationship between teachers' perceptions of their work motivation and principal leadership behaviors based on Path‑Goal Theory in a private school in Karen State.

The questionnaire was comprised and designed into two parts to hand out data collection. Path–Goal Leadership Questionnaire was used to determine the teachers' perceptions of principal leadership behaviors with five‑point Likert scale ranging from (1) always to (5) Never. The Multidimensional Work Motivation Scale (MWMS) developed by (Ryan & Deci, 2000) was then adapted to determine teachers' perceptions of their work motivation with the Likert five-points scale a 5-point Likert-type scale ranging from strongly agree (1) to strongly disagree (5). The reliability of two variables were tested, and Cronbach's coefficient alpha was calculated on all.

5. Research Findings

Research Objective One

Table 1 Summary of Mean and Standard Deviation of Teachers' Perceptions of Principal Leadership Behaviors (n=79)

	Variables	Mean	SD	Interpretation
1.	Directive Leadership Behavior	3.70	.477	High
2.	Supportive Leadership Behavior	3.32	.588	Moderate
3.	Participative Leadership Behavior	3.47	.680	Moderate
4.	Achievement-oriented Leadership Behavior	3.14	.769	Moderate
	Total	3.41	.464	Moderate

Table 1 presents the summary of the mean and standard deviation of teachers' perceptions of principal leadership behaviors, which has four dimensions mentioned in the table above. The mean score of directive leadership behavior was 3.70, supportive leadership behavior was 3.32, participative leadership behavior was 3.47, and achievement‑oriented leadership behavior was 3.14 respectively. Among four types of principal leadership behaviors, the highest range of overall rating was 3.70 for directive leadership behavior while the

lowest was 3.14 for achievement-oriented leadership behavior. According to the interpretation criteria, the overall perception of teachers of principal leadership behaviors, which included four dimensions was 3.41 and considered a moderate level.

Research Objective Two

Table 2 Summary of Means and Standard Deviations of Teachers' Perceptions on their Degree of Work Motivation (n =79)

Variables	Mean	SD	Interpretation
1. Extrinsic regulation	3.12	.932	Moderate
2. Introjected regulation	3.73	.810	High
3. Identified regulation	4.13	.792	High
4. Intrinsic regulation	4.09	.800	High
Total	3.64	.581	High

Table 2 presents the summary mean and standard deviation data of teachers' perceptions of their work motivation. The overall mean score of the teachers' perceptions on their level of work motivation at Karen State was 3.68, which is interpreted as high. Moreover, the identified regulated motivation was the highest mean score with 4.13, followed by intrinsic regulated motivation was 4.09, then introjected regulated motivation was 3.73. Finally, extrinsic regulated motivation scored only 3.12 which represented as moderate level.

Research Objective Three

Table 3 Correlation between the Teachers' Perceptions of their Work Motivation and Principal Leadership Behaviors (n =79)

Variables		Teachers' Work Motivation	Conclusion
Teachers' Perceptions Towards Principal Leadership Behaviors Based on Path-Goal Theory	Pearson Correlation	.428 **	There is a significant relationship between these two variables
	Sig. (2-tailed)	.000	

Table 3 describes the Pearson correlation coefficient data between teachers' perception of their work motivation and principal leadership behaviors. The relationship between these two variables was found moderately correlated, r = .428, p < .001. The value of Pearson correlation (r) is .428, and Sig. (2-tailed) is .000. Since the Sig. (2-tailed) is smaller than .05, the relationship between teachers' work motivation and principal leadership behaviors was significant. Therefore, the research hypothesis is accepted: there is a significant

relationship between teachers' perceptions of their level of work motivation and principal leadership behaviors based on Path-Goal Theory in a private school in Karen State, Myanmar.

6. Discussion

Principal leadership behaviors showed that the interpretation of the teachers' perceptions of principal's supportive, participative, and achievement-oriented leadership behaviors were moderate and directive leadership behavior was high in a private school in Karen State. Among four dimensions of principal leadership behaviors, teachers' perceptions on directive principal leadership behavior were with the highest mean score. Therefore, teachers in a private school in Karen State perceived their principal's leadership as directive most often and achievement-oriented less often than other behaviors.

In this study, except for the directive leadership behavior, the principal was moderately effective in unitizing effective skills in participative leadership behavior, followed by supportive leadership behavior, when achievement-oriented leadership behavior was the least effective for school principals. There were several researchers have confirmed the principal behaviors in supportive, participative, and achievement-oriented leadership behavior. According to Farhan's (2017) study, supportive leadership behavior could well be utilized by learning leaders to encourage their followers through establishing strong relationships and increasing trust relationships. Supportive leadership behavior gave what is lacking the loving followers while they were engaged in duties that were difficult to perform and physically demanding. Leaders that use supportive behaviors are willing to go their way to make work enjoyable for followers, which gives followers the confidence they need to succeed (Northouse, 2016). Achievement-oriented leadership behavior is only applied by the leader who encourages followers to do their best work and establishes a high level of achievement for his or her followers, display a high level of trust in their followers' abilities to create and accomplish challenging goals, and works hard for continuous improvement. On the other hand, the achievement-oriented leadership behavior is ineffective when the work is well-organized and simple (Northouse, 2018).

In the second variable of teachers' work motivation, the research found that teachers at a private school in Karen were positively and highly motivated. By category, identified regulated motivation was the high mean score, followed by intrinsic regulated motivation, and introjected regulated motivation and lastly extrinsic regulation was the lowest mean score. Furthermore, school teachers are highly motivated by the personal value of their work, their interest in their career, and the fact that they find their work exciting and enjoyable. Renbarger and Davis (2019) conducted a study that looked at self-efficacy, mentoring, and professional development as antecedents to work motivation for new teachers and found that barriers to professional development such as workload, time, and opportunities were negatively related to work motivation. So, they advocate removing these limitations to enhance teachers' work motivation, Patterns of engagement in professional development and teachers' work motivation were also analyzed, and the findings showed that higher behaviors of participation led to a higher level of work motivation in teachers (Yoon & Kim, 2022). Similarly, Reaves and Cozzens (2018)

discovered that teachers in safe and supportive schools have stronger intrinsic motivation and self-efficacy, which the target school should have with this research result. Moreover,

As a final point, based on the statistical outcome of the study, it was evident that the research hypothesis was correct and thus was accepted as the result revealed that there was a significant relationship between teachers' work motivation and principal leadership behaviors in a private school in Karen State, Myanmar. According to the result, three types of the leadership behaviors within four dimensions in this study showed significant correlations to the work motivation of teachers except for directive leadership behavior. Farhan (2018) suggested that when school leaders or principals take into consideration their school teachers or staff members' perceptions, they might need to adopt a different leadership approach or style. According to the Path-Goal Theory, school leaders should not apply only one leadership behavior in order to handle the complicated problems that occur within a school organization, it is most likely necessary to use a different of leadership behaviors. Therefore, this study suggested that the school principal could use more supportive leadership behavior to make their teachers happy and satisfied to be a part of the group, supports them in resolving difficulties that prevent them from carrying out their duties, and behave in a manner that was respectful of their personal needs.

7. Conclusion

The purpose of this study was to identify whether there was a significant relationship of teachers' perceptions of their work motivation and principal leadership behaviors based on Path-Goal Theory in a private school in Karen State, Myanmar. A quantitative correlational research design was to investigated the teachers' perceptions of their work motivation and principal leadership behaviors based on Path-Goal Theory in a private school in Karen State, Myanmar. The total population in this study was 79 teachers during the academic year of 2021-2022. Directive leadership behavior was evaluated and interpreted highly while other leadership behaviors were evaluated moderately. On other hand, among four dimensions of teachers' work motivation, introjected regulation scored the highest total mean score of 4.13, which interpreted as high level with the rating scale of 3.51-4.50 whereas extrinsic regulation scored the lowest mean score of 3.13, which considered as moderate level with the rating scale of 2.51-3.50. The overall perception of teachers on their work motivation, which includes four dimensions resulted 3.64, which considered as high level with the rating scale of 3.51-4.50. Lastly, the results the correlation between the teachers' perception of their work motivation and principal leadership behaviors was positively and moderately correlated with $r(79) = .428$ **, $p<.001$.

8. Recommendations

According to the findings of this study, the researcher provided the following recommendations to the principal, and teachers, as well as other future researchers. First, the principal should ensure that teachers are engaged in decision-making and that their feedback was gathered to develop the school's action plan, and support teachers when they are faced with challenging tasks, not only at work but also with personal matters when necessary. School principal should also focus more on supportive leadership, participative leadership, and

achievement-oriented leadership behaviors. Then, the school teachers should work closely with the principal and discuss and openly communicate with the principal about any issues in a respectful way. Lastly, it is recommended that future researchers should consider other theories of leadership styles and motivation in the future for a more extensive and diverse scope on this topic.

9. References

Aung, N. K. (2014). *A comparative study of teachers' decision-making styles and their job satisfaction in four selected migrant high schools in Mae Sot District, Tak Province, Thailand* [Master's thesis]. Assumption University.

Bass, B. M. (2008). *The Bass handbook of leadership: Theory, research, and managerial applications* (4th ed.). New York, NY: Free Press.

Burkhauser, S. (2017). How much do school principals' matter when it comes to teacher working conditions? *Educational Evaluation and Policy Analysis, 39*(1), 126-145.

Carson, R. L., & Chase, M. A. (2009). An examination of physical education teacher motivation from a self-determination theoretical framework. *Physical Education and Sport Pedagogy*, *14*(4), 335-353. https://doi.org/10.1080/17408980802301866

Ekinci, E., & Acar, F. E. (2019). Primary School Teachers' opinions on Professional Development. *Journal of Education and Training Studies, 7*(4), 1-12. Retrieved from: http://jets.redfame.com.

Farhan, B. Y. (2018) Application of Path-Goal Leadership Theory and Learning Theory in A Learning Organization. *The Journal of Applied Business Research*, *34*(1).

House, R. J. (1996). Path-Goal Theory of Leadership: Lessons, Legacy, and a Reformulated Theory. *Leadership Quarterly, 7,* 323-352.

Hoy, W. K., Miskel, C. G., & Tarter, C. J. (2013). *Educational administration: Theory, research, and practice* (9th ed.). New York: McGraw-Hill.

Lussier, R. N., & Achua, C. F. (2016). *Leadership: Theory, application & skill development* (Sixth edition). Cengage Learning.

Melecio, V. K. L. (2020). *A correlation study on teachers' perception of the school climate and their degree of work motivation at Assumption College Samutprakarn, Thailand* [Master's thesis]. Assumption University. http://www.assumptionjournal.au.edu/index.php/Scholar/article/view/5077

Northouse, P. G. (2016). Leadership: Theory and practice (7th ed.). Thousand Oaks, CA: Sage Publications. Rafferty, A. E., & Griffin, M. A. (2006). Refining individualized consideration: Distinguishing developmental leadership and supportive leadership. *Journal of Occupational & Organizational Psychology, 79*(1), 37–61.

OECD. (2019). *OECD Future of Education and Skills 2030: OECD Learning Compass 2030.* OECD 2019

Price, A. M. (2008). *The relationship between the teacher's perception of the principal's leadership styles and personal motivation* [Doctoral Dissertation]. Southern Mississippi University. https://aquila.usm.edu/dissertations/1219

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68-78. https://doi.org/10.1037/0003-066X.55.1.68th

Renbarger, R., & Davis, B. K. (2019). Mentors, Self-efficacy, or Professional Development: Which Mediate Job Satisfaction for New Teachers? A Regression Examination. *Journal of Teacher Education and Educators*, *8*(1), 21–34. https://dergipark.org.tr/en/pub/jtee/issue/44909/559132

Reaves, S. J., & Cozzens, J. A. (2018). Teacher Perceptions of Climate, Motivation, and Self-Efficacy: Is There Really a Connection. *Journal of Education and Training Studies*, *6*(12), 48-67. https://doi.org/10.11114/jets.v6i12.3566

Sindhu, I. H. (2012). *Educational Administration and Management.* Pearson. http://www.myilibrary.com?id=475857

Yoon, I., & Kim, M. (2022). Dynamic Patterns of Teachers' Professional Development Participation and Their Relations with Socio-Demographic Characteristics, Teacher Self-Efficacy, and Job Satisfaction. *Teaching and Teacher Education*, *109*, 103565. https://doi.org/10.1016/j.tate.2021.103565

Zajda, J. (2015). Globalization, ideology and politics of education reforms. In *Globalization, ideology and politics of education reforms* (pp. 153-162). Springer, Cham. DOI I 0.1007 /978-3-319-19506-3

ADMINISTRATION OF BASIC EDUCATIONAL INSTITUTIONS OF LOCAL GOVERNMENT ORGANIZATIONS IN CHACHOENGSAO PROVINCE

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ABSTRACT

This research aimed to 1) study the administrative level of basic educational institutions of local government organizations in Chachoengsao province and 2) study the factors influencing the administration of basic educational institutions of local administrative organizations in Chachoengsao province. The questionnaire was used as a tool to collect data from 400 teachers in schools under the Chachoengsao provincial administrative organization. The statistics used in the data analysis were mean, standard deviation, and multiple regression analysis. The results showed that 1) the administration of basic educational institutions by local administrative organizations in Chachoengsao province was at a "high" level. When considering each aspect, it was found that the budget management aspect had the highest average (4.05), followed by academic administration (4.01), general administration (3.96), and personnel management (3.86), respectively; and 2) participation factors, external factors, internal factors, and educational management processes affect the administration of basic educational institutions of local administrative organizations in Chachoengsao province.

Keywords: Basic Education Administration, Local Government Organization Chachoengsao Province

1. Introduction

Many countries around the world attach importance to the basic education of their people as a basis of development, especially the basis of building competitiveness in economics, society, technology, and communication, which is becoming more and more intense continuously. Therefore, each country attaches importance to the provision of basic education to eliminate inequality and create equality and opportunities for the education of the nation's people according to the country's growth index. Basic education management that meets the needs of the country and the people with efficiency, quality, thoroughness, and fairness are necessary for each country to consider and strive for success and continuation of education management at the higher education level according to the direction of national development. In particular, the development of educational

institution management to be independent, flexible, and efficient. Education is a tool to help develop people in a nation to have the knowledge, abilities, and characteristics that meet the needs of the country and respond to globalization. All areas of education need to develop skills that can be used to lead a happy life and a creative career (Tony Wagner, 2012, p. 24).

The Constitution of the Kingdom of Thailand, B.E. 2560, has stipulated the importance of education in Chapter 5 Policy Guidelines of the State, Part 4 Policy Guidelines on Religion, Society, Public Health, Education and Culture, Section 80 (3). Education to improve the quality and standards of educational management at all levels and all forms in accordance with economic and social changes. The state must establish a national education plan, and laws to improve national education and provide for the development of quality teachers and educational personnel to keep up with the changes in the world society. As well as instilling in learners a consciousness of being Thai, having discipline, taking into account the interests of the public and adhering to the democratic regime of government with the King as Head of State, Section 80 (4), promoting and supporting decentralization so that local government organizations, communities, religious organizations, and private sectors, organize and participate in educational management to develop educational quality standards to be equal and in line with basic state policy guidelines. (Constitution of the Kingdom of Thailand, B.E. 2560, 2017, pp. 23-24) and the 12th National Economic and Social Development Plan B.E. 2560-2021 and (draft) the 13th National Economic and Social Development Plan, which set the direction and strategy for national development, which is to accelerate the building of more immunity in various development dimensions to prevent the risk factors that Thai society has to face and strengthening the foundation of the country in various fields, along with giving importance to the development of quality people and Thai society, to be able to keep pace with changes, have the opportunity to access resources and to benefit from economic and social development fairly. As well as create economic opportunities through the knowledge base, technology and innovation, and creativity based on environmentally friendly production and consumption to lead to the stable and sustainable development of the country.

The national education plan focuses on developing 2 areas, consisting of 1) developing Thai people to be complete human beings, both physically, mentally, and intellectually, with knowledge, morality, and culture in living and able to live with others happily; and 2) developing Thai society to be a strong society with sustainable and balanced development in terms of quality society, society of wisdom and learning, and social reconciliation and generosity. (Revised National Education Development Plan 2017–2036) This edition aims to emphasize that education management must be done in order to develop Thai people to be complete human beings, both physically, mentally, and intellectually, with knowledge, morality, ethics, and a culture in life that can coexist happily with others. Section 1: General Chapters, Purposes, and Principles Section 9 (2) The organization, structure, and process of educational management specify the decentralization of powers to educational district areas, educational institutions, and local government organizations. (5) Identify and mobilize resources for educational management from various sources, and (6) specify participation of individuals, families, communities, community organizations, local government organizations, private sectors, private organizations, professional organizations, religious institutions, enterprises, and other social institutions. Chapter 2 on

Educational Rights and Duties, Article 12 states that apart from the state, the private sector, and the local government organization, individuals, families, community organizations, private organizations, professional organizations, religious institutions, enterprises, and other social institutions have the right to provide basic education in accordance with the Ministerial Regulation, Section 22 of the National Education Act B.E. 2562 (2019) and its amendments, which states that the management of education must be based on the principle that all learners are able to learn and develop themselves and regard learners as the most important. The educational management process must encourage learners to develop naturally and to their full potential. Non-formal and informal education must emphasize the importance of knowledge, morality, the learning process, and integration as appropriate for each level of education. Section 4: Educational Management Guidelines Section 29 Education institutions shall be jointly organized with individuals, families, communities, community organizations, local government organizations, private organizations, professional organizations, religious institutions, enterprises, and other social institutions. Promote the strength of the community by organizing a learning process within the community for the community to have education and training, seek knowledge and information, and know how to select wisdom and various sciences to develop the community in accordance with its problems and needs, as well as find ways to support the exchange of development experiences between communities (Ministry of Education, 2019, p. 14-15).

The implementation of the decentralization of education administration to the local administrative organizations' successful management in one aspect rather than a holistic one. However, educational institutions still face problems in education administration to support decentralization in many aspects. In terms of factors, regulations hinder especially in personnel management. The powers and duties of some committees in educational areas cannot be implemented, and frequent changes in the central policy and work segmentation structures are not consistent with the context of offices, educational institutions, personnel, and budgets. The work culture of the personnel that is still attached to the culture of power, therefore, hinders the decentralization of educational administration. (Office of the Education Council Secretariat, 2016), which is consistent with Lippit's research (Lippit,2009) proposed that the decentralization of administration and education management that would lead to the development of educational institutions should be based on the following principles: 1) Decentralization should be given to decision-makers who have as much knowledge and understanding of the tasks they are going to perform as possible. 2) The effect of decentralization will be good. True authority is delegated to all levels of the organization, and decentralization is not effective if the delegates are required to report back to the central authority for all the tasks they perform. 3) Managers at all levels should have confidence that when decentralized, the delegates have the ability to make decisions about the tasks assigned to them and that those closest to the task must be made better than the decision-making; and 4) Decentralization should have clear objectives, policies, and measures, but the implementation of policies in each locality does not necessarily require the same practice and also consistent with Riley (Riley, 2007) that has been proposed education reform in England, according to the Education Reform Act of 1988, provides for the decentralization of education administration to public and private organizations and agencies to play a role in education management. This results in network management at the

school and institutional levels. Synergies are of the same nature as networks, and schools should implement synergies by networking. The success of networking and inclusion depends on trust, solidarity, honesty, and selflessness.

From the administration of educational institutions under the local administrative organization, it was found that the education system has 5 problems that have not been solved concretely, namely: 1) problems in the quality of learners that are below educational standards. 2) problems of teachers with a shortage of both quantitatively and qualitatively, problems in the ability to organize the teaching process appropriately and facilitate quality learning. 3) problems in the distribution of educational opportunities that are not yet covered and respond to all groups of people with different conditions in terms of physical, economic, and social abilities. 4) Problems of administration and decentralization of education management that still have systemic problems mean we cannot manage education smoothly. It has not yet been able to establish administrative unity of practice, and 5) the problem of participation in educational management of various sectors is still less. Teaching and learning management are the responsibilities of educational institutes and teachers. But the family and society, which play an important role in the management of education, have fewer roles, duties, and burdens in the provision of education than the Ministry of Education's departments, resulting in high budget burdens but not reflecting the quality as they should be. (Sub-Committee on Education Management and Human Development Reform, 2015, pp. 18-19).

Chachoengsao Province is a province that has many schools that are managed by the local government as a supervisor in terms of academic administration, budget management, personnel management, and general administration with the problems of basic educational institute administration of local administrative organizations. The local government organization should be systematically developed for basic education administration based on participation factors, external factors, internal factors, and educational management process efficiency. Therefore, the researcher is interested in studying the model of the administration of basic education institutions of the local government organization in Chachoengsao Province to apply the information obtained from the study as a guideline for the development of education management by the local administrative organization to be very effective.

2. Objectives

(1) To study the administrative level of basic educational institutions of local government organizations in Chachoengsao Province

(2) To study the factors influencing the administration of basic educational institutions of local administrative organizations in Chachoengsao Province

3. Literature review

In the study "Administration of Basic Educational Institutions of Local Government Organizations in Chachoengsao Province," the researchers reviewed the literature related to the educational management of local government organizations. The details are as follows:

3.1 Theory and related research

Concepts of education management of local government organizations

Local education management refers to the local government organization responsible for providing education, both formal and informal, to be of high quality and comprehensive standards for people in the area under the powers and duties of the local government organization. (Local Administrative Organization, 2007).

The laws related to the education management of local administrative organizations are the Constitution of the Kingdom of Thailand B.E. 2550 and the National Education Act B.E. 2542 and amended (No. 2) B.E. 2545 as follows:

The Constitution of the Kingdom of Thailand B.E. 2550 has stipulated provisions related to the education management of important local administrative organizations, namely (Local Administrative Organization, 2007).

Article 80 (4) promotes and supports decentralization to enable local governments, communities, religious organizations, and the private sector to organize and participate in the provision of education to develop educational quality standards that are equal and consistent with basic state policy guidelines. Section 289 The local government organization has the powers and duties to maintain the arts, customs, local wisdom, and good culture of the locality. The local government also has the right to provide education, training, and vocational training as appropriate to the needs of that locality. Participation in the provision of education and training of the state, considering its conformity with national standards and the education system, including the maintenance of arts, customs, local wisdom, and good local culture.

The National Education Act, B.E. 2542, and its amendments (No. 2), B.E. 2545, the provisions related to the education management of important local administrative organizations are as follows:

Section 9 (2) The organization, structure, and process of education management shall be decentralized to the educational territories, educational establishments, and local government organizations.

Section 41 The local government organization has the right to provide education at any level or all levels according to readiness, suitability, and needs within the locality.

Section 42. The Ministry shall prescribe rules and procedures for assessing the readiness of education of local government organizations and has the duty to coordinate and promote local government organizations to be able to provide education in accordance with policies and educational standards, including proposing to recommend a budget allocation to support the education management of local government organizations.

Principles of education management of local government organizations

1) The education management of the local government organization must adhere to the principle of lifelong education for the people to allow society to participate in education management and to continually develop the subject matter and learning process.

2) Local government organizations can provide quality, standardized education thoroughly, without charge for not less than 12 years, according to Section 49 of the Constitution of the Kingdom of Thailand, B.E. 2550.

3) The local government organization shall provide education for persons with physical, mental, intellectual, emotional, social, communication, and learning disabilities, physically handicapped; handicapped persons, who are unable to rely on themselves; without a caregiver; or underprivileged; to have the right and opportunity to receive special basic education; and to provide education for gifted people in an appropriate format, taking into account their abilities in accordance with the Act National Education B.E. 2542.

4) Educational management must be to develop Thai people to be complete human beings, both physically, mentally, and intellectually, with knowledge, morality, ethics, and culture in life, able to live happily with others.

5) Including promoting religion, art, national culture, sports, local wisdom, Thai wisdom, and universal knowledge. As well as conserving natural resources and the environment, having the ability to work, self-reliance, creative thinking, continual self-knowledge, and self-learning.
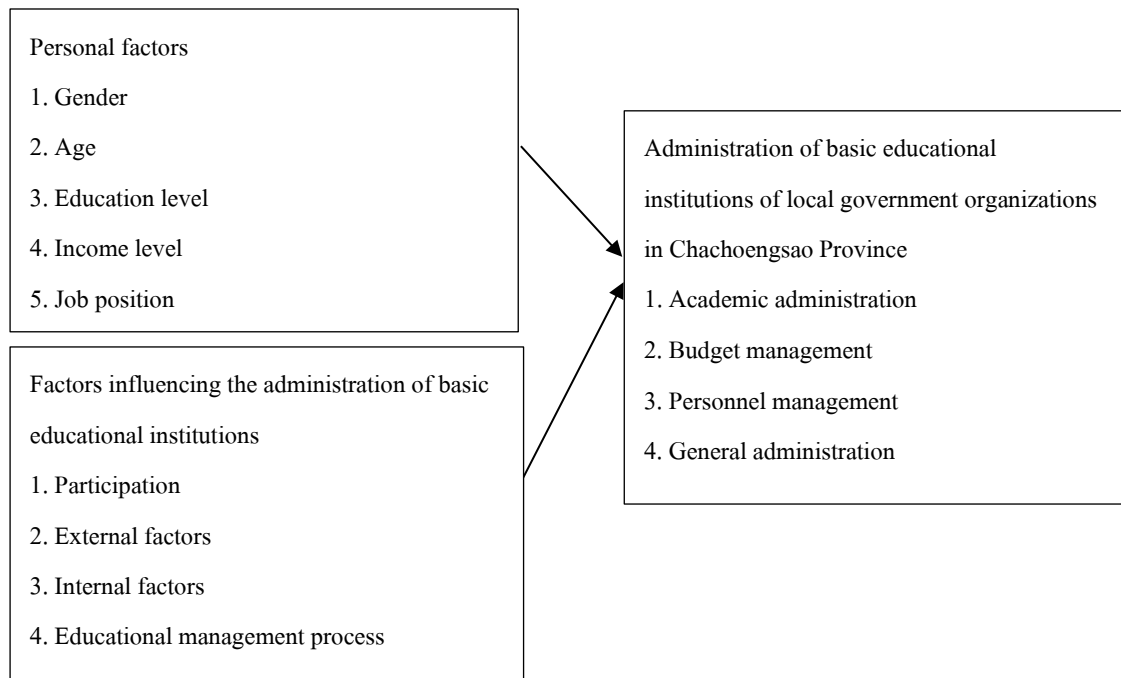
3.2 Conceptual framework

Personal factors

1. Gender

2. Age

3. Education level

4. Income level

5. Job position

Factors influencing the administration of basic educational institutions

1. Participation

2. External factors

3. Internal factors

4. Educational management process

Administration of basic educational institutions of local government organizations in Chachoengsao Province

1. Academic administration

2. Budget management

3. Personnel management

4. General administration

Diagram 1 Conceptual Framework

3.3 Hypotheses

Participation factors, external factors, internal factors, government policy factors, social sector participation, and development promotion projects affect the administration of basic educational institutions by local administrative organizations in Chachoengsao Province.

4. Research methodology

4.1 Research design

In this research, it is quantitative research using survey methods and questionnaires as a tool to collect data.

4.2 Population and samples

The population in this research consisted of 7,931 teachers in schools under the Chachoengsao provincial administrative organization. The sample group consisted of 400 teachers in schools under the control of the Chachoengsao provincial administrative organization (Yamane, 1970) at 95 percent confidence. The randomly stratified classification of teachers in schools affiliated with local administrative organizations in Chachoengsao Province in each district.

4.3 Research instruments

The tool for this research was a questionnaire consisting of 3 parts as follows:

Part 1 The questionnaire on personal factors of respondents include gender, age, education level, income level, and job title. The questionnaire was a multiple choice.

Part 2 The factors influencing the administration of basic education institutions were questionnaire, including participation, external factors, internal factors, and educational management processes. The questionnaire was based on a rating scale of 5 levels, i.e. very good, good, fair, poor, very poor.

Part 3 The questionnaire on the administration of basic educational institutions of local administrative organizations in Chachoengsao Province was based on a rating scale of 5 levels, i.e. very good, good, fair, poo, very poor.

4.4 Data collection

The researcher conducted the data collection according to the following steps:

1. The researcher requested a letter from the Graduate School of Suan Sunandha Rajabhat University to the administrators of the educational institutes under the Chachoengsao provincial local administrative organization for assistance in data collection.

2. The researcher conducted the data collection on their own and the questionnaire was returned after the respondents filled out the information.

3. The returned questionnaires were used to verify their integrity for data analysis.

4.5 Data analysis

1. Respondents' personal factors were classified by gender, age, education level, income level and job position. Frequency and percentage.

2. Information about the administration of basic education institutions of local government organizations in Chachoengsao Province and factors influencing the administration of basic education institutions. The mean, standard deviation, decision criterion and consideration criteria were analyzed. The researcher determined the interpretation of opinion scores into 5 levels and used a 5-level estimation scale as follows:

Average score 4.21 – 5.00 Very good

Average score 3.41 – 4.20 Good

Average score 2.61 – 3.40 Fair

Average score 1.81 – 2.60 Poor

Average score 1.00 – 1.80 Very poor

4. Multiple regression analysis with enter methods to determine the influence of factors influencing the administration of basic educational institutions of local administrative organizations in Chachoengsao Province The statistical significance was set at the 0.05 level.

5. Data conclusion

1. Most respondents were female for 59.15 percent. Most respondents were aged 41 - 50 years for 68.39 percent. Most of the respondents had a bachelor's degree for 89.19 percent. Most respondents had income levels of 30,001 -40,000 baht, 57.06 percent, and 68.91 percent were skilled teachers.

2. The administration of basic education institutions of local administrative organizations in Chachoengsao province was at a high level ($\overline{X}$=3.98, S.D.=0.50). When considering each aspect, it was found that budget management is the most average ($\overline{X}$=4.05, S.D.=0.57). Followed by academic administration ($\overline{X}$= 4.01, S.D.=0.57), general administration ($\overline{X}$=3.96, S.D.=0.54), and personnel management ($\overline{X}$=3.86, S.D.=0.48) respectively, with details in Table 1.

Table 1 Mean and Standard Deviation of Basic Educational Institution Administration of Local Administrative Organizations in Chachoengsao Province.

Field	Name List	$\overline{X}$	S.D.	Result
1.	Academic administration	4.01	0.57	Good
2.	Budget management	4.05	0.50	Good
3.	Personnel management	3.86	0.48	Good
4.	General administration	3.96	0.54	Good
	Total	3.98	0.50	Good

3) Participation factors, external factors, internal factors, and educational processes affect the administration of basic educational institutions of local administrative organizations in Chachoengsao Province by 52.98%.

6. Summary and Discussion

   1. The administration of basic educational institutions by local administrative organizations in Chachoengsao province was at a "high" level. When considering each aspect, it was found that the budget management aspect had the highest average (4.05), followed by academic administration (4.01), general administration (3.96), and personnel management (3.86), respectively. This is because the local government organization plays an important role in the administration of basic education institutions. Therefore, guidelines and policies for the administration of educational institutions have been established to achieve the specified goals, and the results of the study are consistent with the research results of Jongrak Saen-en (2020), who has studied the educational management of local government organizations in Thailand. The results showed that the educational management of local government organizations in Thailand was at a "high" level.

   2. Participation factors, external factors, internal factors, and educational management processes affect the administration of basic educational institutions by local administrative organizations in Chachoengsao Province. This is because the Chachoengsao provincial administrative organization encourages participation in the administration of educational institutions. There is an analysis of external and internal factors and a study of the educational management process, thereby enabling the school administration of the local administrative organizations to achieve maximum efficiency. The results of the study are consistent with the research results of Weena Mapate (2561) who studied local education management: a case study of Tha Phra Municipal School, Muang District, Khon Kaen Province. The results showed that local education management was influenced by participation, internal factors, external factors, and educational management processes.

7. Suggestions

7.1 Suggestions for applying the research results

   (1) The local government organization in Chachoengsao province should promote educational institutions to have systematic academic administration, continuous evaluation, and measurement.

   (2) The local government organizations in Chachoengsao province should allocate a sufficient budget to basic education institutions to use in the process of teaching and learning to be more efficient.

   (3) The local government organization in Chachoengsao province should encourage basic education institutions to allocate educational personnel with knowledge and abilities in accordance with the context of the educational institution.

   (4) The local government organizations in Chachoengsao province should encourage educational institutions to have more efficient general administration. They should use modern equipment for communication between educational institutions and local governments and related agencies.

7.2 Suggestions for future research

   The next study should be a combination of both qualitative studies. Interviews to collect qualitative data should be adopted to collect data from the administrators of the schools, teachers, and the administration of the

local administrative organizations to gain insights to use them as guidelines for the administration of basic educational institutions of the local administrative organizations to be most effective.

8. References

Jongrak Saen-en. (2020). Educational management of local government organizations in Thailand. *Journal of Administrative and Management Innovation, 8*(3),78-93.

Lippitt. (2009). Patterns of aggressive behavior in experimentally created social climate. *Journal of Social Psychology*, *18*(1), 19 -32.

Local government organizations. (2007). *Decentralization of local education management.* Bangkok: Thai Wattana Panich.

Ministry of Education. (2019). *National Education Act No. 4 B.E. 2562.* Bangkok: Teachers Council of Thailand.

Office of the Education Council Secretariat. (2016). *Decentralization of education to the locality.* Bangkok: Teachers Council of Thailand.

Sub-Committee on Educational Management and Human Development System Reform. (2015). *Education reform guidelines.* Bangkok: Ministry of Education.

Wagner,Tony. (2012). *Tony Wagner's Seven Survival Skills*. [On-line]. Accessed 4 March 2022. Available fromhttp://www.tonywagner.com/7-survival-skills.

Weena Mapate. (2561). Local Education Management: A Case Study of Tha Phra Municipal School, Muang District, Khon Kaen Province. *Journal Dhammathas Academic, 21*(2), 179-188.

Yamane,Taro. (1973). *Statistics: An Introductory Analysis*. (3rd ed). New York. Harper and Row Publications.

A CORRELATIONAL STUDY OF TEACHERS' PERCEPTIONS OF THE PRINCIPAL'S TRANSFORMATIONAL LEADERSHIP BEHAVIOR AND WORK MOTIVATION WITH ORGANIZATIONAL COMMITMENT AT WENFENG PRIMARY SCHOOL, SHANDONG PROVINCE, CHINA

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ABSTRACT

This study explored the relationship between the principal's transformational leadership behavior and work motivation with organizational commitment at Wenfeng Primary School, Shandong Province, China. The sample consisted of 130 full-time teachers who taught during the academic year 2021-2022. A quantitative correlational research design was employed to determine the level of the principal's transformational leadership behavior, teachers' work motivation and organizational commitment. Teachers' perceptions of the principal's transformational leadership behavior were measured using the Multifactor Leadership Questionnaire (MLQ). Work motivation was measured using the Multidimensional Work Motivation Scale (MWMS) and Organizational commitment was measured using the Organizational Commitment Questionnaire (OCQ). The data collected was analyzed by using descriptive statistics (means and standard deviations) and correlational analysis (multiple correlation coefficient). Findings showed that the overall level of teachers' perceptions of their principal's transformational leadership behavior at the school was high. The overall level of teachers' perceptions of their degree of work motivation was moderate and the overall level of teachers' perceptions of organizational commitment was high. *Transformational Leadership Behavior* was significantly positively correlated with *Organizational Commitment* ($r = .78$, $p < .001$), at a significance level of .05. *Work Motivation* was significantly and positively correlated with *Organizational Commitment* ($r = .81$, $p < .001$) at a significance level of .05. The combination of the principal's *Transformational Leadership Behavior* and teachers' *Work Motivation* was significantly correlated with *Organizational Commitment* at the target school.

Keywords: Teachers' Perceptions, Transformational Leadership, Organizational Commitment, Work Motivation

1. Introduction

With a wide range of global challenges arising in the world nowadays, educational reform, quality education and leadership effectiveness have gradually drawn attention from scholars and practitioners. School principals, who take charge of and are responsible for leading changes and improving school performance and effectiveness, are at the forefront of this focus. Nowadays different leadership styles are employed by school principals which are based on their specific school contexts. Transformational leadership is such a style which has been popular (Leithwood & Jantzi, 2000). Transformational leadership behavior is an essential factor by which school principals can address the everchanging challenges of their schools by focusing on the development of workers and motivating them to make new changes for their schools (Lakmal, 2013). School restructuring benefits in a shift from instructional leadership to transformational leadership (Ibrahim et al., 2014). Notwithstanding, the role of teachers is vital in every stage of school development and reform. Teachers who actively perform their duties or make efforts to achieve school goals have higher work motivation, which is a driving force for them to enjoy their job, find satisfaction and have a sense of achievement. Previous studies (Raman et al., 2015; Selamat et al., 2013; Zacharo et al., 2018) have shown that an increasing number of teachers are more willing to get involved in making contributions to the success of their schools due to the transformational leadership behavior of their principal. This positively impacts the achievement of school goals, organizational performance, and their professional competences. Based on the Chinese Teacher Development Report during 2020-2021, published by Northeast Normal University, primary school teachers are assuming a heavier workload than ever before. School principals are motivating teachers through use of contingent rewards, job appraisals, and opportunities of promotion, which in many ways can be effective. However, these teachers may also benefit from the intrinsic motivation provided through a transformational leadership style. This study aims to identify the relationship of teachers' perceptions of transformative leadership behavior and work motivation with their organizational commitment at Wenfeng Primary School, Shandong Province, China to obtain a fuller and deeper picture of the actual phenomena in specific setting. The school principal at target school places a high value on improving teachers' qualities and professional development through various means, which highly stimulates the improvement of teaching skills, work motivation, organizational commitment, and school performance. Thus, the target school is suitable for the researcher to investigate the relationship in this study.

2. Research Objectives

The following objectives form the basis of the current study:

(1) To determine the level of teachers' perceptions of the principal's transformational leadership behavior, work motivation of primary school teachers, and organizational commitment of primary school teachers at Wenfeng Primary school, Shandong Province, China.

(2) To determine whether there is a significant relationship of teachers' perceptions of the principal's transformational leadership behavior and work motivation with organizational commitment at Wenfeng Primary School, Shandong Province, China.

3. Literature Review

3.1 Related Concepts and Theories

Transformational leadership is a leadership style in which leaders appeal to the potential of workers and motivate them to perform beyond their expectations and self-interests for the common good of their organization. Leaders' behaviors inspire workers to contribute to the achievement of the shared visions and goals of their organization rather than their personal goals. Workers feel empowered to deal with specific tasks with strong confidence under the influence of leaders (Jovanovica & Ciricb, 2016). Leaders pay attention to the needs of workers and transform them into change agents. According to Avolio and Bass (1985), there are four dimensions of transformational leadership: *Idealized influence*, *Inspirational motivation*, *Intellectual Stimulation*, and *Individualized Consideration*. Idealized influence refers to the leaders' charisma as role models for their workers. Followers admire, respect, and follow their leaders because of their distinctive qualities, determination, and phenomenal competencies. At the same time, they are willing to emulate and have the same vision as the leaders. Individualized consideration refers to the behaviors that leaders understand and satisfy workers' individual needs as advisors and even promote the actualization for their development. Workers feel strong support from their leaders, which facilitates their commitment towards their organization. Inspirational motivation refers to the behaviors that leaders inspire workers to make them perform beyond their expectations. Workers are guided to cope with challenges provided by leaders with meaning. They could actively get integrated into working out the solutions for the common good of their organization (Ibrahim et al., 2014). Intellectual stimulation refers to the behaviors that leaders tackle the challenges or problems with workers and help them to approach old problems from a new angle in an innovative way, which highly develop their competencies to higher levels and enhance their commitment towards their organization (Geijsel et al., 2003).

Work motivation is defined as a driving force for people to stimulate their passion for the job, improvement of their job performances, and willingness to work together effectively to achieve goals (Mangkunegara & Octorend, 2015). There are four concepts that are related to work motivation: *External Regulation*, *Introjected Regulation*, *Identified Regulation*, and *Intrinsic Motivation*. External regulation refers to how people are motivated to perform an activity out of external incentives like getting rewards, promotion or being afraid of punishment. Identified regulation refers to how people are motivated to perform an activity out of valuing its importance from their perspective. Introjected regulation refers to how people are motivated to perform an activity to avoid social pressure and guilt or to boost self-worth. Intrinsic motivation refers to the inherently autonomous motivation that people are willing to perform an activity out of passion and interest. Work motivation is vital in influencing the productivity of the followers willing to contribute to their work out of internal or external incentives. Pinder et al. (2014) stated that work motivation is a positive force from both within and beyond human beings to undertake work-related actions. Work motivation is essential for leaders to consider for an energetic organizational atmosphere and better school performance.

Organizational commitment is a sense of loyalty, and belonging employees have towards the organization they work for. There are three dimensions related to organizational commitment: *Affective*

Commitment, *Continuance Commitment*, and *Normative Commitment*. Affective commitment refers to employees' attachment to their organization out of their willingness and own volition. Continuance commitment refers to employees' fear of the costs if they leave the organization. Normative commitment refers to employees' strong obligation to the organization by remaining (Joo et al., 2012). Leaders need to create a supportive environment for followers, provide benefits for them such as opportunities for professional development, bonus, job promotions, pay increases, and most importantly, encourage followers to identify with the shared goals of their organization and get involved in the organization development (Hulpia et al., 2011).

3.2 Related literature and Previous Studies

Based on the previous study conducted by other researchers, Ibrahim et al. (2014) found a significant, positive, and moderately strong correlation between transformational leadership and teachers' organizational commitment and teacher profession in 27 secondary schools in Sarawak, Malaysia. Khasawneh et al. (2012) reported a significant, positive, moderately strong relationship between transformational leadership and vocational teachers' organizational commitment at Jordanian High schools, Jordan, Arabia. Tentama and Pranungsari (2016) reported that there was a significant, positive, and strong relationship between teachers' work motivation and job satisfaction with organizational commitment in Extraordinary School 1, Bantul Yogyakarta, Indonesia. Salleh et al. (2016) found that a significant, positive, and strong correlation between work motivation and organizational commitment in an engineering company in Dungun, Terenggaru, Malaysia. George and Sabapathy (2011) conducted a study and confirmed that there was a significant, positive, and moderate strong relationship between work motivation and organizational commitment of degree college teachers. Since the relevant studies are scarcely conducted in China especially in the school context, therefore this study intends to identify the relationship of teachers' perceptions of the principal's transformative leadership behavior and work motivation with their organizational commitment at target school simultaneously to provide a complete picture of the specific situation from a new perspective.

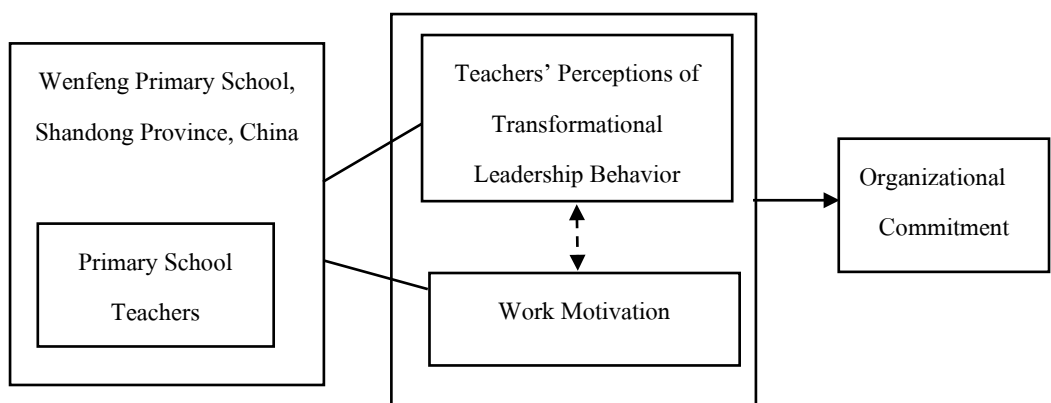**3.3 Conceptual Framework of the Study**

Figure 1 Conceptual Framework of the Study

3.4 Research Hypothesis

There is a significant relationship between teachers' perceptions of the principal's transformational leadership behavior and work motivation with organizational commitment at Wenfeng Primary School, Shandong Province, China, at a significance level of .05.

4. Research Methodology

4.1 Research Design

The design of the research was a correlational design, using quantitative research, to determine the level of transformational leadership behavior, work motivation, and organizational commitment. Data collected was analyzed by using descriptive statistics (means and standard deviations) and Correlational analysis (Multiple correlation coefficient).

4.2 Population and Sample

The population of this study was comprised of full-time teachers who had taught during the academic year 2021-2022 at Wenfeng Primary School. The population sampling method was used in this study. Therefore, the sample consisted of all 130 teachers at the school.

4.3 Research Instrument

Teachers' perceptions of the principal's transformational leadership behavior was measured using the Multifactor Leadership Questionnaire (MLQ), developed by Bass and Avolio in 1995 and comprised of 20 items covering four subscales of transformational leadership behavior. Responses are rated using a 5-point Likert-type scale that range from "1 = not at all, 2 = once in a while, 3 = sometimes, 4 = fairly often, 5 = frequently". Work motivation was measured using the Multidimensional Work Motivation Scale (MWMS), developed by Deci and other researchers in 1985 and comprised of 16 positive items covering four subscales of work motivation. Responses are rated using a 7-point Likert-type scale that range from "1 = not at all, 2 = very little, 3 = a little, 4 = moderately, 5 = strongly, 6 = very strongly, 7 = completely very strongly". Organizational commitment was measured using the Organizational Commitment Questionnaire (OCQ), developed by Allen and Meyer in 1997 and comprised of 18 items covering three subscales of organizational commitment. Responses are rated using a 5-point Likert scale that range from "1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree".

4.4 Data Collection

A total of 130 questionnaires were distributed online and 120 questionnaires were returned resulting in a 92.3 percent return rate.

4.5 Data Analysis

Descriptive statistical analysis and correlational analysis was carried out through use of a statistical package.

5. Research Findings

Table 1 below summarizes the findings for Objective One. The overall mean score for the level of teachers' perceptions of transformational leadership behavior at target school was 3.99 and interpreted in the scale of 3.51-4.50 as high. *Idealized Influence* had the highest mean score of 4.06, followed by *Inspirational Motivation* with a mean score of 3.98, then *Intellectual Stimulation* with a mean score of 3.97, while *Individualized Consideration* received a mean score of 3.94. Based on the criteria of interpretation, transformational leadership was perceived overall as high.

Table 1 Summary of Means and Standard Deviations of Teachers' Perceptions of Transformational Leadership Behavior at Wenfeng Primary School (N =120)

Transformational Leadership	Mean	SD	Interpretation
Idealized Influence	4.06	.67	High
Inspirational Motivation	3.98	.67	High
Intellectual Stimulation	3.97	.67	High
Individualized Consideration	3.94	.67	High
Total	**3.99**	**.65**	**High**

Table 2 summarizes the findings for Objective Two. The overall mean score for the level of teachers' perceptions of their degree of work motivation was 4.30 out of a scale of 3.51-4.50, which was interpreted as moderate. The research findings also revealed that *External Regulation* had the highest mean score of 4.36, followed by *Introjected Regulation* at 4.29, then *Identified Regulation* at 4.29 as well. *Intrinsic Motivation* received the lowest mean score of 4.25. Based on the criteria of interpretation, the total perception of teachers on their degree of work motivation were interpreted as moderate.

Table 2 Summary of Means and Standard Deviations of Teachers' Perceptions of their Degree of Work Motivation at Wenfeng Primary School (N =120)

Degree of Work Motivation	Mean	SD	Interpretation
External Regulation	4.36	1.30	Moderate
Introjected Regulation	4.29	1.32	Moderate
Identified Regulation	4.29	1.29	Moderate
Intrinsic Motivation	4.25	1.33	Moderate
Total	**4.30**	**1.28**	**Moderate**

Table 3 summarizes the findings for Objective Three. The overall mean score for *Organizational Commitment* was 3.96 from a scale of 3.51-4.50, which was interpreted as high. The total mean score for each sub-dimension respectively was: *Affective Commitment* with a mean score of 4.02, *Normative Commitment* with

a mean score of 3.95, and *Continuance Commitment* with a mean score of 3.91. Based on the criteria of interpretation, the scores were interpreted at a high level.

Table 3 Summary of Means and Standard Deviations of Teachers' Perceptions of Organizational Commitment at Wenfeng Primary School (N =120)

Organizational Commitment	Mean	SD	Interpretation
Affective Commitment	4.02	.74	High
Continuance Commitment	3.91	.67	High
Normative Commitment	3.95	.70	High
Total	**3.96**	**.69**	**High**

Table 4 below shows the correlation between teachers' perceptions of the principal's *transformational leadership behavior* and *work motivation* with their *organizational commitment*. It demonstrates a significant, very strong correlation between two independent variables and one dependent variable whereby R = .92, F (2,117) = 340.82, p < .001. The correlation coefficient obtained reveals that the two independent variables account for 85% of the variance of the dependent variable, R^2 = .85.

Table 4 Multiple Correlation Between Teachers' Perceptions of the Principal's Transformational Leadership Behavior and Work Motivation and Organizational Commitment (N =120)

Variables	R	R^2	*dfs*		F	p
			Total	Residual		
Independent						
1. Transformational Leadership Behavior	.92	.85	2	117	340.82	< .001
2. Work Motivation						
Dependent						
Organizational Commitment						

6. Discussion

The overall mean score of teachers' perceptions of the principal's transformational leadership behavior at Wenfeng Primary School was at a high level, which was perceived as high as all the sub-dimensions as well. Among four dimensions related to the first objective, *Idealized Influence* had the highest mean score, followed by *Inspirational Motivation*, then *Intellectual Stimulation*, lastly *Individualized Consideration* received the lowest mean score. In addition, the overall mean score of teachers' perceptions of their degree of work motivation at Wenfeng Primary School was at a moderate level, which was also considered as moderate as all the sub-dimensions. Out of four dimensions pertaining to the second objective, *External Regulation* received the highest

mean score, followed by *Introjected Regulation* and *Identified Regulation*, lastly *Intrinsic Motivation* got the lowest mean score. Apart from that, the overall mean score of teachers' perceptions of organizational commitment at Wenfeng Primary School was at a high level, which was taken as high as all the dimensions as well. Among three dimensions related to the third objective, *Affective Commitment* had the highest mean score, followed by *Normative Commitment*, then *Continuance Commitment* received the lowest mean score. Furthermore, teachers' perceptions of the principal's *transformational leadership behavior* were found to be significantly, positively, strongly correlated with *organizational commitment*. Teachers' *work motivation* was found to be significantly, positively, very strongly correlated with *organizational commitment* as well. As to the correlation between three variables, the combination of teachers' perceptions of the principal's transformational leadership behavior and teachers' work motivation is significantly, very strongly correlated with organizational commitment at Wenfeng Primary School, Shandong Province, China.

The results of the study illustrated that the overall level of teachers' perceptions of the principal's transformational leadership behavior at target school was high. Other studies that have determined that there are correlations between the same variables. Khasawneh et al. (2012) conducted research on the relationship between transformational leadership and organizational commitment of vocational teachers in Jordan and found that there was a strong correlation between the variables. Additionally, in a study by Ibrahim et al. (2014) on schoolteachers in Malaysia it was also found that transformational leadership was correlated with organizational commitment.

Similarly, findings related to work motivation have also been seen in other research studies (e.g., Tentama & Pranungsari, 2016; Salleh et al., 2016). The results of the study indicated that there is a significant, very strong correlation between teachers' perceptions of the principal's transformational leadership behavior and work motivation and organizational commitment at target school. Since the relevant studies are scarcely conducted in China especially in the school context, therefore this study intends to identify the relationship of teachers' perceptions of the principal's transformative leadership behavior and work motivation with their organizational commitment at target school simultaneously to provide a fuller picture of the specific situation from a fresher angle.

7. Recommendations

As the study findings have shown the levels of transformational leadership, job commitment and work motivation to be relatively high at this school, the findings demonstrate that at the target school is demonstrating the benefits of effective leadership and this is shown by the teachers' motivation and commitment. Thus, the following recommendations are made with intent to encourage further positive results and increasing benefits for the school. Firstly, the school can benefit even more by focusing on the two-way exchange in communication between school principal and teachers. The school principal can listen to teachers' needs considerably, which will help to assign appropriate tasks to teachers for the development of their career. Additionally, school principals can encourage teachers to be more self-motivated by using the principals of transformational leadership. Motivating teachers to contribute out of their interest in and passion for their job is vital for the development of

the school. Secondly, teachers should be allowed opportunities to positively exchange opinions with peers to learn from each other, improve their own abilities or get out of their fixed mindset to think out of the box. Proposing fresh ideas to the school principal and administrators and expressing individual or professional needs play a vital part in making leaders recognize teachers' value and importance in this school and further stimulate their intrinsic motivation in return. Lastly, future researchers may want to investigate similar relationships in other contexts to gain more insight into the variables or conduct other statistical analysis to find additional relationships and factors that influence transformational leadership, job commitment and work motivation.

9. References

Bass, B. M. (1985). *Leadership and performance beyond expectations*. Collier Macmillan.

Bass, B. M., & Avolio, B. J. (1995). The multifactor leadership questionnaire form 5x. Palo Alto, CA: Mind Garden.

Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of research in personality*, *19*(2), 109-134.

Ibrahim, M. S., Ghavifekr, S., Ling, S., Siraj, S., & Azeez, M. I. K. (2014). Can transformational leadership influence on teachers' commitment towards organization, teaching profession, and students learning? A quantitative analysis. *Asia Pacific Education Review*, *15*(2), 177-190.

Joo, B. K. B., Yoon, H. J., & Jeung, C. W. (2012). The effects of core self-evaluations and transformational leadership on organizational commitment. *Leadership & organization development journal*, *33*(6), 564-682.

Jovanovica, D., & Ciricb, M. (2016). Benefits of transformational leadership in the context of education. *The European Proceedings of Social & Behavioural Sciences EpSBS*, 497-503.

Khasawneh, S., Omari, A., & Abu-Tineh, A. M. (2012). The relationship between transformational leadership and organizational commitment: The case for vocational teachers in Jordan. *Educational Management Administration & Leadership*, *40*(4), 494-508.

Lakmal, D. (2013). Transformational Leadership Behavior: Theory and Reflections. *Available at SSRN 2398486*.

Mangkunegara, A. P., & Octorend, T. R. (2015). Effect of work discipline, work motivation and job satisfaction on employee organizational commitment in the company (Case study in PT. Dada Indonesia). *Universal Journal of Management*, *3*(8), 318-328.

Meyer, J. P., & Allen, N. J. (1997). *Commitment in the workplace: Theory, research, and application*. Sage publications.

Pinder, C. C. (2014). *Work motivation in organizational behavior*. Psychology press.

Raman, A., Cheah, H. M., Don, Y., Daud, Y., & Khalid, R. (2015). Relationship between principals' transformational leadership style and secondary school teachers' commitment. *Asian Social Science*, *11*(15), 221-228.

Salleh, S. M., Zahari, A. S. M., Said, N. S. M., & Ali, S. R. O. (2016). The influence of work motivation on organizational commitment in the workplace. *Journal of Applied Environmental and Biological Sciences*, *6*(58), 139-143.

Tentama, F., & Pranungsari, D. (2016). The Roles of Teachers' Work Motivation and Teachers' Job Satisfaction in the Organizational Commitment in Extraordinary Schools. *International Journal of Evaluation and Research in Education*, *5*(1), 39-45.

Zacharo, K., Koutsoukos, M., & Panta, D. (2018). Connection of teachers' organizational commitment and transformational leadership. A case study from Greece. *International Journal of Learning, Teaching and Educational Research*, *17*(8), 89-106.

"WHO OWNS THE ENGLISH LANGUAGE?"

AN INVESTIGATION AND IMPLICATIONS FOR LANGUAGE TEACHING

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ABSTRACT

This academic paper aims to investigate the status of the English language in the today's situation. It is undeniably believed by a great number of Thai students and people, in general, that sounding native‑like in the English language is important. This paper offers another aspect and belief by pointing out that the English language should be owned by the people who use it for the main purpose of communication. With this aspect, Thai students' English communicative competence can fruitfully be developed if they set desired outcomes of the language learning as the ability to communicate intelligibility, comprehensibility, and interpretability, not the ability to use the language exactly as a native speaker does. Teachers, therefore, play a significant role in the teaching and learning in the classroom. Additional role for teachers is therefore designers, who can design appropriate teaching approaches and making classroom environment as accommodating and nurturing as possible.

Keywords: English as an international language (EIL); communicative competence in EIL; ownership of English;

1. Introduction

"If English can no longer be said to be the property of an exclusive club of Inner Circle locations (Widdowson, 1994), then the notion of the native speaker as the norm for ELT must increasingly be called into question" (Burns, 2005, p.3).

Obviously, a lot of questions have been raised concerning the language communicative competence of the non‑native English speakers. Some of the highlighted questions include *"Who owns the English language?"* and *"Which standard should the communicative competence of the non‑native English‑speaking countries be based on?"* These sorts of questions have always been highlighted in English language education because they seem to have an impact on the language competence of our students. Quite a vast number of students obtain low

competence and performance in English in spite of the fact that they have been studying English for more than 12 years. Many students think that they are "failing" to learn and acquire the English language. They believe that they would never be able to excel their English, and thus many of them have become afraid of or given up on improving it. A question, then, emerges whether or not we should base our communicative competence on those native speakers.

In this paper, the first part will present the definition review of communicative competence proposed by theorists and educators. Then, the explanation of English as an International Language (EIL) in the Expanding Circle countries is highlighted. After that, the conclusion whether or not communicative competence in EIL necessarily needs to be that of native English speakers. If so, how much of the native norms can be considered. Finally, language teaching and instructional approaches will be discussed and suggested in relation to communicative competence in the use of EIL.

2. Objective

(1) To review the definition of communicative competence in the English language proposed by theorists and educators.

(2) To explain English as an International Language (EIL) in the Expanding Circle countries

(3) To conclude whether or not communicative competence in EIL necessarily needs to be that of native English speakers

3. Literature Review

3.1 Communicative Competence in the English Language

It has been long known that language teaching and learning is based on the idea that the goal of language acquisition, especially the second language acquisition, is communicative competence. It is undeniable to say that a vast number of people, who speak English as a second language, tend to view communicative competence on the basis of the standard English and communicative norm (such as American norm or British norm) which are highly valued in some prestigious social functions such as conferences, lectures, public meetings, and examinations. It can be implied here that people mistakenly understand that linguistic competence and communicative competence are analogous. Therefore, it is essential to investigate the definition of communicative competence, so that it can unfold the view of communicative competence in EIL.

Language competence can be seen in two different viewpoints, namely linguistic competence that deals with producing and understanding grammatically correct sentences, and communicative competence, which was first coined by him, lies in its focus on social context as an essential factor determining language ability in interacting with one another in a language community. Chomsky (1965) believes that linguistic competence can be separated from the rest of communicative competence and studied in isolation. On the contrary, Dell Hymes' (1967, 1972, as cited in Brown, 1994) criticism of the concept of linguistic competence is that it is an abstraction without any relevance to actual use, and it is impossible without studying forms along with the ways in which

they are used. To this point, it is to say that communicative competence, indeed, includes the whole of linguistics competence plus the whole of forms for using language items in context and other factors like attitudes, values, and motivation.

Second language acquisition emerged around the 1970s, evidence to support a multi- notion of communicative competence for second language teaching was proposed. Canale and Swain (1980, as cited in Brown, 1994) defined communicative competence in four different components, namely grammatical competence, discourse competence, sociolinguistic competence, and strategic competence. The first two categories define more on the linguistic system while the last two focus on the more functional aspects of communication.

Canale and Swain's definition mentioned above has undergone some other modifications over the years. Lyle Bachman (1990, cited in Brown, 1994) , claimed by Brown as the best modification to explain communicative competence, adds strategic competence as an entirely separate element of communicative language ability. Hence, strategic competence serves an important function of making the final decision on the productive and receptive means for negotiating meaning among speakers.

As can be seen here, the later definitions of communicative competence relate to those non- native English speakers. Communicative competence in language teaching focuses on the ability to use the language correctly and appropriately to accomplish communication goals. The desired outcomes of the language learning process are the ability to communicate intelligibility, comprehensibility, and interpretability, not the ability to use the language exactly as a native speaker does.

3.2 Communicative Competence in the Use of English as an International Language

In the current situation, the focus of communicative competence seems to be that of non-native speakers, and thus it would be worthwhile to investigate how communicative competence is measured in English as an International Language (EIL) based on the findings from literature.

According to Kachru (1986, as cited in Burns, 2005) , he proposes a three- circle model which distinguishes native speakers in the Inner Circle from the non-native speakers in the Outer and Expanding Circles. His notion depicts a distinction between English used by native norms and non- native English speakers. The model is marked by the fact that there is no standard worldwide English from its traditional centers as a language that is intra-national and has international varieties. In the model, English as a Native Language (ENL) represents the Inner Circle, English as a Second Language (ESL) represents the Outer Circle, and English as a Foreign Language (EFL) by the Expanding Circle. It is to say that no one group owned English but it was owned by those who speak it.
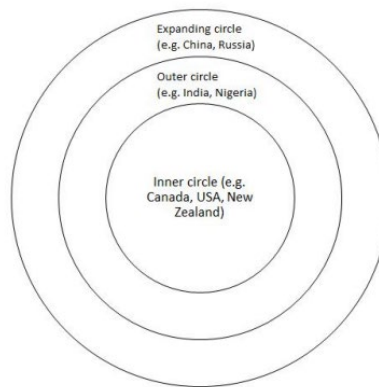
Figure 1 Kachru's three concentric circles model (1986)

On the opposite viewpoint, Quirk（1985）argues that a single standard English（American or British）should be promoted worldwide. He indicates a view of variation from the native standard English as interlanguage on the way to native speaker standard usage and accordingly as inappropriate pedagogical models in non‑native contexts.

These two opposing key players mainly focus their arguments on the users in the Outer Circle, while they agree that Expanding Circle countries are "dependent on the norms set by the native speakers" (Acar, 2007: p. 43）. This agreement, however, is rejected and argued strongly by Jenkins（2000）and Seidlhofer（2001）. Jenkins's（2000）research project on phonology EIL argues that some sounds that are often found in native speakers' speech but that are difficult for non‑native speakers to produce are not necessary for international intelligibility. She argues that speakers of ELF use their English primarily to communicate with other non-native English speakers of English in non‑native English‑speaking settings. They need, therefore, to be intelligible to and to understand other non‑native speakers rather than to blend in with native speakers. On the same note, a study conducted by Phan Le Ha (2009) on "English as an international language: international student and identity formation" revealed that Asian international students from China, Taiwan, Korea, Indonesia and the Philippines, studying in Thailand, felt that they were in control of their English and enjoyed multiple positions with respect to English and identified themselves with English in diverse ways.

Other arguments against native English norms in EIL have also been contributed such as Kramsch（1998, as cited in Burns, 2005）, Seidlhofer（2003）, argues that it is unrealistic and far‑reached for non‑native English speakers to achieve perfect communication through 'native‑like.' The goal of using the language is to achieve their purpose in communication which should not be based on the native model. From the intercultural aspect, Michael Byram（1997）raises a notion on FLT/EIL communicative competence through the role of learners of English as a foreign or international language should not be as imitators of native speakers but as social actors engaging with other social actors in a particular kind of communication and interaction which is different from that between native speakers.

3.3 Communicative Competence in the Use of EIL and Native Norms in Language Teaching

The early approaches used in Foreign Language Teaching (FLT) focuses on grammar translation mainly in writing. Translating sentences, grammar instruction and reading aloud are employed in a classroom. Around the mid‑19th century, the focus was shifted from writing to speaking; thus, 'oral based teaching methodology' was introduced. Nowadays, the latter is mainly focused in a classroom setting through different approaches. However, the native English standard is still a critical issue in teaching and learning. On the one hand, there are arguments going against the idea of basing the teaching on the norms of native speakers for various reasons. On the other hand, others support the traditional fixation in many English Language Teaching (ELT) contexts on the notion of working with one standard, either British or American English, so that the competence of non‑native speakers of English can be measured and assessed.

The argument for having a native norm as a model can be seen in classes where teachers mainly teach grammar in the classroom and do all kinds of activities to promote the 'correct English' such as pattern drills, grammar‑based syllabuses, and so forth. In English language instruction in the EFL/EIL situation, even though communicative language teaching is instructionally promoted, grammar teaching has never left the classroom. The major problem is not the lack of instruction on grammatical features, but the lack of opportunities for communicative language use.

In Singapore, English is spoken as their second language. They have English as an official language which is called "Singlish." However, there is a controversy going against the use of their version of English. There is a movement called 'The Speak Good English Movement' (SGEM) in 2000 "with the objective of promoting the use of 'good' English among Singaporeans but with the real intent, of eliminating Singlish altogether" (Wee, 2005, cited in Ferrell and Tan Kiat Kun, 2007, p. 396). Also, the government has entrusted the Ministry of Education to maintain an acceptable standard of English in the school system that does not include the use of Singlish. Thus, the instruction would focus on basic rules on the "international terms of grammar, and vocabulary", which can be implied to use Standard English (native norms) as a model. Standard English is also emphasized in English language syllabus 2020 at the secondary level developed by the Ministry of Education of Singapore (The Ministry of Education of Singapore, 2020)

Cook (1999) argues that language teaching would benefit by paying attention to the L2 users rather than concentrating primarily on the native speakers. "The native speaker model is unnecessary because students get many things out of learning the language other than sounding like native speakers" (p.198).

In Koreen's (2005) thesis, she reveals that teachers teaching adult ESL change their teaching approach from a grammar‑based approach to a task‑based approach because they realize that communicative competence included "actional, sociocultural, discourse, and strategic competencies, in addition to linguistic competence" (p. iii). Thus, their major criterion for assessment changes from grammatical accuracy to communicative fluency — "the learner's ability to perform the language task successfully, to "get the message across" (p. iv).

Two more research studies suggest that nativelike goal is not the focus of instruction and real‑life communication where English takes place in non‑native settings, which can be seen in their suggestion on

promoting communication strategies, rather than native competence. Firstly, Somsai and Intaraprasert (2011) suggest in their research study concerning Thai university students, majoring in English at Rajamangala Universities of Technology, and their oral communication problems that teachers should promote communication strategies which help them to cope with oral communication problems, namely (1) strategies for conveying a message to the interlocutor and (2) strategies for understanding the message to improve the communicative competence of language learners. Secondly, Waelateh and others (2019) conducted a study on "Distinctive Aspects of Native and Non-Native English-Speaking Teachers and Their Performances in Thai Universities" with 200 Thai students and 20 Thai English lecturers across four universities in Thailand. The results revealed that both students and the lecturers found that Native English-Speaking Teachers (NESTs) and Non-Native English-Speaking Teachers (NNESTs) were "equally qualified English teachers" (p. 228). Noteworthily, it showed that them being NESTs and NNESTs did not affect their teaching performance.

4. Discussion and Implications for Language Teaching

Based on the literature review, it can be concluded that native model can be considered and based on depending on where and who the speakers are using the language. In EIL, the desired outcomes of the language learning process are the ability to communicate intelligibility, comprehensibility, and interpretability, not the ability to use the language exactly as a native speaker does. It can also be said that the ownership of the English language does not belong to those speakers in the Outer and Expanding Circles when they use English in the dominant environment where English is not the main medium used by native speakers.

According to the evidence and notions of educators and linguists previously, the authors suggest that English use in the Expanding Circle countries should be taken into an account of accomplishing the main goal of successful communication rather than those of the native norms.

Being learners and teachers in the Expanding Circle countries, it is important for them to be aware of the status of English as an International Language (EIL) and the purpose of English use among people. Thus, they understand what communicative competence is taken into account in teaching and learning. For learning, the authors suggest as follows:

(1) Students will understand that achieving a nativelike goal is far-reaching. Moreover, by being EIL learners or users, they will realize that the English language is no longer owned by the Inner Circle countries. A foreign speaker has an equal power as a native speaker. Some aspects (e.g., basic grammar rules and vocabulary) of the native English speaker can be used as a model, so that they can carry out a conversation with people from diverse background effectively, while still maintaining its own identity such as accent and some distinctive vocabulary items as other varieties of native English such as American, Australian, or British do.

(2) Students or learners in the expanding circles may utilize their first language from which they can transfer strategies and linguistic knowledge. They are able to learn and apply rules that may aid in facilitating the acquisition process, etc. Thus, this will help to promote better attitudes towards learning English which refers to an important vehicle that can take them to an effective communication and a successful outcome in doing

business. Using the L1 more in teaching can also bring language teaching to the realization that it is helping students to use L2s, not imitate native speakers. In short, these changes can convince students that they are successful multi-competent speakers, not failed native speakers.

For teaching, the authors believe that a shift, where appropriate, from English as a Native Language (ENL) to English as an International Language (EIL) would have beneficial effects for the non‑native teachers. Once an alternative description of English is available and accepted, one which is not tied to its native speakers, 'non‑native' speaker teachers will no longer need to think of themselves as something they are not. Thus, they can choose for their students what approaches, methods, strategies and activities that would serve the purpose of English use and take language competence and language performance into account of English instruction.

Teachers, therefore, play a significant role in the teaching and learning in the classroom. Additional role for teachers is designers. Teachers must design appropriate teaching materials, choose the right approach and strategies that fit students' needs and interests

(1) Teaching approaches

As this paper suggests so far about communicative competence in the use of EIL, in language instruction, teachers should bear in mind that basic grammar and vocabulary which are based on those of native English speakers (Standard English) are to be emphasized; however, being able to use English intelligibly, appropriately, comprehensively is the end goal. Therefore, choosing the right approach and activities that would suit the learners is vital. Based on the literature and the theorists, Task‑based Learning (TBL) is proposed. Even though Communicative Language Teaching (CLT) is directly related to the theory of Communicative Competence (CC), it does not completely support structural knowledge of the language. Thus, fluency is more focused than accuracy in this approach, which does not match with the communicative competence in EIL. All of those educators applied TBL in their EFL classrooms and found this approach useful in promoting both form and function of the language.

These two approaches will help students enhance their learning and acquiring the language since they carry the structural, functional, and interactional aspects in the learning. Besides, teaching them communicative strategies is required and promoted in order for students to be able to negotiate and compromise in order to get messages across. Moreover, the intercultural aspect can also be included through activities and teaching materials. With this type of activities, teaching materials, and other external factors, students will become more motivated to learn.

(2) Classroom environment

The literature suggests that the learning environment should be accommodating. Humanistic techniques are encouraged. Teacher-student relationship is to be concentrated because this can promote extrinsic motivation and turn it to intrinsic one. Thus, learning English as an international or foreign language will become successful in terms of communicative competence and better performance. The classroom environment suggested in the literature involves working in pairs, small groups, and interactive activities that are of learners' interests and aptitudes.

7. Conclusion

Communicative competence in the English language refers to the notion of using the language to achieve the purpose in communication which should not be based on the native model. In the expanding circle countries, intelligibility, comprehensibility, and interpretability (as proposed by Kachru and Nelson in 2001(Burns, 2005) play such an important role in learning and acquiring a second language. Therefore, learners and teachers have to be aware of what it means to learn and teach English as an International Language (EIL). In the EIL context, many native norms are no longer taken into account as a goal to achieve in the learning. This will certainly take a burden off the teachers' shoulder and to make the teaching and learning English more realistic, enjoyable, accommodating, and achievable in terms of successful communication. Here, Communicative Language Teaching (CLT) and Task-based Learning (TBL) are most appropriate to the learners of EIL since they involve both forms and functions of language.

8. Suggestion

Introducing a variety of English and informing students of the goal in learning English with the focus on its functions and merely basic forms that are internationally accepted would help make the learning meaningful to the learners of EIL.

9. References

Acar, A. (2007). Standards and Competence in English as an International Language Pedagogy. *The Asian EFL Journal Quarterly, 9(4): Conference Proceedings*. (Online) retrieved from https://www.academia.edu/1196719/Towards_the_Development_of_Alternative_Criteria_for_International_Journal_Paper_Evaluation

Brown, D. (1994). *Principles of language learning and teaching*. (pp. 67, 226-229). Englewood Cliffs, New Jersey: Prentice Hall Regents.

Brown, D. (2000). *Principles of language learning and teaching*. CA: Pearson Education.

Burns, A. (2005). Interrogating new works of English language teaching. In Burns (Eds)*, Teaching English from a Global Perspective*. (pp. 3,7). Virginia: TESOL Publishing.

Byram, M. (1997). *Teaching and Assessing Intercultural Communicative Competence*. (pp. 21). Clevedon: Multilingual Matters.

Chomsky, N. (1965). *Aspects of the theory of syntax*. Cambridge, Mass.: MIT Press.

Cook, V. (1999). Going beyond the Native Speaker in Language Teaching. *TESOL Quarterly*, *33*(2), 185-209. Retrieved from http://www.jstor.org/stable/3587717.

Farrell, T.S.C. and Tan Kiat Kun, S. (2007). Language policy, language teachers' beliefs, and classroom practices. *Applied Linguistics*, *29*(3): 381-403. Oxford University Press.

Jenkins, J. (2000). *The phonology of English as an international language*. Oxford: Oxford University Press.

Kachru, B. (1985). Standards, codification and sociolinguistic realism: English language in the outer circle. In R. Quirk and H. Widowson (Eds.), English in the world: Teaching and learning the language and literatures (p. 11-36). Cambridge: Cambridge University Press.

Koreen, D.R. (2005). *Implementing the Canadian language benchmarks: Teachers' perceptions of changes in their teaching approaches, classroom practices and conceptions of Teaching.* (Master thesis, University of Manitoba). Retrieved from http://www.asian-efl-journal.com/

Phan Le Ha. (2009). "English as an international language: international student and identity formation", *Language and Intercultural Communication*, 9:3,201-214. Retrieved from http://dx.doi.org/10.1080/14708470902748855

Quirk, R. (1985). The English language in a global context. In R. Quirk & H. G. Widdowson (Eds.), *English in the world: Teaching and learning the language and literature*. (pp. 1-6). Cambridge: Cambridge University Press.

Richards, J.C., & Rodgers, T.S. (2001). *Approaches and methods in language teaching*. (2nd ed). (pp. 153-177, 223-243). Cambridge, UK: Cambridge University Presss. http://www.coe.int/t/dg4/linguistic/source/seidlhoferen.pdf

Seidlhofer, B. (2001). Closing a conceptual gap: The case for a description of English as a lingua franca *International Journal of Applied Linguistics*, *11*(2), 133-58.

Seidlhofer, B. (2003). A concept of international English and related issues: From 'Real English' to 'Realistic English'? *Strasbourg: Council of Europe*. Retrieved from http://www.coe.int/t/dg4/linguistic/source/seidlhoferen.pdf

Somsai, S. and Intaraprasert, C. (2011). Strategies for coping with face-to-face oral communication problems employed by Thai university students majoring in English. 11(3), 83-96. Retrieved from *GEMA Online Journal of Language Studies* database.

The Ministry of Education of Singapore. (2020). *English Language Syllabus Secondary Express Course Normal (Academic) Course*. Retrieved from https://www.moe.gov.sg/-/media/files/secondary/syllabuses/eng/sec_exp-na_els-2020_syllabus-(1).pdf

Waelateh, B., Boonsuk, Y., Ambele, E. A., & Wasoh, F.- ezah. (2019). Distinctive Aspects of Native and Non-Native English-Speaking Teachers and Their Performances in Thai Universities. *Journal of Human Sciences, 20*(2), 225–257. Retrieved from https://so03.tci-thaijo.org/index.php/JHUMANS/article/view/213176

Wongthon, Y. and Sriwanthana, S. (2007). Learning English outside the classroom: Case study of tuk-tuk drivers in Phranakhon Si Ayuthaya. *International Education Journal*, *8*(2), 433-448. Retrieved from http://iej.com.au

THE RELATIONSHIP BETWEEN TEACHERS' PERCEPTIONS OF LEADERSHIP CAPACITY, TEACHERS' SELF-EFFICACY, AND ITS EFFECTS ON THEIR PERCEPTIONS OF CLASSROOM MANAGEMENT STYLES AT A GUANGZHOU ELEMENTARY SCHOOL IN GUANGDONG PROVINCE, CHINA

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ABSTRACT

Much research and unprecedented demands have been placed on Chinese schools that have indicated the importance of conceptions in teachers' self-efficacy and the effect of school leadership. As education worldwide engages in reform, Guangdong Province, China is part of this movement that confirms that meaningful, lasting change occurs at the school level, with reflective leaders and teachers who are effective managers of the learning environment. This study aims to establish the relationship between teachers' perceptions of leadership capacity, teachers' self-efficacy, and its effects on their perceptions of classroom management styles. This study utilized a questionnaire from 100 respondents divided into the high leadership capacity questionnaire of Lambert (2003) to measure teachers' perception of leadership capacity; self-efficacy used questions from a study done by Woolfolk (1990), and classroom management style from Classroom Management Profile. Utilized Mean and Standard Deviations to measure the teachers' perception of leadership capacity, self-efficacy, and perceptions of classroom management styles. Pearson Product Moment Coefficient of Correlation was used to examine the relationship between the variable. Results of the Pearson correlation revealed there was a positive relationship of teachers' leadership capacity and classroom management styles, $(r\,(100) = .950, p = .000)$; teachers' self-efficacy and classroom management styles, $(r\,(100) = .618, p = .000)$.

Keywords: Leadership Capacity, Teachers' Self-Efficacy, Classroom Management Styles, Teachers' Perceptions

1. Introduction

Schools need teachers with effective classroom management to increase students' achievement and attain the sustainable development of schools. Many research concerns continue to support the need for teachers and managers on the effectiveness of classroom management under the topic of management (Burkett, 2011). Burkett (2011) cited evidence to suggest proper classroom management techniques can be used to improve the effects of teacher instruction. Finding ways to ensure the behaviors of classroom management and raise academic achievement is the responsibility of the classroom teacher. Teacher productivity can be a challenging requirement for the normal functioning of schools. Since the COVID-19 pandemic in recent years, many schools have faced the increasing pressure of survival and applied theory to practice for guaranteeing the effectiveness of classroom management. The pressure included maintaining the standards of the courses during the prolonged closure of schools.

One major influence on the effective management of the classroom is a teacher's self-efficacy. Self-efficacy is teachers' belief in their capabilities or skills to successfully execute each task in the classroom. Teachers will apply a classroom management style depending on their experience and self-efficacy. The teachers' self-efficacy is an element that contributes to being better improve the effectiveness of their classroom management styles. Another factor in effective management styles of the classroom is the school's initiative and leadership. If a school does not recognize or value classroom management skills in its teachers, the development of these skills suffers. This quantitative study examines the relationship between teachers' self-efficacy, perceptions of leadership capacity, and their effect on perceptions of classroom management styles at a Guangzhou Elementary School, in Guangdong Province, China. This research could provide some ideas and be served as reference material in the future.

2. Research Objective

(1) To determine the level of teachers' perceptions towards leadership capacity at a Guangzhou Elementary School, Guangdong Province, China. (2) To determine the level of teachers' self-efficacy at a Guangzhou Elementary School, Guangdong Province, China. (3) To determine the level of teachers' perception of classroom management styles at a Guangzhou Elementary School, Guangdong Province, China. (4) To determine whether there is a significant relationship between teachers' self-efficacy, perceptions of leadership capacity, and its effect on perceptions of classroom management styles at a Guangzhou Elementary School, Guangdong Province, China.

3. Literature Review

3.1 Theory, Concept and Related Research

Leadership Capacity: The High Leadership Capacity Theory of Lambert (2003) consists of four crucial areas that require the sustainable development of school improvement. Intense Focus on Vision: Regarding intense focus on vision, it needs to improve teachers' abilities to develop their professional skills and make

schools more effective with that. To make sure the maintenance of school improvement, one thing they can do is keep their school moving forward by reviewing the school vision regularly. Reflection and Innovation: To make schools achieve high leadership capacity, then the High leadership capacity needs reflection and innovation. At the same time, teachers need to guarantee that each one of them performs and is encouraged to participate in the group initiative process. What is more, all teachers and members should be actively responding to the school community and involved in collaborative innovation. Shared Governance: Shared Governance will maintain school improvement when the teachers are effective in shared governance. Shared Governance is about participation and integrated innovation in classroom management. Thus, teachers and all academic members should develop their relationships to seek new strategies and new opportunities to improve school achievement. Monitors and Response to Students' Achievement: The fourth one is monitoring and responding to students' achievements. Student achievements are the most measurable and sustainable aspect of school achievement. To achieve the mission of the school, every teacher needs to be well prepared for teaching, coaching, assessing, and making lesson plans.

Teachers' Self-Efficacy: Albert Bandura (1977) states individuals develop their self-efficacy beliefs by interpreting information from four major categories of experiences that influence self-efficacy levels. The first one is past personal performance or accomplishment may influence self-efficacy. Although self-efficacy is flexible and individualized, it usually comes from sources of past performance experiences (Tadele & Terefe, 2016). The second one is vicarious learning experiences which are obtained through observing new skills and strategies in others. In exemplary leadership, modeling the way for others is deemed important (Kouzes & Posner, 2012), and observing others perform successfully can improve people's belief in their capabilities to perform the same. Moreover, such vicarious learning helps build encouraging persistence in efforts. The third one is verbal persuasion as in social influences of motivational and moral climate. Positive feedback and morale which is from a credible person such as a coach, mentor, teacher, or parent build and sustain a sense of confidence or self-efficacy. Before asking for the hand to seek the heart, Leadership uses verbal backing and support techniques that inspire to set out for new opportunities (Kouzes & Posner, 2012).

Classroom Management Styles: In the classroom management profile, Santrock modified these style names, which consist of four necessary areas: Authoritative: The authoritative teacher places limits and controls on students, but, at the same time supports independence. The authoritative teacher is also with a growth mindset to considerable verbal interaction and relevant questions or comments, this climate offers the students the opportunity to acquire and rehearse relational abilities. Authoritarian: The authoritarian teacher has forceful control over the classroom. They require strict compliance with the rules and allow no disruption of teachers' presentations. Indifferent: The indifferent teacher is not incredibly involved in the management of the classroom. This indifferent teacher places few demands, if any, on the students and generally appears apathetically. They feel that class preparation is not worth the effort. Thus, they will use the same materials year after year, and classroom discipline is lacking in these teachers. Laissez-faire: A laissez-faire teacher places few demands and

controls on students. The laissez-faire teachers accept the students' impulses and actions and are less likely to monitor their behavior.

Related Research: High leadership capacity: Lambert (2003) developed high leadership capacity into the six key features of high leadership, including a shared vision that leads to a congruent program. As these key leadership competency categories suggest, it is essential to foster many ways for individuals to partake, and for every individual to contribute in a greater number of ways than one. For example, all faculty members partake in general faculty meetings some are in a leadership team, others are in study groups, and others are still in action research teams and learning communities. Primarily, it is important to share the vision that can keep these perspectives congruent. Self-efficacy: since Bandura was bringing the term self-efficacy to light, psychologists have interpreted self-efficacy from various perspectives. Giving an example of another perspective, Kathy Kolbe, the educator, and famous author, has the idea that believing in a person's abilities or skills can be crucial to measuring cognitive strength (2009). Kathy Kolbe asserted that self-efficacy also involves the aspect of determination and perseverance because it is conducive to overcoming obstacles by utilizing those innate abilities to attain school goals. Classroom management styles: according to Wang (2020), there are main problems existing in classroom management activities in primary schools in China through ways of field investigation, literature analysis, and qualitative research, and compared the causes of these problems from the perspectives of schools, teachers, students, society, and families. The serious analysis provides a certain basis for the solution to the problem. It is believed that through the unremitting efforts of many educators, China has accumulated a lot of experience in classroom management in primary schools, and the theory of education management has also been enriched and developed.

The relationship between leadership, self-efficacy, and classroom management styles: The principals' leadership behaviors influence teachers' perceptions of leadership capacity and self-efficacy which results in a measured impact on classroom management behaviors. One path to solving this problem might be that school administrators must build and raise the teachers' best classroom management ability in them, and then motivate their self-efficacy for teaching, hence, making sure the effectiveness of classroom management. The leadership styles of principals are interpreted and defined by their teachers, and how to boost the teachers' perceptions of school leadership is one of the most popular topics of school management issues in the Chinese education field as many Chinese researchers reported. Administrators lead teachers in school, likewise, teachers, as well as a leader in the classroom need to manage a lot of students in their classroom. The study examines teachers' perceptions of teacher effectiveness to determine if there is a lack of alignment between research about teacher effectiveness and practice in the classroom with their perceptions of school leadership.
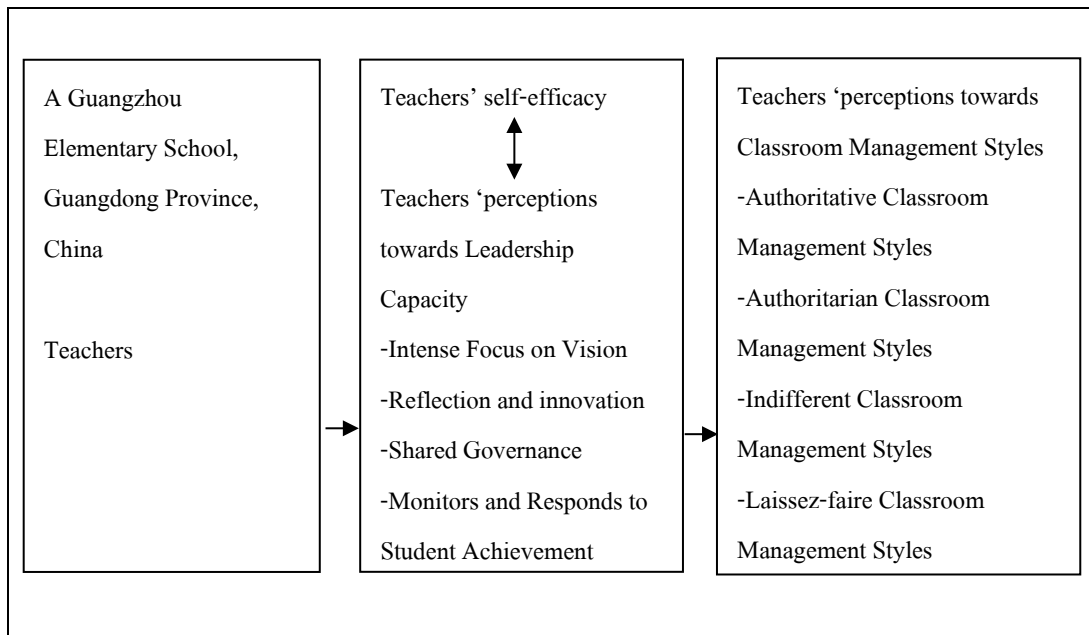
3.2 Research Framework

A Guangzhou Elementary School, Guangdong Province, China Teachers	Teachers' self-efficacy ↕ Teachers 'perceptions towards Leadership Capacity -Intense Focus on Vision -Reflection and innovation -Shared Governance -Monitors and Responds to Student Achievement	Teachers 'perceptions towards Classroom Management Styles -Authoritative Classroom Management Styles -Authoritarian Classroom Management Styles -Indifferent Classroom Management Styles -Laissez-faire Classroom Management Styles

Figure 1 Research Framework

3.3 Research Hypotheses

There is a significant relationship between teachers' self-efficacy and perceptions of leadership capacity, and its effect on teachers' perceptions of classroom management styles at a Guangzhou Elementary School, Guangdong Province, China.

4. Research Methodology

4.1 Research Design

The main purpose of this study was to determine the relationship between two independent variables: teachers' self-efficacy, and perception of leadership capacity, and the dependent variable: the perception of classroom management styles in a Guangzhou elementary school, Guangdong Province, China. Descriptive statistics were used to identify an elementary school in Guangzhou, Guangdong Province, China, teachers' self-efficacy, and perception of leadership capacity on the effectiveness of classroom management. Pearson Correlation Coefficients were used to determine the relationship between teachers' self-efficacy, perception of leadership capacity, and its effects on their perception of classroom management styles in a Guangzhou elementary school. The questionnaire was divided into four parts: Part (I) general information; Part (II) teachers' perception toward leadership capacity in a Guangzhou elementary school; Part (III) teachers' self-efficacy in a Guangzhou elementary school; and Part (IV) the perception of classroom management styles in a Guangzhou elementary school.

4.2 Population and Sample

The participants of this study were 100 teachers from an elementary school in Guangzhou in the academic year 2021. The teacher's return to the completed questionnaires represents a convenience sample and all teachers at the chosen schools were contacted and allowed to volunteer for the study.

4.3 Research Instrument

The researcher used a questionnaire including four parts to investigate the teachers' self-efficacy, teachers' perceptions of leadership capacity, and its effects on their perceptions of classroom management styles at a Guangzhou elementary school, the four parts were:

Part I collects general information on the teacher's demographic variables such as gender, age, nationality, and education. Part II is the questionnaire was used to identify the teachers' perception toward their school leadership which was based on Lambert's (2003) Leadership Capacity School Survey (LCSS). This part had 17 items in four key constructs: (1) Intense focus on vision includes questions numbers 1-6, (2) Reflection and innovation incl questions numbers 7-11, (3) Shared governance includes questions numbers 12-14, (4) Monitors and responds to students' achievement includes question numbers 15-17. Part III is the questionnaire used to determine the differences in teachers' self-efficacy. The questionnaire uses questions from a study done by Woolfolk. This instrument was used to measure the level of self-efficacy among the teachers at the selected Elementary School. Teachers were asked to rate their self-efficacy using a five-point Likert scale where 1=Strongly Agree, 2=Moderately Agree, 3=Agree slightly more than disagree, 4=Disagree slightly more than agree, 5=Moderately Disagree, 6=Strongly Disagree. Part IV is the questionnaire used to determine the differences in teachers' classroom management styles and it contained (12) items. This questionnaire was based on the Classroom Management Profile to determine the presence of teachers' classroom management in this study. The four classroom management styles are: (1) Authoritative Styles included question numbers 4, 8, and 11, (2) Authoritarian Styles included question numbers 1, 3, and 9, (3) Indifferent Styles 35 included questions numbers 2, 5, and 7, (4) Laissez-faire Styles included question numbers 6,10, and 12.

4.4 Data Collection

To ensure this study can be facilitated smoothly, researchers distributed the questionnaire and collected the data in November 2021. The tabulation and computation were done in July 2022.

4.5 Data Analysis

Research Objective 1: Mean and Standard Deviation were used to determine the level of teachers' perceptions towards school leadership at a Guangzhou Elementary School, Guangdong Province, China.

Research Objective 2: Mean and Standard Deviation were used to determine the level of teachers' self-efficacy at a Guangzhou Elementary School, in Guangdong Province, China.

Research Objective 3: Mean and Standard Deviation were used to determine the level of teachers' perceptions of their classroom management styles at a Guangzhou Elementary School, in Guangdong Province, China.

Research Objective 4: the Pearson Correlation Coefficient was used to determine whether there is a significant relationship between teachers' self-efficacy, teachers' perceptions of leadership capacity, and its effects on their perceptions of classroom management styles at a Guangzhou Elementary School, Guangdong Province, China.

5. Research Findings

Table 1 showed the total means and standard deviations of teachers' perception of their school leadership focused on the 4 constructs at an elementary school in Guangzhou. The total mean score of Table 1 was 2.07 in the period of 1.51-2.50 and is regarded as "need". Intense Focus on Vision had the highest mean score of 2.21; Reflection and Innovation had the lowest mean score of 1.99.

Table 1 Total Means and Standard Deviations of Teachers' Perceptions towards Leadership Capacity

Leadership capacity	Mean	SD	Interpretation
Shared governance	2.06	.84	Need
Reflection and Innovation	1.99	.95	Need
Intense Focus on Vision	2.21	.91	Need
Monitors and Response to Student Achievement	2.01	.77	Need
Total	2.07	.77	Need

According to Table 2, 3, the prevalent classroom management style claimed by the respondent is Indifferent (M=2.25, SD=.923). And teachers' self-efficacy believed to be prevalent in the targeted school is Authoritarian (M=3.48, SD=1.090). It probably means that trained teachers are efficacious in delivering of instructions in the classrooms. The teachers' self-efficacy from the targeted school was believed to be prevalent in the school is in instructional leadership (M=3.35, SD=.79). It probably due to the reason that trained teacher is efficacious while delivering instruction in the classrooms.

Table 2 Teachers' Perceptions of Classroom Management Styles (N=100)

Classroom Management Styles	Mean	SD	Interpretation
Authoritative (Question items 4, 8, 11)	3.05	1.235	Moderate
Authoritarian (Question items 1, 3, 9)	3.48	1.090	Moderate
Indifferent (Question items 2, 5, 7)	2.25	.923	Low
Laissez-faire (Question items 6, 10,12)	2.56	.931	Moderate
Total	2.84	1.150	Moderate

Table 3 Teachers' Self-Efficacy (N=100)

Self-reported Efficacy in Various Determinants of Self-efficacy	Mean	SD	Interpretation
Efficacy for Management (Question items 7, 8, 11, 16, 18, 19, 21)	3.33	.71	Agree slightly more than disagree
Efficacy for Instructional leadership (Question items 5, 6, 10, 12, 14, 17, 20)	3.35	.79	Agree slightly more than disagree
Efficacy for Moral leadership (Question items 1, 2, 3, 4, 9, 13, 15, 22)	3.27	.72	Agree slightly more than disagree

Table 4 Pearson Correlation Analysis of Self-efficacy and Management Styles (n=100)

Variable	Classroom Management Styles	
Self-efficacy	Pearson Correlation	.618**
	Sig. (2-tailed)	.000
	N	100

**. Correlation is significant at the 0.01 level (2-tailed).

The result from the final analysis of the current research showed that teachers' management styles are statistically significant predictors of their self-efficacy as about 62% of the variation of teachers' self-efficacy can be attributed to teachers' management style (r=0.618). Therefore, this research can assume that the classroom management styles chosen by teachers depended on teachers' self-efficacy level.

Table 5 Simple Pearson Correlation Analysis of Respondents' Perceptions towards Their Leadership Capacity and Their Classroom Management Styles (N=100).

Variable	Classroom Management Styles	
Leadership Capacity	Pearson Correlation	.950**
	Sig. (2-tailed)	.000
	N	100

**. Correlation is significant at the 0.01 level (2-tailed).

Since r is .950 and Sig is .000, which is less than .05, it means that the correlation coefficient between teachers' perception of leadership capacity and their perception of classroom management styles is .950. According to the significant level of 0.01, it indicated that the relationship between teachers' perception of leadership capacity and their perception of classroom management styles has a significant positive correlation at a Guangzhou elementary school, in China.

6. Discussion

From the collected data of this study, teachers' management styles are statistically significant predictors of their self-efficacy as about 62% of the variation of teachers' self-efficacy can be attributed to teachers' management style (r=0.618 and Sig is .000). This result of the study is like the findings from Edwards and Aboagye (2018) that pointed potential in educator from the country, Ghana. That study shows that if respondents have high perceived leader's self-efficacy. Then, they have more confidence in their ability to succeed. This study confirmed that confidence in teachers' leadership capacity was positively related to critical classroom management styles. It implied that the classroom management style leaders adopt is associated with the level of self-efficacy of teachers. Regarding teachers' leadership capacity and classroom management styles, since Pearson correlation r is .950 and Sig is .000, which is less than .05., it means this study confirmed that confidence in teachers' leadership capacity was positively related to critical classroom management styles. Therefore, teachers understand their self-efficacy in management, and perception of leadership capacity, and adopt appropriate classroom management styles to improve their self-performance. Thus, training and development in the education system can be an effective tool for leaders as the study showed.

7. Suggestion

(1) First, it is necessary for aspiring school managers responsible for teachers' training in China to emphasize the importance of self-efficacy. Chinese teacher education curriculum developers and other stakeholders should concern themselves with the individual abilities to believe in self-efficacy to attain maximum results. Based on the study result, the development and optimization of teachers' perception of leadership and classroom management styles, help to improve the school's achievements and keep the school's sustainable development. Organizing and training frequent activities through content related to developing school leadership and self-efficacy in classroom management and instructions can achieve the common goal effectively.

(2) Second, teachers should pay more attention to choosing the mode of classroom management to improve student outcomes, and appropriately use authoritative styles and authoritarian styles. However, teachers should timely participate in the reflection and innovation development and support school leaders to improve their leadership capabilities. Naturally, there is a force in the work of teaching and encouragement of more self-belief of 'can-do' attitudes.

(3) Finally, suggestions for future research are as follows: respondents' honesty and integrity are taken for granted in most surveys, yet they come with uncompleted items and missing data. In this case, a direct observation research practice is recommended. Characteristically, the participants are not representative enough, for this reason, the participant may not reflect the real efficacy beliefs and perception of leadership capacity expressed by themselves in the targeted school. A nationwide sample that could be more representative is highly recommended. A study involving a much larger population is suggested to affect policy in capacity building.

8. Acknowledgement

This study may not be possible without the support of lots of people. Since the study is my first English academic article, it is difficult and unforgettable for me. This writing process allowed me to learn how to critically think and conduct research studies logically. I would like to thank all the people with my sincere appreciation: Dr.Matthew Merritt, my advisor, for his meaningful guidance, advice, support, emails, and phone calls. This was keeping me calm and made progress when I was confused and anxious, and the reassurance and belief in my ability from him supported me to flourish. With his unwavering efforts and encouragement, I am inspired to pursue my passion, and this makes my study look better and better. I am grateful from the bottom of my heart. Asst. Prof. Dr. Poonpilas Asavisanu, the program director and committee chair, provided constructive feedback, and valuable comments and served on my committee. Asst. Prof. Dr. Linchong Chorrojprasert, the committee member serving on my committee. I am truly thankful for her appreciation, positivity, and belief in my writing. It makes me move forward in my thesis with confidence. Finally, I would like to acknowledge with gratitude my families, classmates, and colleagues for their availability, and assistance to answer questions regarding data collection. Their assistance with data collection, kind notes, and general support helped to keep me going during the epidemic situation.

9. References

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191.

Burkett, M. C. (2011b). *Relationships among teachers' personality, leadership style, and efficacy of classroom management.* The University of Southern Mississippi.

Edwards, A. K., Afriyie, S., & Aboagye, S. K. (2018). Relationship between Self-Efficacy and Leadership Styles of School Leaders: Implications for Teacher Development. *International Journal of Psychology and Education (IJOPE), 1*, 141–161.

Kouzes, J., & Posner, B. (2012). *The leadership challenge: How to make extraordinary things happen.* Atlanta, GA: Better World Books.

Lambert, L. G., Monroe, A., & Wolff, L. (2010). Mississippi elementary school teachers' perspectives on providing nutrition competencies under the framework of their school wellness policy. *Journal of Nutrition Education and Behavior, 42*(4), 271–276.

McCharen, B., Song, J., & Martens, J. (2011). School innovation: The mutual impacts of organizational learning and creativity. *Educational Management Administration & Leadership, 39*(6), 676–694.

Tadele, G., & Terefe, E. (2016). Influence of career self-efficacy beliefs on career exploration behaviours among TVET college students in Wollega zones town. Science, *Technology and Arts Research Journal, 5*(1), 108–114.

Woolfolk, A. E., & Hoy, W. K. (1990). Prospective teachers' sense of efficacy and beliefs about control. *Journal of Educational Psychology, 82*(1), 81.

EFFECT OF WEB-BASED DIDACTIC GAME, WORDWALL.NET

ON LEARNING NOUNS IN THAI LANGUAGE CLASS OF

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ABSTRACT

This study aimed 1) to create a didactic game using Wordwall.net to be effective as the standard criterion 80/80 and 2) to compare the learning achievement before and after learning with Wordwall.net. Simple random sampling was used to select 27 participants who were fourth grade students in second semester of 2021 academic year, Watthamnawa school, Phra Nakhon Si Ayutthaya province. The research instruments consisted of lesson plans on nouns, didactic game on Wordwall.net and achievement test. Percentage, mean, standard deviation, and dependent sample T-Test score were used to analyze the data. The findings show that 1) using Wordwall as a web-based didactic game on nouns of 4ᵗʰ grade students is effective at 90.25/81.67, which is higher than the standard criterion at 80/80. The learning achievement on nouns after using Wordwall.net is higher at 0.05 significance level.

Keywords: Didactic Game, Wordwall.net, Noun, 4ᵗʰ Grade Students

1. Introduction

Education is vital to humankind that all deserve an opportunity to learn since the early age of their lives. Everyone should receive proper education based on the fact that human can learn to develop themselves to the full potential. To improve education in the 21ˢᵗ century, student-centeredness and critical thinking should be promoted according to the Ministry of Education (2008). Especially in Thai language curriculum where focuses on reading, writing, listening, speaking, Thai grammar and Thai literatures (Ministry of Education, 2010: 4)

The importance of learning Thai grammar is to enable the students to understand the nature of Thai language, its dynamics and local linguistic wisdom in order to preserve the language as a national asset (Ministry of Education, 2010: 12) One of the significant aspects of Thai grammar is noun, which can be very challenging for the students to acquire. If the students do not know the meaning or misunderstand the function and different types of nouns, they will tend to use the noun in the sentence incorrectly. Panngam B. and Tessana W. (2021) defined noun as people, animals, objects, things, nature, place, idea, belief and value. Nouns can be either living or non-living thing and either concrete or abstract. A noun functions as a part of noun phrase that can be classified into 4 types: 1) common noun refers to things in general, 2) proper noun refers to a specific name of something,

3) classifier refers to types of thing or action that may appear before or after the main noun, 4) abstract noun refers to the transformed word from a verb to a noun by adding a particle "kaan or kwaam" before the verb, which is always abstract. (Ministry of Education, 2018: 17)

From the researcher's observation and discussion with the 4ᵗʰ grade Thai teachers at Watthamnawa school, Phra Nakhon Si Ayutthaya province, it was noticed that the 4ᵗʰ grade students found it challenging to understand noun regarding their relatively low achievement test scores in 1ˢᵗ semester of 2021 academic year. The unsatisfactory low scores may result from several possible reasons such as online learning and on-hand learning management during the COVID19 situation where the students became demotivated and distracted to actively participate in the class activities.

The Office of the National Primary Education Commission (2011) has discussed the definition of educational games (Didactic Game) that educational games are toys that help players to be observant to see and hear or think fast which educational games are different from other toys. Each set has a specific way to play and could be played alone or in groups. Players can check if playing is correct or not. Games are teaching aids that help students develop their intelligence and thinking, observation, reasoning. Because each set of the didactic games has a way to play, especially one may play alone or as a group, players can check the accuracy by themselves. Moreover, learners using the senses with the hand muscles after playing the game, they will be able to conceptualize the subject. It can be seen that the didactic games help learners to learn and have fu.

Wordwall.net is a type of online didactic game as Montathip (2020) said that Wordwall.net is a website that teachers can use to create online game teaching materials. This is to create a new style of lessons that are convenient. easy to use and suitable for teaching in today's era.

Therefore, the researchers considered it vital to develop and improve the student's knowledge of noun, so that they can be more proficient in learning and using Thai grammar. Sanansiang (2014) defined Didactic Game as a tool that assist instruction to make the students enjoy learning and challenge them to develop in terms of cognition, hand muscles, observation, comparison of size, shape and number and logicality. The researchers developed an innovation that promotes learning and class engagement by using Wordwall.net as a learning game. Therefore, the researchers adopted Wordwall.net to create a didactic game as a learning activity to effectively improve noun learning achievement of the students.

2. Research Objectives

1) To create a didactic game using Wordwall.net to be effective as the standard criterion 80/80

2) To compare the learning achievement before and after learning with Wordwall.net.
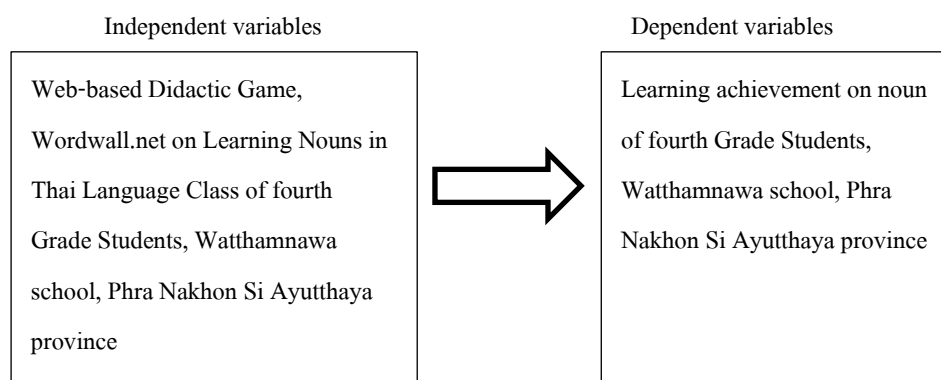
3. Literature Review

3.1 Theoretical framework

3.1.1 Principles of using Thai language According to the Core Curriculum of Basic Education, B.E. 2551 on nouns for 4ᵗʰ graders, learning about nouns will help learners not to be confused in the use of

language for communication. Learners can separate and specify the meaning of the noun and the functions of the words in each type of sentence. It is considered as the basic foundation for learning Thai language, and it is necessary that learners should study the content of the subject matter and nouns thoroughly and understand which is consistent with the use of Thai principles correctly and appropriately (Ministry of Education, 2008)

3.1.2 Wordwall.net is a website that creates learning materials in the form of online teaching games with convenience to access as well as to motivate students to participate in activities during the teaching, and the content is easy to understand. Wordwall.net has a variety of formats, such as matching games, word games, open-box games, quiz games, crossword games, quizzes, and others. You can switch playing styles to suit the age of learners. (Montathip, 2020; Kerdto, 2021; Muatchu, Srikasem and Sangmanee, 2020)

3.1.3 Didactic game is a teaching activity that helps students to think creatively. It is the training of various intellectual skills that are the basis of learning which aims to encourage students to think and dare to act, observe and find cause and effect and problem solving in front of them. It is also a part that encourages learners to be interested during teaching activities, participation and interaction with peers and teachers that will help learners to think outside the box of learning correctly (Buapuen, 2012; Office of the National Primary Education Commission, 2011; Kolgam, 2010)

Independent variables		Dependent variables
Web-based Didactic Game, Wordwall.net on Learning Nouns in Thai Language Class of fourth Grade Students, Watthamnawa school, Phra Nakhon Si Ayutthaya province	⟹	Learning achievement on noun of fourth Grade Students, Watthamnawa school, Phra Nakhon Si Ayutthaya province

Graphics1: Research framework

The content used in this study is part of a Thai language course according to the Basic Education Core Curriculum 2008 for 4th grade students on noun. Wordwall.net was utilized for instruction on three types of noun: (1) common noun, (2) proper noun and (3) classifier.

3.2 Research assumption

3.2.1 The didactic game using Wordwall.net is as effective as the standard criterion 80/80

3.2.2 The learning achievement after learning with Wordwall.net is higher than before.

4. Research Methodology

4.1 Research Plan

This study is an experimental research as in One - group Pretest - Posttest Design (Ritcharoon, 2016)

Group	Pretest	Treatment	Posttest
E	O1	X	O2

E   refers to the students of grade 4/1.

X   refers to the learning activities using in Wordwall.net lessons.

O1 refers to the pretest.

O2 refers to the posttest.

4.2 Research Participants

4.2.1 Population

The population used in the research were students in grade 4 of primary schools under Phra Nakhon Si Ayutthaya NEPO, Ministry of Education.

4.2.2 Samples

The researcher selected a purposive sampling as Prathomsuksa 4 students studying in the second semester of the academic year 2021 at Wat Thammanawa School, Phra Nakhon Si Ayutthaya province, Office of Phra Nakhon Si Ayutthaya Primary Education Area 2. From the survey of Wat Thammanawa School, there are 2 classrooms of Grade 4 students, a total of 57 students with mixed abilities. By using a simple random sampling method, 27 students in grade 4/1 were obtained.

4.3 Research Instrument

4.3.1 Three lesson plans on nouns, grade 4, which is total 6 hours, namely, common noun, proper noun and classifier.

4.3.2 Three sets of didactic games using the Wordwall.net on Nouns, Prathom Suksa 4, consisting of activity 1 Word Search Game, activity 2 True or False Game, and activity 3 Matching Game for classifier.

4.3.3 Learning achievement test on nouns of Prathomsuksa 4 students at Wat Thammanawa School Phra Nakhon Si Ayutthaya Province, multiple choice that has 4 choices for each of 20 questions.

4.3.4 IOC is used to find the content validity of the test by index of item-objective congruence(Saiyod and Saiyod, 1995)

4.4 Data collection

In this research, the researcher collected data as following procedures:

4.4.1 Request a letter from Valayalongkorn University under the Royal Patronage of His Majesty the King to request assistance in collection of research data to the director of Wat Thammanawa School

4.4.2 Before the experiment, the student explained the principles and reasons for the sample students.

4.4.3 The researcher had the sample group do a pre-test by using a 20-item learning achievement test titled Nouns.

4.4.4 Conduct teaching with a learning management plan on nouns, grade 4, with a learning management plan for the 1st, Common Noun for 2 hours, 2nd lesson plan, Proper Noun for 2 hours, and the 3rd lesson plan, Classifier for 2 hours. The lessons were for 27 4th grade students at Wat Thammanawa School Phra Nakhon Si Ayutthaya Province, semester 2, academic year 2021, which the experiment was executed 1 day per week through 3 weeks starting from February 3, 2022 to February 17, 2022, a total of 3 hours.

4.4.5 After each hour of teaching, the researcher asked the sample group to make a set of didactic games using the Wordwall.net on the subject of nouns, Grade 4, consisting of 3 sets, namely Word Search Game, True or False Game, and Matching Game for classifier.

4.4.6 After the end of the experiment, the researcher gave the sample group a posttest by using a 20-item learning achievement test titled Nouns.

4.4.7 The pre-test and post-test scores were used and analyzed to test the hypothesis.

4.5 Data analysis

The researcher collected data analysis from the research instruments according to the following steps:

4.5.1 Quality analysis of learning management plans and an didactic game set using the Wordwall.net on the subject of nouns of grade 4 students was conducted by the mean, standard deviation against the given assessment criteria for interpretation. The quality of the learning management plan shows a mean of 4.98 at the highest level. The quality of the game sets using the Wordwall.net on nouns of grade 4 students had an average of 4.98 at the highest level.

4.5.2 Analysis of the Conformity Index between the Learning Achievement Test on Nouns of Prathomsuksa 4 students was run to find the difficulty discrimination power and confidence the difficulty (p) was 0.62, the discriminant power (r) was 0.23, and the confidence was 0.70.

4.5.3 Comparison of learning achievement scores on the subject of nouns of students in grade Grade 4 after being taught using a series of the game activities using the Wordwall.net titled nouns was conducted by t-test for dependent sample.

5. Findings

The findings of creating the didactic games using the Wordwall.net in Thai subject on Nouns of Prathomsuksa 4 students showed follows:

5.1 The results of creating the didactic games using the Wordwall.net titled Nouns of Prathomsuksa 4 students at Wat Thammanawa School Phra Nakhon Si Ayutthaya Province were effective according to the 80/80 standard.

Table 5.1 shows the number and percentage classified by gender of the sample.

Gender	Number	Percentage
Male	19	70.37
Female	8	29.63
Total	27	100

From Table 5.1 shows the number and percentage classified by gender of the sample in this study. There were 27 samples, classified by gender. It was found that 19 people were male, representing 70.37%, and 8 were female, accounting for 29.63 percent.

Table 5.2 Average, standard deviation and process efficiency (E1)of the didactic game activity series using the Wordwall.net titled Noun of students in grade 4, Wat Thammanawa School Phra Nakhon Si Ayutthaya Province

Activity Set	No. of Students (N)	Total score	$\sum x$	$\overline{X}$	S.D.	Percentage
Common nouns	27	10	238	8.81	1.04	88.15
Proper nouns	27	10	243	9.00	0.88	90.00
Classifiers	27	10	250	9.26	0.81	92.59
Total		30	731	27.07	2.04	90.25

Effectiveness (E1) = 90.25

From Table 5.2, the results of the mean analysis standard deviation and the efficiency of the process (E1) of the educational game activity series using the Wordwall website titled Nouns of Prathomsuksa 4 students at Wat Thammanawa School. It was found that the mean was 27.07, the standard deviation was 2.04 from a full score of 30 points, representing 90.25 percent, indicating that the efficiency of the process (E1) was equal to 90.25.

Table 5.3 Mean Analysis Results standard deviation and the efficiency of the results (E2). From the scores after the study of the achievement test titled Nouns of Prathomsuksa 4 students at Wat Thammanawa School Phra Nakhon Si Ayutthaya Province

N	Total Score	$\sum F$	$\overline{X}$	S.D.	Percentage
27	20	454	16.33	3.00	81.67
		Effectiveness (E2) = 81.67			

From Table 5.3, the results of the mean analysis standard deviation and the efficiency of the results (E2) from the post-study scores of the achievement test titled Nouns of Prathomsuksa 4 students at Wat Tham Nawa School Phra Nakhon Si Ayutthaya Province showed that the mean was equal to 16.33, and the standard deviation

was 3.00 from a total score of 20, representing 81.67 percent, indicating that the efficiency of the result (E2) was 81.67.

Table 5.4 The results of the analysis of the effectiveness of the website-based didactic game activity series on Wordwall.net on Nouns of Prathomsuksa 4 students at Wat Thammanawa School Phra Nakhon Si Ayutthaya Province to be effective according to the 80/80 standard.

Score	No. of Students	Total score	Score	Effectiveness
Post test score of each lesson (E1)	27	30	731	90.25
Post test score of all lessons (E2)	27	20	441	81.67

From Table 5.4, the results of the analysis of the effectiveness of the didactic game activities using Wordwall.net titled Nouns of Prathomsuksa 4 students at Wat Thammanawa School. Phra Nakhon Si Ayutthaya Province was found that the effectiveness of the process (E1) was 90.25 and the efficiency of the result (E2) was 81.67. Therefore, the efficiency of the educational game activity set using the Wordwall.net on the subject of nouns of students in class Grade 4 Wat Thammanawa School Phra Nakhon Si Ayutthaya Province. It has an efficiency of 90.25/81.67.

Table 5.5 Comparison of results of learning achievement on nouns before and after school using Wordwall.net of Prathom Suksa 4 students at Wat Thammanawa School, Ayutthaya province.

		Learning achievement on nouns before and after school				
Test	Total	N	$\overline{X}$	S.D.	t	Sig.
Pretest	20	27	6.96	3.08	-16.151	0.001*
Posttest	20	27	16.33	3.00		

*Statistically significant at 0.05 level

From Table 5.5, the results of comparison of learning achievements on the subject of pre- and post-study nouns using the Wordwall.net of Prathomsuksa 4 students at Wat Thammanawa School, Phra Nakhon Si Ayutthaya Province, was found that the scores of the pre-teaching test using the game activity set as the mean was 6.96, standard deviation was 3.08, and after teaching using didactic game activities using the Wordwall.net on noun, the mean was equal to 16.33, and the standard deviation was 3.00. When testing to compare the student's learning achievement between before and after learning by using t-test for dependent, it was found that the student's learning achievement learning school was higher than before. T-test was -16.151, indicating that Prathomsuksa 4 students at Wat Thammanawa School Phra Nakhon Si Ayutthaya Province the game activity set using the Wordwall.net titled nouns had a statistically significantly higher learning achievement after learning than before at the .05 level.

6. Discussion

From the results of the development of didactic game activities using the Wordwall.net titled Nouns, grade 4 of Prathomsuksa 4 students at Wat Thammanawa School can be described as follows:

6.1 From the results of the study of the effectiveness of the didactic game activity set nouns on Wordwall.net of Prathomsuksa 4 students at Wat Thammanawa School, it was found that the efficiency was 90.25/81.67, which was higher than the 80/80 benchmark set because the researchers created a series of didactic game activities using the Wordwall.net, titled effective Grade 4 student nouns that help students learn. According to the objectives of the research, as well as a series of didactic game activities using the Wordwall.net on the subject of nouns created by the researcher was followed by a systematic procedure. The correct method which the content is appropriate for the age of the learners and a series of activities are of interest and organizing learning activities using didactic game activities using the illustrated Wordwall.net. It is a form of game, which is colorful and exciting to make the learners interested and active in various activities. The format of the learning activities in the didactic game activity series using the Wordwall.net on Nouns. The content is arranged in order from easy to difficult, which are sorted by type of nouns, namely, common nouns, proper nouns and classifiers by using didactic games on the Wordwall.net for learners to do activities. It encourages students to develop their ideas and understanding of the subjects being studied which is a student-centered activity. It also encouraged learners to have the skills to use the Thai language more effectively. Therefore, the results of the study of the effectiveness of didactic game activities using the Wordwall.net on the topic of nouns of grade 4 students created the efficiency according to the 80/80 criteria, which is consistent with the research of Wichasit (2021) who conducted a research on the development of didactic games to promote learning achievement in Thai language subjects on words from foreign languages. The results of the study found that online games to promote learning achievement in Thai subjects on words from foreign languages. The efficiency of Mathayom Suksa 3 students was 78.59 /77.67, which met the specified criteria, i.e., the efficiency was higher than the standard 70/70 and consistent with the research of Khamkongkaew (2019) conducting the educational board game design "My Hospital" to develop learning achievements on Organ system for Mathayomsuksa 5 students at Bodindecha (Sing Singhaseni) School. The effectiveness analysis of the educational board game "My Hospital" for Grade 5 students was as effective as 81.00/81.78, which was higher than the 80/80 benchmark set.

6.2 Based on the results of the study of the learning achievement of Prathomsuksa 4 students at Wat Thammanawa School during pre- and post-study sessions, the subjects were taught using didactic game activities using the Wordwall.net titled nouns to promote their ability to use the Thai language of the sample. The achievement score after school was higher than before with statistical significance at the .05 level, with the mean score before school was 6.96 and the mean score after school was 16.33. After teaching, using didactic game activity series using the Wordwall.net on nouns to promote and develop the ability to use Thai principles. As a result, students have higher average scores after school than before. This is maybe because the content is suitable for learners and interesting in terms of set of activities that make learners understand after studying. As a result, doing a test to measure learning achievement will lead to have higher scores after learning than before. This is

consistent with the research of Kong-iad (2019). The effect of teaching by using games affecting the learning of math on the subject of multiplication among students in Prathomsuksa 2, municipality 8 School (Kindergarten Dream Come True). Average score was based on game-based teaching methods, and the mean score after studying (X = 5.22) was higher than before studying (X = 4.67) with statistical significance at the .05 level according to the hypothesis. In accordance with the research of Photun A., (2016) studied the subject's Effects of game-based teaching based on brain-based learning on learning achievement and attitudes towards learning English of Grade 2 students who are taught using games based on brain-based learning. The achievement in English subjects after learning was higher than before as statistically significant at the .05 level.

7. Suggestion

7.1 Suggestions for applying the research results

(1) Teachers should study the details and how to use didactic game activities using the Wordwall.net and prepare teaching materials to be ready to encourage learners to be interested in learning or may be modified to suit the age of the learners. To achieve the objectives of the didactic game series teacher may use the Wordwal.net and maximize efficiency in learning

(2) Educational institution administrators or those involved in the development of educational quality should encourage and support the use of technology media in teaching and learning and use didactic games to stimulate students' interest in learning and more participation in classroom activities. It is also a review of the knowledge of the content learned that helps to develop the teaching and learning process and develop skills in using Thai principles effectively.

(3) Those who are interested in using this set of didactic games activities using the Wordwall.net should study and understand the steps, principles, goals, aims, sequence of steps and time required to be clear before implementation, in which the learning activities can be flexible in time according to the conditions of the students.

7.2 Suggestions for further research

(1) A series of didactic game activities using the Wordwall.net should be created among other content and at the same level or other levels to enable students to learn effectively and have higher academic achievement.

(2) It is advisable to compare the use of educational games using the Wordwall.net with other forms of didactic games such as Kahoot, Blooket, Gimkit and Vonder Go in order to gain more interesting newness.

(3) There should be a series of didactic game activities using the Wordwal.net, titled nouns created, to be tested with students in other schools in order to draw conclusions from a broader research and for the benefit of development and applied appropriately and effectively.

8. References

Aiyu Matchuaychoo, Nuricha Srikasem and Busaraporn Sangmanee. (2020). *Wordwall Guide.* Retrieved from
    https://pubhtml5.com/tkqt/bvai/basic?fbclid=IwAR2kHPGfP2vWywIj5vEe2lMeXaqXv7jhX_
    4Ju1HBpn7v9Nc0DXTKdnw2y4o.

Atcharaphan Photun. (2016). *The results of teaching using games based on the brain based learning approach
    that has on academic achievement and attitude towards learning English of Grade 2 students.*
    Retrieved from http://ns.nsru.ac.th/bitstream/nsru/150/1/Atcharaphan_Photun.pdf.

Benjakanya Pan-ngam and Warangkana Tessana (2561). Development of learning management on nouns.
    Grade 6 by using the skills exercises for organizing activities with the STAD cooperative group.
    Academic Journal of the Institute of Manpower Development. 1(2), 118.

Boonchu Sanansiang. (2014). *Organizing experiences to practice observation and reasoning for early
    childhood children.* 5th printing, Nonthaburi: Sukhothai Thammathirat Open University

Chonthicha Khamkongkaew. (2019). *Educational board game design "My Hospital" to develop Subject
    achievement Organ systems for grade 5 students Bodindecha School (Sing Singhaseni).* Retrieved
    from http://www.edu.ru.ac.th/images/edu_article/2563-146-academicarticle

Ministry of Education. (2008). *Basic Education Core Curriculum 2008.* Retrieved from
    http://academic.obec.go.th/images/document/1559878925_d_1.pdf

Ministry of Education. (2010). *Basic Education Core Curriculum 2008.* 3rd printing, Bangkok: Chum Chum
    Printing House Agricultural Cooperatives of Thailand Limited.

Ministry of Education. (2018). *Thai Norms, Volume 3.* Third Edition, Bangkok: Office of the Public Health
    Commission, Ladprao.

Office of the Basic Education Commission. (2008). *Basic education core curriculum B.E. 2551 (A. D. 2008).*
    Bangkok: Ministry of Education.

Office of the National Primary Education Commission. (2011). *Most Important Learner Learning Reform.*
    Bangkok: Pim Dee publisher.

Papichaya Wichasit. (2561). *Online game development to promote academic achievement in the subject.* Thai
    story words of foreign language of students in Grade 3 Retrieved from
    file:///C:/Users/Lenovo/Downloads/2021_06_09_12_00_17.pdf.

Panupong Kong-iad. (2019). *Effects of teaching by using games on learning math on multiplication of students
    in grade 2, Municipal School 8 (Kindergarten dream come true)*. Retrieved from
    http://mis.sct.ac.th/MyDocuments/eResearch/135/01.

Paweena Montathip (2020). Wordwall website. Retrieved from https://inskru.com/idea/-MJ2QhNfcnWbvs
    NO9sxL.

Phichit Ritcharoon. (2016). *Research techniques for learning development.* Bangkok: Chulalongkorn University

Saiyod, L. and Saiyod, A. (1995). *Educational Research Methodology.* 4th ed. Bangkok: Suweerivasarn.

Usa Kokgam. (2010). *Comparison of visual computational abilities of deaf learners who were trained using didactic games and exercises*. Srinakharin University Nontarawirot Prasarnmit: Early Childhood Education.

Wiyada BuaPuen. (2012). *A Study of Interest in Educational Game Play of Early Childhood Children. Teachers guide and play by themselves*. Srinakharinwirot University Prasarnmit: Early Childhood Education

A FRAMEWORK FOR PERSONALIZE LEARNING USING GAMIFICATION IN METAVERSE PLATFORM

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ABSTRACT

The objective of this study is to reconnoitre the adaptive framework for personalize learning in Metaverse platform by applying Gamification. Since the popularization of the Internet in 1990s, there are many innovations such as various computer-mediated virtual environments including social networks, video conference, virtual 3D world, augmented reality applications, and Non-Fungible Token Games. The term "Metaverse" has facilitate the digital transformation in every aspect of our physical lives including learning & education. The core of metaverse stands for the vision of immersive Internet. Therefore, life domains, such as learning and education should have their systems redirected to adopted this to keep their availability and longevity. Many researches have discuss the metaverse, the applications to run on, and the historical progress to have the metaverse the way it is today. However, the framework of the metaverse itself is still unclear, and its components cannot be exactly specified. Although E-Learning systems are a need that has developed over the years along with technology, the structures of the available E-Learning systems based on the metaverse are either not well described or are adopted, in their best case, as just a 3D environment. In this paper, this paper examine some previous works to find out the special technologies that should be provided by the metaverse framework, then discuss the framework of the metaverse if applied for Personalize Learning environment framework based on Gamification Design. This will make it easy to develop future metaverse-based Game Based Learning applications, as the proposed framework will make the virtual learning environments work more effectively for each learners in order to achieved the better learning outcomes.

Keywords: E-learning, Personalize Learning, Metaverse, Digital twins

1. Introduction

The Metaverse connects social media to virtual reality and augmented technologies. Their collaboration unleashes creativity and promises transformation ranging from industrial sector to remote education. Meta education powered online distance education have emerged to provide formal and informal blended learning experience in a virtual 3D online campus. This academic paper presents 6 aspects of the Metaverse applied for to education: (1) the meaning of Metaverse especially for Web 3.0 (2) the standard system architecture of Metaverse (3) the special technology for Metaverse and (4) a new framework for personalize E-learning and education (5) a framework for personalized learning using Metaverse Gamification in Metaverse Platform.

2. Research Objective

The purpose of this study was to analyze the framework for and the challenge that will benefit for E-learning and Education in Metaverse Platform. This study explores the procedure for personalize design content for Metaverse based on Gamification.
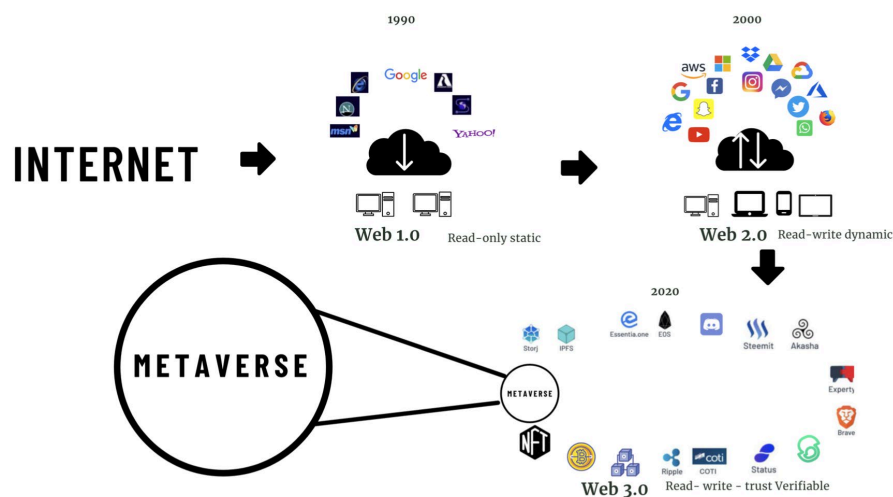
Figure 1. From Web 1.0 to Web 3.0.

3. Literature Review

Innovation has a big impact on people's daily life because they change and improve how people interact, communicate, and do business with each other. Education is a critical field for learning and growing people in society as well as for Economics development both nationality and globally. In this regard, educators often use technological resources to enhance the classroom learning experiences. Below are several examples of the Metaverse being used in education. First, it has been found that meaningful learning through the virtual world has the potential to provide numerous educational opportunities. One study in particular explored the various advantages and disadvantages of the virtual world in an academic environment with the aim of strengthening the curriculum using this technology. Second, as the previous study about personalize E-learning content, designing

learning path activity and personalize learning method for Metaverse platform was designed and to be explore for further contribution research. (Ananya and Priyanka, 2022)

The world wide web has made the internet accessible to all. Today, millions of people use the internet for information, services, communication, and entertainment. As shown in Figure 1 that Web 1.0 was known as the first generation of the World Wide Web. It was designed mainly for searching for information and reading it. It allowed very little interaction between the user or content creation. The next generation of the web, known as Web 2.0, is people-centric, participatory, and interactive. Unlike Web 1.0, Web 2.0 offers users more control and interactivity. With Web 2.0, users are engaging in social media, e-commerce, and the sharing economy. Currently the Web 3.0 era has begun, which includes network transformation to the database, enabling multiple applications to access content beyond the browser, artificial intelligence, 3D web design, and much more. As part of Web 3.0, the Metaverse combines physical and digital lives by utilizing technologies like augmented reality (AR) and virtual reality (VR), 5G, edge and cloud computing, blockchain including artificial intelligence (AI) and non-fungible tokens (NFT). The Metaverse is an idea derived from Neal Stephenson's science fiction novel Snow Crash, published in 1992. The term "Metaverse" combines the prefix "meta" with the word "universe" and refers to the concept of a virtual universe comprised of persistent, interactive, shared, 3D virtual spaces that are linked together. In this novel, Stephenson defines the Metaverse as a massive virtual world parallel to the physical world in which humans, as avatars, interact with each other and software agents in a three-dimensional space metaphorized by the real world. The Metaverse is defined as a virtual reality-based Internet, and it is anticipated that it will evolve into a potential successor to the Internet in the near future. Snow Crash brought immense popularity to the Meta- verse. Its concept has also heavily influenced the creation of online virtual worlds like Second Life and Active Worlds. The Metaverse was initially used in the development of internet- based video games and social media. Now Metaverse can be described as a combination of virtual enhanced physical reality with persistent virtual space that can be accessed via VR headsets, AR glasses, smartphones, PCs, and game consoles. Many in the tech industry see the Metaverse as being the heir of the modern internet. The Metaverse creates a virtual world beyond reality with artificial intelligence and blockchain technology. (Ananya and Priyanka, 2022)
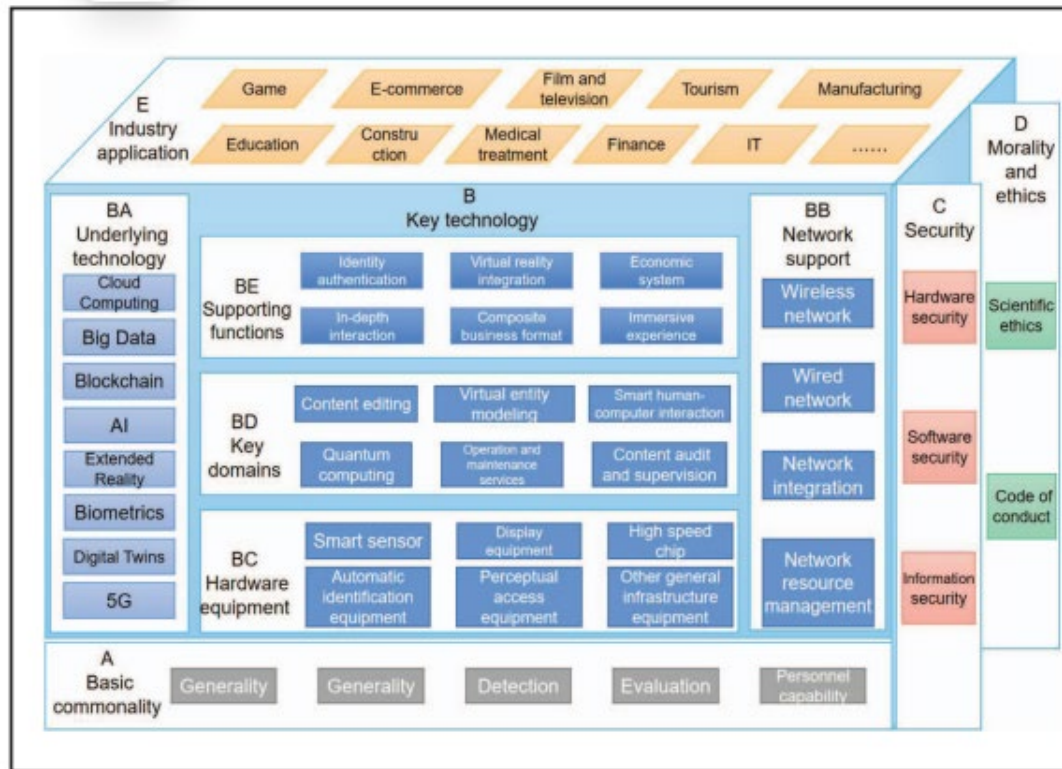
Figure 2. Standard system architecture of Metaverse

System Architecture of Metaverse is to standardized, lead and guarantee the development of Metaverse in an orderly manner. The standards of Metaverse cover a variety of technologies combined with the previous Metaverse researches, application explorations and interviews. System includes five parts which are (A) Basic Commonality, (B) Key Technology, (C) Security, (D) Morality and Ethics, and industry application, as shown in Figure 2. It mainly reflects the composition relationship of the various parts of the standard system. Each Key Component describe as these follows:

(A) Basic Commonality: It includes five categories which are included generality, reliability, detection, evaluation and personnel capability. It is located at the bottom of Metaverse standard architecture diagram and is the support of B-Key technology, C-Security and E- Industry application. Generality standard mainly includes term definition, reference model, metadata and data dictionary. Reliability standards mainly include system/platform reliability, equipment reliability and service reliability. Detection standards include testing requirements and testing methods for technologies, products and services related to Metaverse. Evaluation standards include evaluation index and evaluation methods of each module of Metaverse. Personnel capability standards include standards of competency requirements and competency assessment methods for the relevant personnel in Metaverse.

(B) Key Technical Standards: It includes five parts: BA-Underlying technology, BB-Network support, BC-Hardware equipment, BD-Key domains and BE- Supporting functions, which are used to guide the research and implementation of key technologies of Metaverse, ensure the effectiveness of key technologies construction, and break down the technical barriers between collaborative development and module interaction.

(C) Security Standards: It mainly includes three parts: hardware security, software security and information security, which is located on the far right of the vertical plane of Metaverse standard system architecture. Hardware security standards are used to guide the protection requirements of physical equipment in Metaverse system and avoid production accidents caused by equipment failure. Software security standards are used to guide the protection requirements of systems, platforms and application software, and standardize product design, implementation, functional security and other standards. Information security requires that the data/information of relevant information systems, software and hardware Metaverse will not be damaged, changed or leaked, so as to ensure the continuous and reliable operation of Metaverse.

(D) Morality and Ethics: They include scientific ethics and code of conduct, which is located on the far right of the vertical plane of Metaverse standard system architecture and runs through other parts to establish a compliance system and a set of moral obligations that define right and wrong in Metaverse. Scientific ethical standards include ethical binding standards such as pledge, code, guidelines, principles, recommendation, statement and declaration. Code of conduct standards include code of ethics, rules and regulations and legal provisions in the virtual network environment.

(E) Industrial Application Standards include the standards of game, education, E-commerce, film and television, tourism, medical treatment, construction, finance, manufacturing, Internet and other industries. It is located at the top level of standard system architecture of Metaverse. It refines and implements A-Basic commonality and B-Key technology for the specific needs of the industry. At the same time, it follows the C-Security standards and D-Morality and ethics to guide all industries to promote the construction of Metaverse
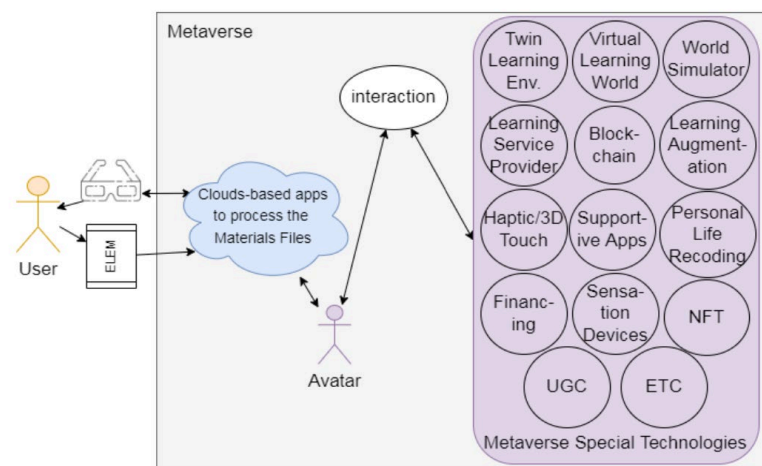

Figure 4. A Case Study on E-Learning Environment framework. (ELEM)

Although there are many proposed systems to work on the Metaverse, ELAM is proposed framework consists of users, needed, devices, and Metaverse components that consist of infrastructure, avatar, and the Metaverse special technologies which are described as these follows and has shown in Figure 4.

1. Starting with the twin world, it is used to merge the virtual objects on scenes extracted by camera, previously captured, or drawn as a 3D environment to the real world.

2. A virtual world (VW) is an entire world build virtually to be compatible with the object used in or created to be operated on VW.

3. The mirror world is a world simulates everything in the real world with some noticed changes due to being mirrored.

4. The service provider (SP) is the provider from which interaction applications should obtain permission to access the Metaverse special technology.

5. Blockchain is the main aspect of the Metaverse used to make continuous and serialized processes with unique identities to avoid fraud or losing data.

6. Augmentation is used to simulate the objects in 3D models using makers from the real world, mainly used in games and educational purposes.

7. Haptic is an application that provides kinesthetic communication to help provide a complete experience to user.

8. The other supportive, cooperative, or independent apps have their existence and space in the Metaverse special technology too. All these technologies depend on two different technologies, i.e., financing and lifelogging. Lifelogging is used record personal data, visiting logs, surfing history, etc.

9. Financing is usually used with applications that provide paid services.

10. NFT and UGC. The non-fungible token (NFT) is usually a unique item or collection that has to be bought before being used, as they already cryptographic items and cannot be replicated. Many NFTs are sold in auctions that increase or decrease their prices over time.

11. User-generated content (UGC) collects each other content depending on the applications and their topics.

12. The sensation is also very needed technology that is used to read from sensors and then send vibrations to user devices to provide them with the senses of the experience they are using.

13. We should also mention that there may be other essential technologies, but these are the important parts that we can use for the moment to associate the new era of virtual environment. Together, these technologies can provide the user with the best experience according to the course, the used materials, the version of technology they are using, the nature of the lectures or application content, etc. (Neama et.al, 2022)
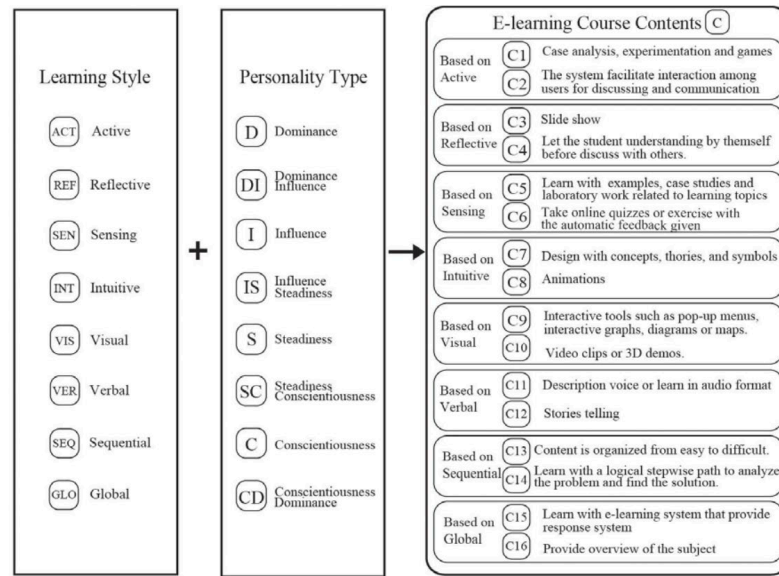
Personalize E-Learning Content

Figure 5. A new framework for e-learning design using Learning Styles and Personality

Regarding to E-learning, the role of personal learning style is very important for online learning process and outcome. All students are exposed to same exercises, discussions, delivery of content, depending on preference of institution or tutor. Personalization in e-learning is the use of technology and student information to tailor the e-learning course for each individual difference in the way that students achieve better learning outcomes. In order to ensure that learners engage and take responsibility for their own learning, many researchers suggested that the differences and distinctiveness of each learner must be taken into account in preparing the learning procedures. The differences between students can be their learning styles, learning orientations, learning rates, cognitive styles, multiple intelligence, talents and many more. The consideration of individual differences in learning allows them to be responsible for their own learning, retain information longer, apply the knowledge more effectively, have positive attitudes towards the subject, have more interest in learning materials, have higher score and high intrinsic motivation level. It is found that necessary challenges and opportunities for learning and self-development will be provided if learners' differences are considered in learning. Moreover, the emphasis of individual difference in learning increase both learner's satisfactions and motivation towards learning; producing a better grade in the subject. One of the research projects develop framework intends to personalize the learning materials and accommodate to the majority of students in science and technology disciplines, through which their learning preferences could be effectively supported; producing a better learning performance. (Nida, 2014)

4. Research Design Methodology & Framework:

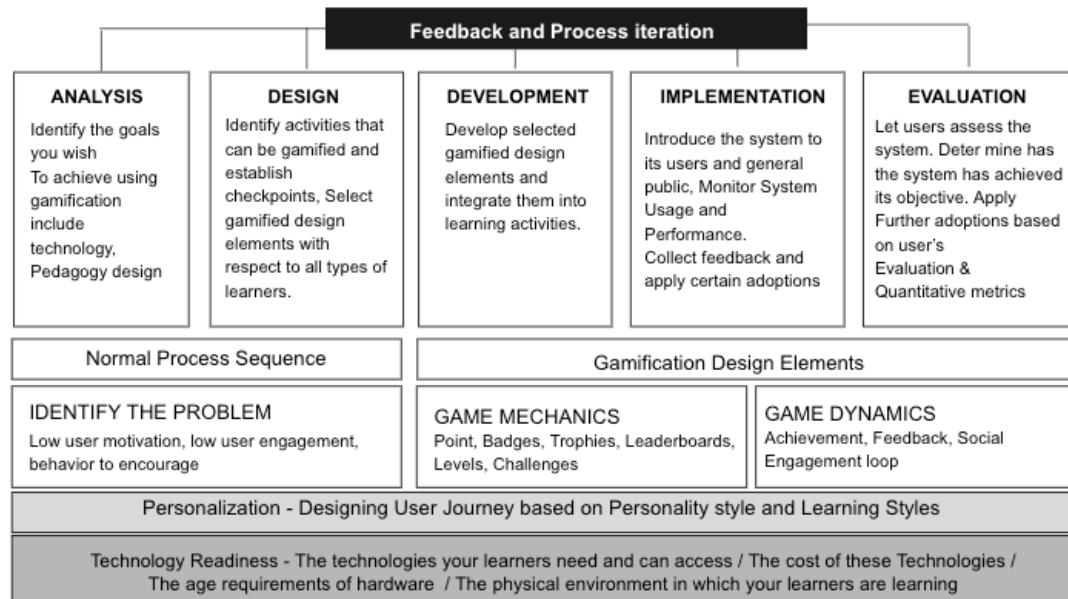A framework for personalize learning using gamification in metaverse platform

Figure 6. A framework for personalize learning using gamification in metaverse platform

Our studies relating to personalization in e-learning concentrate on two main aspects. Firstly, is the framework for designing e-learning content process which are started from phase Analysis, Design, Development, Implementation and Evaluation. Secondly is the personalize design based on Personality style and Learning Style Layer. And the last layer is the Technology Readiness in which we have clarify the technology use.

The research design process will be included 5 main phases:

1. Analyze: Course Domain, Content, Students, Instructors, Learning Environment, Function Requirement, Interaction Requirement

2. Design: The structure of activity, User interface & User Experience

a) Define the user journey: It defines the unit activity that include each of the learning goals.

b) Designing the user interface: It defined the layout, 3D model, Multimedia elements

3. Development: Games and contents.

4. Implementation: Operations process and maintenance

5. Evaluation: Satisfaction surveys and Measurable metrics such as users, time spent, learnability, efficiency

5. Conclusion and Future work:

The Metaverse, an emerging technology, will give birth to a new way of life with the integration of virtual and reality, open up a huge market space and inject a strong power for economic and social development.

Its final form and future economic benefits are difficult to measure at present, which means there is still a long way to go for the development of Metaverse in the future. For our country, Metaverse is a new development opportunity. Thus, at this stage we must follow up the development progress of Metaverse in time, explore application scenarios, construct standard system and research core standards to actively promote the healthy development of Metaverse industry.

Considering the previous conceptual frameworks for gamification in E-learning, it has some advantages, gamification offers positive features to inspire learners's performance and produce measurable feedback.

For future work, we will explore this research methodology & framework by design and create the prototype for a Game based learning content in Metaverse, Develop, Implementation and Evaluation. Qualitative and Quantitative inputs should be collected in order to improve conceptual framework. Additionally, more research is needed to articulate the didactic changes between personalize game-based learning and gamification in education for a detailed investigation. The future contribution aims to enhancing learning capacity in the 21st century, and the future of Metaverse in education.

6. References:

Ananya B., Priryanka M. (2022). Impact of the Metaverse on the Digital Future : People's Perspective, *Proceedings of the Seventh International Conference on Communication and Electronics Systems (ICCES 2022) IEEE Xplore Part Number: CFP22AWO-ART; ISBN: 978-1-6654-9634-6*

Dianwei W., Xiaoge Yan., Yang Z. (2021) Research on Metaverse: Concept, development and standard system, *2nd International Conference on Electronics, Communications and Information Technology (CECIT)*

Jashandeep, S., Meenakshi, M., Nitin, S. (2022). Metaverse in Education : Applying Metalytics to Measure Customer Experience in the Metaverse, 12, 135-142

Neama A. Dahan., Muna Al-Razgan., Ali Al-Laith., Muaadh A. Alsouf., Mahfoudh S. Al-Asaly and Taha Alfakih. (2022). Metaverse Framework: A Case Study on E-Learning Environment (ELEM), *Article in Electronics 2022, 11, 1616. https://doi.org/10.3390/electronics11101616*

Nida D. (2014). A New Framework for E-Learning Using Learning Style and Personality., *International Journal of Sciences: Basic and Applied Research (IJSBAR)*

P. D. Ariyadewa., W.V. Wathsala., V. Pradeepan., R.P.D.D.T. Perera., D.A.S. Atukorale. (2010) Virtual Learning Model for Metaverses., *2010 International Conference on Advances in ICT for Emerging Regions (ICTer)*

Wei Yang Bryan L., Zehui X., Dusit N., IEEE fellow., Xianbin C., Chunyan M., Sumei S., *IEEE Fellow., Qiang Yang., IEEE Fellow., (2022). Realizing the Metaverse with Edge Intelligence: A Match Made in Heaven.*

Yuntao W., Zhou S., Ning Zhang., Dongxiao L., Rui X., Tom H. L., Xuemin S. (2022). A Survey on Metaverse: Fundamentals, Security, and Privacy., *arXiv:2203.02662v2 [cs.CR] 8 Apr 2022.*

THE EFFECTIVENESS OF CHINESE CHARACTER-BASED TEACHING USING A BLENDED-LEARNING APPRAOCH ON STUDENTS' CHINESE CHARACTER RECOGNITION ABILITY IN A THAI BILINGUAL SCHOOL

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ABSTRACT

Developing students' Chinese character recognition skills contributes to the development of Chinese as a second foreign language learners' reading skill. This study started from the current learning situation and learning habits of the subjects. The effectiveness of the new approach was demonstrated through a blended learning approach that combined traditional Chinese character classroom teaching method with information technology products. The study was a single-group experimental study. The objectives of this study were to (1) explore a blended instructional approach based on Chinese characters to improve students' Chinese character recognition skills and (2) investigate students' perceptions of learning Chinese characters and using blended learning methods to improve their Chinese character recognition skills. The sample consisted of 12 elementary 6/1 students from the first semester of the 2022 school year at Tawat Sawetchat Bilingual School (โรงเรียนทวัดเศวตฉัตร) in Khon San District, Bangkok, Thailand. Data were analyzed by means of descriptive statistics, and paired-sample t-test. A comparative analysis of the pre-test and post-test revealed that the subjects' scores improved from 30.67 on the pre-test to 35.75 on the post-test. Second, the questionnaire results showed that the lesson plans developed based on the blended learning strategy were effective in helping the subjects improve their Chinese character recognition skills. The alpha coefficient of the scale was 0.98, indicating a high internal consistency of the scale items. Finally, in the open-ended questions, some subjects indicated that it was beneficial to use this method as early as possible.

Keywords: Chinese Character Recognition, Blended Learning, Innovative Pedagogy, Primary School Students

1. Introduction

According to the Chinese Proficiency Grading Standards for International Chinese Language Education, which was published by the Language and Literature Committee of the Ministry of Education of the People's Republic of China on March 24, 2021, the master list of quantitative language indicators stipulates that students must be able to recognize 300 Chinese characters. This means that they have reached the first level of the Chinese language（Education Ministry China, 2021）. At Wat Sawetachat School, a Thai-Chinese bilingual school in Bangkok, Thailand, students are required to take five courses in Chinese, math, science, art, and physical fitness. The goal of Chinese language instruction is clear: not only to master everyday communication in Chinese, but also to be able to read and write Chinese materials to solve general problems in other basic subjects. So that means that students need to learn the ability to hear and speak Chinese, but also need to develop their reading and writing skills. However, the author identified that the 6th graders had difficulty recognizing Chinese characters, so they had a hard time learning in those courses in Chinese. The students were proficient in utilizing Chinese Pinyin and frequently used Thai phonetic transcriptions and Hanyu Pinyin for subjects other than Chinese. In other words, the Chinese characters, which are what distinguish Chinese from other languages, were ignored by the students. Therefore, it was needed to investigate a new teaching method to develop the students' Chinese character recognition skills.

2. Research Objective

1. To design lesson plan using Chinese character-based and blended learning approaches to help improve students' character recognition in Chinese.

2. To investigate students' perceptions of learning Chinese characters and using blended learning methods to improve their Chinese character recognition skills.

3. Literature Review

By reading the literature, the variables in the problem became clear. The students' ability to recognize Chinese characters can be improved and developed through appropriate teaching methods, and the dependent variable can be determined. The unique Chinese character-based teaching method in this study is the independent variable.
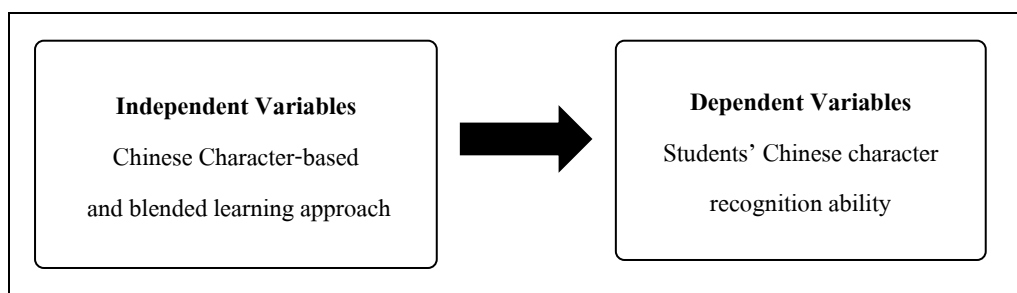
3.1 Research Framework

Figure 1. Research Framework

3.2 Research Hypotheses

Students' Chinese character recognition ability was enhanced through Chinese Character-Based Teaching using a Blended-Learning approach.

3.3 Theory, Concept and Related Research

The purpose of this study is to effectively increase students' Chinese character literacy, and the teaching approach adopted is information visualization and blended learning. It is divided into two main parts, theories and related studies. The theoretical part mainly includes the theory of Teaching Chinese Characters as a Foreign Language and the theory of Psychology and Pedagogy. Related research includes general teaching methods for Chinese characters, methods for assessing the learning effectiveness of Chinese characters, and methods for constructing blended learning. The idea of my literature review is to connect existing research methods and research directions in a new way.

There are three core elements surrounding the learning of Chinese characters, character form, character meaning, and character sound. There are six relationships among the three elements. Character form to character meaning(f2m), character meaning to character form(m2f), character form to character sound(f2s), character sound to character form(s2f), character sound to character meaning(s2m), and character meaning to character sound(m2s). Due to the issues explored in this study, and the limited time available for research. Only f2m is discussed.

The Chinese Proficiency Grading Standard for International Chinese Language Education (CPGS). The Quantitative criteria of CPGS, the table states that elementary level or level one bands learners need to master three hundred Chinese characters. (Education Ministry China, 2021). Due to the limited research time, I had to narrow down the number of target Chinese characters. Zhou (2007) said that Recognition may be more important than writing when it comes to reading and utilizing computers. And it suggests thirty-two basic Chinese characters that beginners should master. Shen, Wang & Tsai (2009) counted 100 high-frequency radicals from the 9999 Chinese characters in the modern Chinese Dictionary, and I pick up from which eight additional characters (UCCUC) selected for this study, together with the thirty-two characters mentioned above, for a total of forty Chinese characters for the study purposes.

After identifying the forty target Chinese characters, let's look at the general learning strategies for Chinese characters. Jian & Zhao (2001), According to their investigation and research on Chinese characters learning strategies of foreign students at the beginners' stage, they have compiled six Chinese character learning strategies, (1) Stroke. (2) Phonetic. (3) Morphological. (4) Generalization. (5) Review. (6) Application. On basic Chinese character teaching skills and competencies. (Zhou, 2007) argues that recognition should come first before writing. Because most Chinese characters represent morphemes and are composed of a unified form, sound and meaning.

Once a regular Chinese character learning strategy has been established, how do we test the learning effect? The research of Chan et al. (2022) established a set of inspection methods for the evaluation of children's Chinese character acquisition, and the research results gave me a lot of inspiration. Their research team conducted

a Chinese character acquisition assessment on 173 secondary kindergarten students aged 5-6 in Hong Kong, measuring their ability to associate the form, sound and meaning of Chinese characters.

Google classroom

In general, Google Classroom is nothing more than a program that facilitates distance learning by offering a series of sharing possibilities and total synergy with the classic functions of the Google world. Available for free for six years and already widely used by many teachers, the program has become the most used by teachers in these times of pandemics. Its functions allow you to assign exercises, tests, and questionnaires, store didactic material in a shared space, share videos, and exchange messages quickly and quickly (Smith, 2020).

Google Classroom has a lot of options but, more importantly, it can allow teachers to do more to help educate students remotely or in hybrid settings. A teacher is able to set assignments and then upload documents that explain what is required for completion, and also provide extra information and a place for students to actually work. Google Classroom also allows for the export of grades into a student information system (SIS) making it far easier to use automatically school-wide. Google offers an originality report feature that lets teachers run a check against other student submissions from the same school. It is the great way to avoid plagiarism (Edwards, 2022)

Blended Learning

In Helen & Staker's (2015) book, a study is mentioned where they interviewed over 150 educators behind blended learning programs starting in 2010. The definition for blended learning is given in three parts (1-In Part through Online Learning, 2-In Part in a Supervised Brick-and-Mortar Location, 3-An Integrated Learning Experience). The results of Tayebinik & Puteh (2013) show that blended learning may become the most important educational model in the future, and point out that it is a range of delivery methods to meet the course objectives. Hrastinski (2019) study noted that the breadth of conceptualizations means that essentially all types of education that include some aspect of face-to-face learning and online learning are being described as blended learning in the literature. About "How should we organize such learning environments in order to support learning effectively?". Güzer & Caner (2014) give the answer is that we should study to integrate constructivist and collaborative models into blended learning environments and aim to educate more creative and curious students who reads, writes and produces for the world.

Assessment and Evaluate in Chinese Characters

The research of Chan et al. (2022) established a set of inspection methods for the evaluation of children's Chinese character acquisition, and the research results gave me a lot of inspiration.

4. Research Methodology

4.1 Research Design

The subjects of this study were twelve students in the 6th Grade class, three girls and nine boys. The experiment used a mixed method. To demonstrate the effectiveness of experimental variables (a unique blended learning teaching scheme), this experiment used a single group pre-test and post-test design. The pre-test and

post-scores were analyzed to identify students' Chinese character recognition ability. A questionnaire and open-ended questions were designed to collect students' opinions and suggestions for the experiment. Among them, the unnamed comments of open-ended questions further prove the validity of the experiment. the subject clearly indicated that this intervention should be implemented as early as possible.

4.2 Population and Sample

The target group of this study included twelve sixth graders from Wat Sawetachat School, a Thai-Chinese bilingual school in Bangkok, Thailand. In the Bangkok area, there are 14 Thai-Chinese bilingual public elementary schools that offer Chinese as a second language and require students to study five subjects using Chinese. Based on the above, referring to the average number of students in my school, if each grade level, each class has 20 students, so there are 120 students in one school. If other schools had the same or more students than my school, there would be at least 1,680 children in this Chinese project.

4.3 Research Instruments

To achieve Objective 1, my tools include a Lesson plan, Chinese character-based preview materials, and Chinese character-based learning materials. To achieve Objective 2, my tools included the Pre-Test & Post-Test of the Chinese character Recognition Ability Test, and a Chinese character-based with blended learning approach questionnaire, and a few open-ended questions.

It is necessary to clearly point out the following, the source of the pre-study material is the open source of the Internet (Chinese character stroke order), which I summarized and organized into a google slide. The questionnaire, which consisted of thirty questions, came from the instructor's suggestions and was tailored to the actual situation of this experiment. The design idea of the Chinese character test paper was taken from the research team of Chan et al. (2022). There are 40 multiple-choice questions in total, and the score is 40 points.

What happens when design thinking is paired with a blended learning model? How to demonstrate flexibility is also a sub-question that this study attempts to explore. Design thinking, it consists of five steps empathy, define, ideate, prototype and test. it not only provides strong support for the progress of this study but also provides ideas for the development of lesson plans.

4.4 Data Collection

This experimental study was conducted from June to July 2022 in the 6th grade of elementary school at Tawat Sawetchat Bilingual School(โรงเรียนทวัดเศวตฉัตร), Bangkok. This was a single group study. A pre-test of Chinese character recognition skills was first completed before the lesson plan was implemented. Then after completing the experimental lesson plan with 40 target Chinese characters, the subjects were given a post-test. This was followed by a questionnaire and open-ended question on the second day. The process of a number of time points was as follows: complete the Item Objective Congruence score assessment by the end of the first week of June, then, begin pre-testing and complete the lesson plan for the lab intervention by July 15, and return questionnaires by July 20.

The lesson plan was implemented and the researcher recorded the observations into a notebook at any time during the implementation process. The pre-test and post-test were able to collect the test scores of the

subjects quickly because of the use of the Google Forms application. Questionnaires and open-ended question were also collected through Google questionnaires.
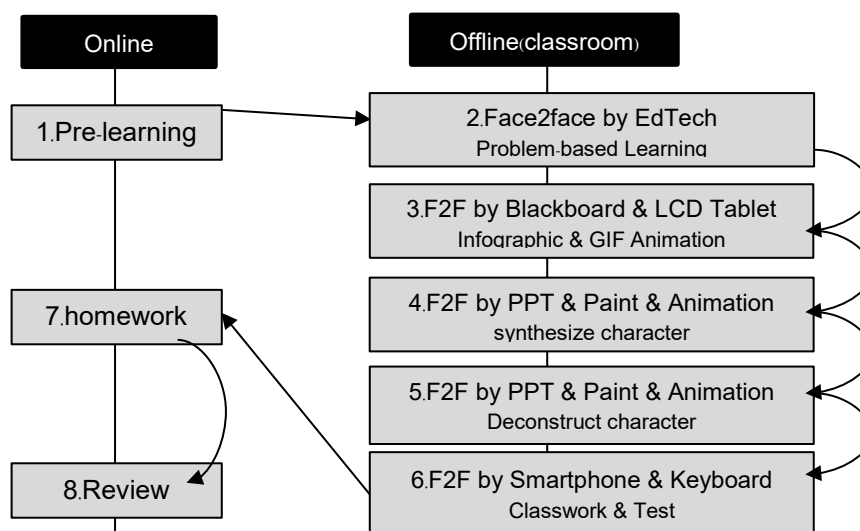

Figure 2 Model for Blended Learning on Chinese Character Recognition Ability Development

In step two of the classroom parts, after the instructor asked questions and showed images or GIF animations of information related to the target Chinese character, the subjects were divided into four groups of three. Sketches were created based on what they had just seen. One member of each group was asked to draw the outline of the relevant image associated in the brain on the blackboard, while the remaining three members were also asked to complete the drawing task on paper or tablet. The key guiding question for this step was, how do you translate and create the information you observe and receive into a Chinese character if you were the first person to invent it thousands of years ago? The teacher needs to guide and inspire the students to think about it.

In step three, After the subjects watched the evolution of the target Chinese characters, they needed to complete the tasks of observing and imitating writing. the participant writes the Chinese character as large as possible, how large is appropriate? Five to ten times larger than the usual Chinese characters written in the homework exercise book. The purpose of this is to deliberately slow down the writing speed so that the subjects can experience the relationship between the spacing and length of the strokes. This part does not need to mind the right order of the strokes to prevent distracting the subject.

In step four, the experimental participants need to combine the meaning of the target Chinese character with the Thai meaning, infer the meaning of the synthesized Chinese character, and draw the outline of the figure or thing reflected in the mind, or use onomatopoeia, or use body movements. any way. The teacher judges whether the understanding is correct or not.

In step five uses the concepts taught about the combination and breakdown of the fundamental strokes of Chinese characters to activate the overlaid impact of the topic knowledge and to consolidate and strengthen it. In the final step, the Chinese Hanyu pinyin appears for the first time, and I want to emphasize that it cannot appear

in all the previous steps. Students use the Hanyu Pinyin input method to type the target char into the comments section of Google Classroom or to use the Line social application and send char to the teacher.

4.5 Data Analysis

Because the pretest scores conformed to a normal distribution, this study took a parametric test. The data derived from the instruments were analyzed Descriptive statistics mean, S.D. and Paired Samples t-Test. The content of the interviews was analyzed for textual analysis. The scores of the pre-test and post-test and the questionnaire were collected using excel.

5. Research Findings

Table 5.1 shows the means scores on the pre-test and post-test

Paired Samples Statistics		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	pre-test	30.67	12	6.880	1.986
	post-test	35.75	12	4.789	1.382

Table 5.2 Paired samples test for pre-test and post-test

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	pre-test -post-test	-5.083	2.392	.690	-6.603	-3.564	-7.363	11	.000

This study reveals the mastery of Chinese character recognition skills through blended learning strategies among Thai students in a sixth-grade bilingual special class. The results of the Chinese character recognition test revealed that blended learning strategies are an effective teaching method. Specifically, the Based on the analysis comparing the pre-test and post-test, it was found that the subjects' scores increased from 30.67 on the pre-test to 35.75 on the post-test. Secondly, the questionnaire results indicate that the lesson plan developed based on the blended learning strategy is effective in helping the subjects to enhance their Chinese character recognition skills. The alpha coefficient of this scale was 0.98, showing a high internal consistency of the items on this scale. The results of the questionnaire were generally in the middle of the range in favor of good. The second item had the highest score of 4.17. The lowest score was 2.58 for the thirtieth item. The answers collected by the open-ended questions also showed effectiveness, and some subjects indicated that they should have learned

earlier. the hypotheses presented at the beginning of this study are statistically valid. It is recommended to use it as early as possible, e.g., starting after the third grade.

6. Discussion

After 4 weeks of implementation of the intervention treatment experiment, the analysis of the results based on the three research instruments can be interpreted and concluded that the design of a unique Chinese character-based pedagogy, implemented through a blended learning approach, was effective in improving students' Chinese character recognition skills. The core reasons for the success of this study are the clear research ontology (developing students' Chinese character recognition skills), the specific measures were taken including the improvement of the traditional instructional materials and teaching methods to suit the Internet application environment, as well as the appropriate distribution of learner milestones inside and outside the classroom, and finally, the targeted assessment and evaluation. This can be discussed as follows.

6.1 Explicit identification of research ontology (development of Chinese character recognition skills)

In accordance with the CPGS (Chinese Proficiency Grading Standards) for international Chinese language education, I selected the first twenty Chinese characters and tested them on the subjects of this study. The subjects explicitly told the authors of this study to label these Chinese characters with Hanyu Pinyin or pronunciation; otherwise, it was impossible for the subjects to know the meaning of these square Chinese characters. So, what we can determine is that the subjects have the ability to transfer sounds to meanings (S2M), but not the ability to transfer glyphs to meanings (F2M).

6.2 Modification of instructional materials and traditional teaching methods

During the intervention phase of treatment, lesson plan design and modification of teaching materials are included. First, when designing the lesson plan, questions are set to ask students to design Chinese characters that express a specific meaning. The aim was to fully stimulate students' creativity, and subjects expressed the guessed or inferred meanings through drawings or action behaviors. This is the same as the findings of Kim et al. (2021), where M Girls' High School was significantly effective in developing creative thinking skills, but not in developing knowledge information processing skills, which is different from my findings. Secondly, it is the processing of traditional learning materials into new materials adapted to Internet applications that is necessary for the successful implementation of the blended learning approach. The learning materials used in my study included Chinese character pre-reading materials (stroke order), and Chinese character instructional materials (GIF animations, infographics) with the help of Google Classroom, complete with blended learning.

6.3 Appropriate distribution of online and offline learning objectives

Appropriately distributing the weight of online and offline learning content is also necessary to make the blended learning approach successful. The online learning materials in this study focused on pre-reading and review, and on students who missed the classroom lectures. The instructional activities in the offline classroom focused on the need for the instructor to guide the students (heuristic instruction). Unlike the study by Daspit &

D'Souza (2012), converting a business course to an online course does not require students to return to a traditional classroom. And students need to be trained on how to use the wiki system properly. The mobile application used in this study, on the other hand, it was simple for the subjects to operate (as opposed to a complex mobile game application). The instructional materials used in the offline teaching activities were not only designed for use in the classroom only, they were also visible in the Chinese Character Recognition course of Google Classroom, by clicking on the web links of the materials. The benefit of this is that when students are unable to attend school for any reason, they can see the missed content on their smartphones. We can see that the blended learning approach is an extension and supplement to traditional teaching activities, which is consistent with the findings from Daspit & D'Souza's (2012) study.

6.4 Specialized testing and assessment

The test used in this study is the Form to Meaning (F2M), which is based on a study by Chan et al. (2020), a team of researchers who summarized six tests of Chinese character recognition ability and recommended that more international Chinese language educators promote this test (CCAA, Chinese character acquisition assessment). The authors of this study initially planned to use two of the CCAA tests, F2M and M2F, but finally canceled the M2F test due to time constraints. The similarity between the two studies is that 40 Chinese characters were selected. The difference is that the forty Chinese characters in this study were derived from high-frequency monograms. In contrast, the 40 Chinese characters in Chan et al. (2020) were selected from the 200 most frequent Chinese characters in the teaching programs of 21 kindergartens in Hong Kong. The participants in this study tried to get their teachers to give hints and ask them to pronounce the Chinese characters they did not know during the quiz. One student told the teacher that he was confident that he could get a perfect score on the test if the teacher pronounced all 40 characters. From the above observations, we can find that the subjects' ability to translate the pronunciation and meaning of Chinese characters predates the transformation of the character form and meaning. These findings echo the inference in the findings of Chan et al. (2020).

7. Suggestions

This study suggests pedagogical implication and recommendations for further studies as follows:

1. It is suggested that a teacher needs to limit the classroom learning time for each Chinese character to between fifteen and twenty minutes, so it did not affect the overall progress of the experiment.

2. Regarding the technological innovation in teaching and learning, the teacher needs to be aware that the implementation of blended learning strategies requires the use of smartphones, applications for teaching and learning. Thus, the teacher needs to use information technology more effectively, instead of using technology for technology's sake.

3. Make the assessment and evaluation more relevant to students' learning progress. The assessment cycle can cover the entire range of elementary school levels. According to the standards set by the Ministry of Education in mainland China, the number of Chinese characters that need to be mastered in the lower elementary grades (first through third grade) and in the upper elementary grades (fourth through sixth grade) is then spread

out over each school year, and each student's mastery progress can vary. Database technology, or traditional grade bag management, could be introduced to track and record the analysis of students' Chinese literacy development.

8. Acknowledgement

9. References

Chan, S. W., Cheung, W. M., Huang, Y., Lam, W. I., & Lin, C. H. (2020). Development and validation of a Chinese character acquisition assessment for second-language kindergarteners. *Language Testing*, *37*(2), 215-234.

Daspit, J. J., & D'Souza, D. E. (2012). Using the community of inquiry framework to introduce wiki environments in blended-learning pedagogies: Evidence from a business capstone course. *Academy of Management Learning & Education*, *11*(4), 666-683.

Education Ministry China. (2021, March 31). Chinese Proficiency Grading Standard for International Chinese Language Education (GF0025). *Ministry of Education of the People's Republic of China*. From http://www.moe.gov.cn/jyb_sjzl/ziliao/A19/202111/W020211118507389477190.pdf

Edwards, L. (2022, April 5). What Is Google Classroom? *Techlearning*.com https://www.techlearning.com/features/what-is-google-classroom

Güzer, B., & Caner, H. (2014). The past, present and future of blended learning: an in depth analysis of literature. *Procedia-social and behavioral sciences*, *116*, 4596-4603.

Helen, H, Shen. Ping, Wang. & Chen-hui, Tsai. (2009, July). *Learning 100 Chinese Radicals*. Peking University Press. pp-5.

Horn, M. B., & Staker, H. (2015). *Blended: Using disruptive innovation to improve schools*. John Wiley & Sons.

Hrastinski, S. (2019). What Do We Mean by Blended Learning? *TechTrends*, 63:564–569.

Kim, Eung-chun, Kim, Hye-jin, Lee, & In-young. (2021, May 26). Blended Learning Daily Chinese Vocabulary Education to Develop the Creative Thinking Skills and Knowledge Information Processing Skills. *Han-Character and Classical written language Education No.50 pp.67-107*. DOI: https://doi.org/10.15670/HACE.2021.50.4.67

Smith, A. (2020). GOOGLE CLASSROOM The 2020 Complete Guide for Students and Teachers on How to Benefit from Distance Learning and Setup Your Virtual Classroom. *www.goodreaders.com*. https://www.goodreads.com/book/show/54517000-google-classroom

Tayebinik, M., Puteh M. (2013). Blended Learning or E-learning? *arXiv preprint arXiv:1306.4085*.

Wang, H.W. & Shu, Y.X (2015). Quantitative Analysis-based Chinese Characterology on teaching and learning Chinese as a foreign language. *Tsinghua University Press.* https://wqbook.wqxuetang.com/book/1285647

Zhou, J. (2007). *Theories and Methods of Chinese Character Teaching*. Beijing Book Co.Inc.

A SURVEY OF JAPANESE-LANGUAGE LEARNING OBJECTIVES OF STUDENTS MAJORING IN JAPANESE FOR BUSINESS COMMUNICATION AT SRIPATUM UNIVERSITY

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ABSTRACT

The purpose of this paper is to investigate the Japanese-language learning objectives of first-year/second-year/third-year students enrolled in the Department of Japanese for Business Communication at Sripatum University. The survey method used was a multiple-response format through a questionnaire survey, in which multiple choices were selected from a list of 17 objectives. The survey results obtained a total of 192 respondents overall from first-year through third-year students. The response numerical value collected was processed using descriptive statistics and two analyses were proceeded with: students' response behavior and students' response results. The objectives for learning Japanese, which accounted for approximately 50% or more of the survey results, were ten items for first-year students, six items for second-year students, and four items for third-year students. The students' objectives for learning Japanese were summarized as *Interest in Japan and the Japanese-language*, including modern popular culture, Japanese tourism and exchange with Japan, and *Expectations for future employment*. It is important to create learning contents and learning environment that enable students to achieve their various objectives through the intramural and extracurricular activities of the Japanese-language major program.

Keywords: Japanese-language learning, Learning objectives, Business Japanese, Cross-sectional study, Sripatum University

1. Introduction

As a teacher of Japanese-language, it is of great interest to know about students' motivations, reasons, and purposes for learning Japanese. In fact, there are international survey reports on reasons for studying Japanese. There will also be opportunities for teachers who teach Japanese to hear directly from students. Through credible information on Japanese-language education, it may be possible to know the general reasons or purposes for learning Japanese. According to a survey by the Japan Foundation (2017; 2020), the number of higher education institutions offering Japanese-language courses and the number of students in Thailand were 91 institutions and 22,787 students, respectively, in fiscal year 2015, however, in 2018, the number of institutions and students decreased slightly to 84 and 20,506, respectively. Of these, there are 40 institutions of higher education with a major in Japanese (*Ibid.*, 2022). Only five institutions of higher education have

Business Japanese as their department name, accounting for only 12.5% of the total number of institutions with Japanese major course. The number of students in the Department of Japanese for Business Communication (hereafter referred to as the JBC Department) at Sripatum University was 43 when the JBC Department opened in 2015. Since the academic year 2017, the number of students has increased to more than 100. Over the past three years, the JBC Department has enrolled 122 students in 2020, 115 students in 2021, and 136 students in 2022. In reaction to this background of increased enrollment, the researcher decided to conduct a survey because he judged that it would be of some significance to the JBC faculty members to directly survey the Japanese-language learning objectives of students enrolled in the JBC Department. The term *objective* of Japanese-language learning as used in this paper means to *direct action with the intention of an object to be realized or a state to be attained.* Another term related to *objective* is *motivation* or *reason*, however, the original meaning of *motivation* is *trigger*, and it includes *conscious/unconscious causes.* Depending on how one views *the degree of subjective and objective factors* in *conscious or unconscious causes*, it may be *reason* (DIGITALIO, Inc., 2019). In any case, it was chosen to use the term *objective* in order to have a clear view of where and what the future direction of students majoring in Japanese-language is as of this moment.

2. Research Objectives

(1) To survey the objectives of Japanese-language learning for each year level from first year to third year students enrolled in the JBC Department

(2) To share students' Japanese-language learning objectives obtained through the survey results with the JBC Department faculty members, and use the survey results as an opportunity to discuss efforts and innovations to increase students' interest in *Business Japanese*.

3. Literature Review

3.1 Related Research

Several academic researches on the objectives of Japanese-language learners enrolled in higher education institutions in Thailand could be cited that focus more on *Motivation* than on *Reason/Objective.* Narita (1998) discussed the relationship between motivation and performance among 44 Thai university students studying Japanese. In this research study, he conducted 30-item survey of motivations for learning Japanese and extracted six motive-oriented factors: *Cultural understanding, Integrative, Instrumental, Benefit, International*, and *Triggering* from a factor analysis of the survey data. Utsugi (2011) investigated the relationship between Japanese-language proficiency and motivation to learn Japanese among 90 Thai university students. Based on factor analysis, analysis of variance (ANOVA), and multiple comparison technique using the Tukey method, five factors were extracted from the findings: *Instrumental motivation, Understanding Japan-minded, Curiosity/Interest, Induced-oriented*, and *Interest in learning Japanese.* In addition to the academic research mentioned above, Kongjit (2013) reported that the main motivations of the students majoring Japanese-language at Chiang Mai University were *Interest in and aspiration for Japanese subcultures*, and *Career development expectations* such as studying and working in Japan, as well as the

specific goal of studying in Japan. According to a survey report of educational institutions 2018 by the Japan Foundation (2020), Of the 17 objectives of Japanese-language learners at 84 institutions of higher education in Thailand, six items accounted for more than 50% of the total. In order of highest to lowest, the above six items were *Interest in the Japanese-language* (92.9%), *Interest in anime, manga, J-POP, fashion, etc.* (88.1%), *Future employment/work aspirations* (75.0%), *Interest in Japanese culture* (66.7%), *Sightseeing in Japan* (65.5%), and *Study in Japan* (53.6%). However, it should be noted that the results of this survey included responses not only from institutions with a major in Japanese-language, but also from institutions with other Japanese-language programs or courses, and that the survey did not directly target Japanese-language learners. As seen in these search reports, it was found that the objectives of learning Japanese were understood from the viewpoint of all Japanese learners. It would be important to investigate the objectives of learning Japanese by the stage of the educational institution, by the type of major such as major/minor/elective courses, or by each grade level of student. In any case, in the questionnaire survey in this paper, the researcher decided to adopt the 17 objectives used in the Japan Foundation' survey in selecting the choices for Japanese-language learning objectives, considering the advantages of comparative analysis and discussion.

3.2 Research Hypotheses

It is expected that the objectives for learning Japanese in first-year, second-year, and third-year students, excluding fourth-year students who were not included in this survey, will differ according to the characteristics of the JBC Department. Based on this expectation, it was hypothesized that as students enhanced Japanese learning through the JBC Department's Business Japanese courses, i.e., as they moved into the upper grade, their Japanese-language learning objectives should become more business-related and pragmatic.

4. Research Methodology

4.1 Research Design

Research design implies the establishment of a framework for research methods. In accordance with this definition, in designing this survey, emphasis should be placed on the collection, measurement, and analysis of respondents' data to minimize data bias and to maintain the accuracy of the aggregate results of the collected data, which would enhance the reliability of the measurement and analysis results. In a questionnaire survey as a research method for quantitative research, it is important to ensure the reliability of the survey results. With regard to the validity of the survey results, attention should be paid to present the correct measurement method (statistical processing method) that is appropriate to the purpose of the research. Based on the tabulation, measurement, and analysis results, a descriptive design was adopted that allowed for an explanation of the background and factors behind these results. At the same time, the adoption of a descriptive design is said to also allow sufficient insight into the reasons, objectives, and methods of the study (QuestionPro Survey Software, 2022). In addition, this questionnaire survey was based on a cross-sectional study framework in the sense that it compared the results of responses through different years from first-year until third-year students.

4.2 Target Group

Target group in this research consisted of students enrolled in the JBC Department. The first-year students were 139 students enrolled in academic year 2022 who took general education course, *HUM132 Future Skills* in the 1-1 semester (corresponding to June-July term) in 2022. The second-year students were 39 students who took *JBC331 Japanese for Business Correspondence*, and the third-year students were 65 students who took *JBC433 Japanese for Business Presentation*. For second-year/third-year students, the courses were offered in the summer semester of academic year 2021 (June-July in 2022).

4.3 Research Instrument

A questionnaire was used as the research instrument, and 17 items were set for the objectives of learning Japanese. A multiple-response format or multiple-choice method was used, allowing respondents to choose any number of applicable items (Social Survey Research Information Co., Ltd., n.d.). Of the 17 items, the last item was *others*, which was an open-ended question or descriptive method. The language used in the questionnaire was both Thai and English. *Google Forms*, a questionnaire design and management software, was used as the means of administering the questionnaire survey.

4.4 Data Collection

When collecting data through *Google Forms*, it was asked academic advisor of the JBC Department for first-year students, and it was asked the subject teachers of the JBC Department for second-year and third-year students. After explaining the questionnaire survey to the JBC Department faculty, the researcher asked them to conduct it in early July 2022. The total number of respondents was 192, the breakdown of 192 respondents was as follows. Namely, 102 first-year students responded, for a valid response rate of 73.3%, 27 second-year students responded, for a valid response rate of 69.2%, and 63 third-year students responded, for a valid response rate of 96.9% (rounded to two decimal places). Cronbach's alpha coefficient was 0.84 (DATAtab Team, 2022). The reliability coefficient (internal consistency) is an index of the reliability of the valid responses to the measurement results. A method called descriptive statistics was used for the statistical processing of the valid responses collected (Casio Computer Co., Ltd., 2022).

4.5 Data Analysis

The data analysis first summarized the actual number of responses by students in the questionnaire survey, i.e., how many choices students selected from the list of objectives from item No.1 to item No.17 (Table 1). Next, it summarized the number of respondents who chose each item in the questionnaire for each year student's level (Table 2).

4.5.1 Analysis of Students' Response Behavior

First, by each year student' level, first-year students had the largest number of 6 and 11 responses answered, with 14 students, respectively, secondly, was followed by 11 students each with 8 and 11 responses, and thirdly, 10 students with 7 responses, in that order. The total number of students for all responses above came to 60 students, accounting for 58.8% of the total 102 students. Other than this, the number of responses selected by first-year students were all less than 10 students, except for 16 and 17 zeros. The average number of responses per first-year student was 7.5. Second, second-year students had none in the double digits. The

largest number of students was 4, with 1, 5, and 8 responses, respectively, followed by 3 students with 3 responses. The total number of students with these responses was 12, accounting for 44.4% of the total of 27 students. The average number of responses per second-year student was 6. Finally, third-year students, like the second-year students, had only a single digit number of selected choices. The highest number of responses was 9 students with 5 responses, and the number of selected responses was 8 students with 2, 6, and 7 responses, respectively. The average number of choices per third-year student was 5.6. Looking at the total for all year-students combined (192 students), an average of 7.67 students was 6 responses in the number of selected responses, an average of 7.33 students was 8 responses, an average of 6.33 students was 5 responses, and an average of 6.00 students was 7 responses.

Table 1 Aggregate number of responses selected by students

No. of selected responses	First-year	Second-year	Third-year	Subtotal	Mean	SD
1	3	4	3	10	3.33	0.58
2	4	2	8	14	4.67	3.06
3	8	3	6	17	5.67	2.52
4	7	2	6	15	5.00	2.65
5	6	4	9	19	6.33	2.52
6	14	1	8	23	7.67	6.51
7	10	0	8	18	6.00	5.29
8	11	4	7	22	7.33	3.51
9	5	2	3	10	3.33	1.53
10	11	1	1	13	4.33	5.77
11	14	2	1	17	5.67	7.23
12	1	0	2	3	1.00	1.00
13	4	0	0	4	1.33	2.31
14	3	1	1	5	1.67	1.15
15	1	0	0	1	0.33	0.58
16	0	1	0	1	0.33	0.58
17	0	0	0	0	0.00	0.00
Total	102	27	63	192	3.76	2.75

4.5.2 Analysis of Students' Responses

Regarding the objectives of learning Japanese by each-year student from first-year until third-year, the most frequent response item for first-year students was item No.8 with 85 students, accounting for 83.3% of the total, and next was item No.2 with 83 respondents, accounting for 81.4% of the total. The items that received more than half of the responses (50.0% or more) were, in order of highest to lowest, item No.5 (77.5%),

items No.7/item No.11 (63.7%, respectively), item No.10 (57.8%), item No.13 (55.9%), item No.1 (52.0%), and item No.14 (51.0%). Of the total number of 17 items, the above nine items accounted for 52.9%. The two items that received the highest number of responses from second-year students were item No.5 and item No.10, each with the same percentage of 66.7%. The items that received more than 50.0% of the total responses were, in order of highest to lowest, item No.6/item No.8 (59.3%, respectively), and item No.2 (55.6%). The five items mentioned above accounted for 29.4% of the total number of 17 items. For third-year students, item No.2 was the most common response, accounting for 77.8% of the respondents, followed by item No.8 at 73.0%. The two items that accounted for 50.0 to 60.0% range of the total were item No.5 (61.9%) and item No.10 (50.8%). Of the total number of 17 items, four items showed 50.0% or higher, accounting for 23.5%. Looking at all year students combined, item No.2 and No.8 were the most common, each accounting for 76.6% of the total, followed by item No.5, which accounted for 70.8%. Only two items, item No.10 (56.8%) and item No.11 (52.6%), were in the 50.0% range, while approximately 50.0% were in item No.7 (49.0%), item No. 13 (47.4%), and item No.14 (46.9%). Incidentally, none of the students selected item No.17 (*Others*).

Table 2 Aggregate results of multiple responses from students

	Objectives of Japanese learning	First-year	Second-year	Third-year	Total
1	Interest in Japanese culture (e.g., history, literature, arts)	53 (52.0%)	6 (22.2%)	21 (33.3%)	80 (41.7%)
2	Interest in anime, manga, J-POP, fashion, etc.	83 (81.4%)	15 (55.6%)	49 (77.8%)	147 (76.6%)
3	Interest in politics, economy and/or society	20 (19.6%)	4 (14.8%)	12 (19.0%)	36 (18.8%)
4	Interest in science and/or technology	11 (10.8%)	5 (18.5%)	12 (19.0%)	28 (14.6%)
5	Interest in the Japanese language	79 (77.5%)	18 (66.7%)	39 (61.9%)	136 (70.8%)
6	Use Japanese to take an exam/earn a certificate	38 (37.3%)	16 (59.3%)	13 (20.6%)	67 (34.9%)
7	Study in Japan	65 (63.7%)	9 (33.3%)	20 (31.7%)	94 (49.0%)
8	Future employment/work aspirations	85 (83.3%)	16 (59.3%)	46 (73.0%)	147 (76.6%)
9	Necessary for current work and Use Japanese	34 (33.3%)	11 (40.7%)	21 (33.3%)	66 (34.4%)
10	Sightseeing in Japan	59 (57.8%)	18 (66.7%)	32 (50.8%)	109 (56.8%)
11	Goodwill programs and exchanges with Japan	65 (63.7%)	13 (48.1%)	23 (36.5%)	101 (52.6%)
12	Information gathering/communication in the Japanese-language	48 (47.1%)	7 (25.9%)	7 (11.1%)	62 (32.3%)
13	Speaking Japanese at work, school, or in the community	57 (55.9%)	11 (40.7%)	23 (36.5%)	91 (47.4%)
14	Understanding other cultures and cross-cultural communication	52 (51.0%)	10 (37.0%)	28 (44.4%)	90 (46.9%)
15	Mother language or heritage language	5 (4.9%)	2 (7.4%)	3 (4.8%)	10 (5.2%)
16	Recommendation of family, relatives, etc.	11 (10.8%)	2 (7.4%)	3 (4.8%)	16 (8.3%)
17	Others (please specify)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	Total answers	**765**	**163**	**352**	**1,280**
	Mean	**45.00**	**9.59**	**20.71**	**75.29**
	SD	**27.61**	**5.85**	**14.62**	**46.21**

5. Research Findings

5.1 Features of First-year Students

As ten items (item No.8, No.2, No.5, No.7, No.11, No.10, No13, No.1, No.14, and No.12) were found to have a ratio of approximately 50.0% or more as features of first-year students, they had a very wide range of objectives compared to second-year and third-year students. Especially, item No.8; *Future job* (83.3%) and item No.2; *Japanese pop culture and subculture related to anime, manga, etc.* (81.4%) showed very high percentages. Item No.5; *Interest in the Japanese-language itself*, also showed approximately 80% (77.5%). In terms of culture, item No.1: *Interest of traditional Japanese culture* (52.0%) also exceeded half of the respondents, although at a lower rate than item No.2; *Contemporary youth culture*. The low percentage of respondents (37.3%) for the objective of *Japanese-language proficiency test* or *Japanese-language examination for foreign Japanese learners* in item No.6, which is related to item No.8, suggests the need to explore the background factors behind this low percentage. The objective of *Language and cultural exchange using Japanese* was suggested by five items: No.7; *Study in Japan* (63.7%), item No.11; *Goodwill exchange with Japan* (63.7%), item No.10; *Sightseeing in Japan* (57.8%), item No.13; *Japanese conversation at school, etc.* (55.9%), and item No.14; *Understanding other cultures and cross-cultural communication* (51.0%).

5.2 Features of Second-year Students

In terms of the features of second-year students, it could be said that they were narrowed down to six items when viewed in terms of about 50.0% or more of the items. These six items were item No.5; *Interest in the Japanese-language itself* (66.7%), item No.10; *Sightseeing in Japan* (66.7%), item No.6; *Japanese-language proficiency test* (59.3%), item No.8; *Future job* (59.3%), item No.2; *Japanese pop culture* (55.6%), and item No.11; *Goodwill exchange with Japan* (48.1%). Although it was a coincidence that item No.6 and item No.8 had the same ratio, it was noteworthy that they were perceived as the importance and relevance of *Japanese-language proficiency test = Future employment/work*. Except for item No.5, second-year students' responses appeared to determine their own objectives that were beneficial or utilitarian value for themselves.

5.3 Features of Third-year Students

Third-year students characterized the objectives as even more limited than first-year and second-year students. Only four items had a ratio of 50.0% or more, that is, they were item No.2; *Japanese pop culture* (77.8%), item No.8; *Future job* (73.0%), item No.5; *Interest in the Japanese-language itself* (61.9%), and item No.10; *Sightseeing in Japan* (50.8%). However, item No.6; *Japanese-language proficiency test*, was low at 20.6%, a decrease of 38.7 points from the second-year students. The number of third-year students who have passed the intermediate level of *the Japanese-language proficiency test* is currently only a few percentages, which is a matter of concern for faculty members of the JBC Department. Additionally, item No.7; *Studying in Japan* (31.7%), was also less common. As seen in item No.14; *Understanding other cultures and cross-cultural communication* (44.4%), item No.11; *Goodwill programs and exchanges with Japan* (36.5%), and item No.13; *Speaking Japanese at work, school, or in the community* (36.5%), these three items were low percentages in consideration of the objective of *Interacting with Japanese people through Japanese-language*. It could be said that the objective of learning the Japanese-language was divided into two categories: the actual benefit of *Work/Sightseeing* and the students' own interest and curiosity of *Japanese-language/Modern Japanese culture*.

6. Discussion

Comparing the results of responses from students in the JBC Department with the results of the Japan Foundation' survey (item No.5, No.2, No.8, No.1, No.10, and No.7) mentioned in *3.1 Related research*, although the rankings were different, all six items were included in first-year students, in approximately 50.0% or more of the items. In addition, there were responses to item No.11; *Goodwill programs and exchanges with Japan* (63.7 %), item No.13; *Speaking Japanese at work, school/in the community* (55.9%), and item No.14; *Understanding other cultures and cross-cultural communication* (51.0%), which differed from the survey results of the Japan Foundation. Among second-year students, item No.7; *Study in Japan* (33.3%) and item No.1; *Interest in Japanese culture* (22.2%) had low percentages of less than 50%, instead, responses to item No.6; *Use Japanese to take an exam/earn a certificate* (59.3%) and item No.11 (48.1%) were seen. Third-year students similarly showed low percentages for item No.1 (33.3%) and item No.7 (31.7%). Through this discussion, as students moved into the upper grade or the level of Japanese-language learning increased, it was suggested that the objectives of learning Japanese or the priority and rank order of those objectives also changed.

7. Conclusion and Suggestion

The learning objectives of the Japanese major students in the JBC Department were listed as ten items in about 50.0% or more of the first-year students' responses, decreasing to six items in the second-year students, and four items in the third-year students' responses. As an interpretation of the answer results, it could be considered of the factor that the objective was achieved and the factor that the objective was focused on as moving to upper year. The five items that accounted for more than 50.0% of first-year, second-year, and third-year students combined were item No.2; *Interest in anime, manga, J-POP, fashion, etc.*, item No.8; *Future employment/work aspirations* (76.6%, respectively), item No.5; *Interest in the Japanese-language* (70.8%), item No.10; *Sightseeing in Japan* (56.8%), and item No.11; *Goodwill programs and exchanges with Japan* (52.6%). Simply put, it could be said that there were two objectives: *Interest in Japan and the Japanese-language*, including modern popular culture, tourism, and exchange, and *Expectations for future employment*. However, Chusri (2018) pointed out that although Thai students' objectives for learning Japanese, such as *Interest in the Japanese-language itself*, *Communicating in Japanese*, and *Liking manga, anime, J-POP, etc.*, could be achieved to some extent once they finished studying at the beginner's level, it was difficult to connect these objectives to motivation for learning to intermediate or advanced levels. The same point could be made for the second-year and third-year students in the JBC Department, who were placed in the intermediate to advanced level range. In fact, item No.6; *Use Japanese to take an exam/Earn a certificate* was answered by third-year students with a low degree of 20.6%. As stated in the research hypotheses, the response results did not indicate that items related to *actual benefit/use-oriented objectives* were particularly prominent. At any rate, motivation cannot be maintained without objective, and it goes without saying that objective is an important factor in continuing learning. As faculty members of the JBC Department, it will be important to create learning contents and learning environment that enable students to achieve their various objectives as much as possible through intramural and extracurricular activities in the educational program. At the same time, it is necessary to discuss

the relationship between the achievement of the objective of *Business Japanese*, which is a distinctive feature of the JBC Department, and the various objectives of the Japanese major students. In the future, the researcher would like to consider conducting a follow-up survey within the framework of a longitudinal study based on the results of the first-year students' responses.

8. Acknowledgement

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9. References

Casio Computer Co., Ltd. (2022). *Keisan Online Calculator* [online]. Retrieved September 2, 2022, from
　　　https://keisan.casio.com/

Chusri, Asadayuth. (2018). [Special Issue] Current Status and Issues of Japanese Language Education at
　　　Overseas Higher Education Institutions: Verify the Invisible Context from Japan: The Current
　　　Situation of Japanese Education in Universities of Thailand. *Waseda Studies in Japanese Language
　　　Education*, No.24, 23-33.

DATAtab Team (2022). *Online Statistics Calculator* [online]. Retrieved September 10, 2022, from
　　　https://datatab.net/statistics-calculator/reliability-analysis

DIGITALIO, Inc. (2019). *Digitalio C-Pot: Kotobank* [online]. Retrieved September 25, 2022, from
　　　https://kotobank.jp/

Kongjit, Saranya. (2013). Current Status of Japanese Language Education at Chiang Mai University. *Journal
　　　of Center for Education and Research, Gunma University*, No.12, 23-34.

Narita, Takahiro. (1998). The Relations between Motivations and Examination Scores: The Case of University
　　　Students in Thailand. *Japanese Language Education around the Globe*, Vol.8, 1-11.

QuestionPro Survey Software. (2022). Definition of Research Design. *Online Survey Software and Data
　　　Intelligence Blog* [online]. Retrieved September 23, 2022, from: https://www.questionpro.com/blog/ja/

Social Survey Research Information Co., Ltd. (n.d). *BellCurve Statistics Web* [online]. Retrieved September 23,
　　　2022, from https://bellcurve.jp/statistics/

The Japan Foundation. (2017). *Survey Report on Japanese-language Education Abroad 2015* [online].
　　　Retrieved September 25, 2022, from
　　　https://www.jpf.go.jp/j/project/japanese/survey/result/survey15.html

_____. (2020). *Survey Report on Japanese-language Education Abroad 2018* [online]. Retrieved
　　　September 25, 2022, from https://www.jpf.go.jp/j/project/japanese/survey/result/survey18.html

_____. (2022). *Web database Search Japanese Language Institutions* [online]. Retrieved September 25,
　　　2022, from https://jpsurvey.net/jfsearch/do/result

Utsugi, Takatoshi. (2011). The Relationship between Japanese Language Proficiency and Motivation to Learn Japanese: A Study of Thai University Students. *Bulletin of Japanese Language Education, Japan Foundation, Bangkok,* No.8, 65-74.

THE EFFECTIVENESS OF PLAY-BASED LEARNING THROUGH SONGS ON THAI KINDERGARTEN STUDENTS' CHINESE VOCABULARY ACQUISITION

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ABSTRACT

The objective of this research was to investigate the effectiveness of Play-based Learning through songs to improve Chinese vocabulary acquisition of kindergarten students in Thailand. 17 students of K1 from Double Trees International Kindergarten Ratchaphruek campus in Bangkok were divided into two groups, including an experimental group and a control group to participate in this research. A Chinese vocabulary test (the Chinese vocabulary speaking test and the Chinese character matching test) was employed after the implementation. The data was analyzed by means of descriptive statistics, and independent sample t-test. The results of the analyses revealed that (1) students in the experimental group achieved significantly higher scores on the Chinese vocabulary speaking test than students in the control group; and (2) Students' Chinese character matching test scores in the experimental group were not different. In summary, the final total scores indicate that the experimental group's Chinese vocabulary acquisition which conducted through the use of play-based learning through songs was superior to that of the control group through a traditional method. The findings suggest that this teaching method can effectively improve students' speaking vocabulary. It is recommended that play-based learning is to be employed with young learners when learning a second language.

Keywords: Play-based Learning, Songs, Chinese, Vocabulary Acquisition, Kindergarten

1. Introduction

In the process of teaching Chinese to Thai kindergarten students, the researcher found that Thai children aged 3-6 are lively and active, and interest is the most direct motivation for them to master a language, so it is more important to focus on the fun of the class in the process of teaching Chinese, especially for Thai kindergarten

Chinese classrooms. Through reading a lot of literature, it is found that play can stimulate and support children's development in language acquisition, communication skills, and concentration (Winnie O'Leary, 2019). And that play-based learning not only enhances the liveliness of the class but also mobilizes students' interest in learning and focuses their attention on the class, thus improving the teaching effectiveness.

Through the teaching practices of the researcher, it was found that when children's songs were introduced into the Chinese classroom, students' attention was immediately attracted by the songs, and they would sing and dance along with the songs, unconsciously learning and remembering a lot of vocabulary in a relaxed and happy musical atmosphere. As many researchers agree, the tune and text of a song are to some extent integrated into memory rather than stored independently. According to McElhinney and Annett (1996), "The integration of the temporal aspect of a tune with the text might promote the better organization of material and consequently enhance recall".

Vocabulary learning is the key to all language learning, so the researcher tried to improve Chinese vocabulary acquisition of kindergarten students in Thailand by using play-based learning through songs, with the principle of fun and the purpose of improving children's vocabulary, combine play and teaching with children's playful and active nature, create a relaxed and happy learning atmosphere. The researcher mainly chose children's songs with light melodies, moderate speed and easy to remember, but also adapted the lyrics of songs that students know well to use in the class, such as Baby Shark, which is a big hit with children.

Compared with the relatively mature system of teaching Chinese as a second language to adults, the research on teaching Chinese as a second language to kindergarten students in Thailand is just in its initial stage and a complete teaching system has not yet been formed. And many Chinese teachers have never been exposed to early childhood education before, which makes research in how to teach Chinese vocabulary to kindergarten students increasingly urgent. Since there is still very limited research on play-based Chinese learning for kindergarten students in Thailand, the researcher will use this study to introduce children's songs into Chinese classrooms in Thailand kindergarten, and actively search for a teaching model or method that can help young children learn Chinese, aiming to enrich the theory of learning Chinese as a second language for kindergarten students, provide some practical experience, as well as provide some reference opinions for Chinese teachers in Thailand or those who are going to Thailand.

2. Research Objective

To investigate the effectiveness of Play-based Learning through songs to improve Chinese vocabulary acquisition of kindergarten students in Thailand.

3. Literature Review

3.1 Theory, Concept and Related Research

In "pedagogics of kindergarten" (1861), Froebel points out that play is the means by which the creative and active instincts of young children can develop, and should be used as a teaching method to create a relaxed

and harmonious activity environment with a free and pleasant psychological environment. In the process of children's play, the children's play should be accompanied by songs in different tones to develop their interest in playing. Through play, children exercise their bodies, develop their language, cultivate their imagination and thinking power, get to know the world, and accumulate life experience.

What is play-based learning, to put it simply: children learn through play. During the act of the play, children are exploring, taking risks, engaging their imagination, and solving problems. For play-based learning to work, educators create a very deliberate environment that encourages the child to participate. Studies show that play promotes a child's literacy and language development. During preschool years, a child's vocabulary grows and develops significantly and play-based learning encourages conversations to occur in a natural way. Even participating in individual play-based learning encourages language and communication. A child will often speak to themselves while playing or narrate the toys they are playing with, even acting out multiple sides of a conversation. (Bestchance, 2020)

As Guglielmino (1986) states, "songs bridge the [brain's] hemispheres, strengthening retention through a complementary function as the right hemisphere learns the melody, the left, the words". That connecting bridge is also mentioned clearly. The songs' benefits as relaxing and motivation and a natural bridge between native and foreign languages can motivate students to increase language practice.

Liu (2014) provided some teaching methods of Chinese children's songs in second language teaching. The action performance method is when the teacher teaches students to read the children's songs aloud with the addition of performing actions based on the content of the children's songs. And Qian (2019) argues that it is necessary to enrich the fun of song teaching and combine songs with play to highlight children's initiative and enthusiasm.

Ilinawati & Dharma (2018) in their study concluded that teaching vocabulary through song improved their students' vocabulary in several aspects; they were: (1) The students' memorization improved in finding the meaning. (2) Students' knowledge in identifying the words based on their cluster. (3) students' pronunciation improved gradually since they had a lot of practice. They also found that songs as the media could be used to facilitate the teaching-learning process, the selection of various songs also influences the students' interest in learning. Besides, teaching vocabulary through songs improved students' vocabulary, it also improved students' motivation in learning.

In Magnussen and Sukying's (2021) study, the use of songs was found to be very useful to enhance receptive vocabulary with young learners as songs include authentic language that can be repeated multiple times in a fun and rhythmic way, and physical movement with songs is believed to activate the brain's right hemisphere, which aids the retention of newly learned, so the use of songs and similar methods facilitate multi-sensory learning.

3.2 Research Framework

After reviewing literature, the researcher was convinced that play-based learning through songs on Chinese vocabulary acquisition, which was the independent variable of this study, could enhance kindergarten students' Chinese vocabulary acquisition, which was the dependent variable of this study.
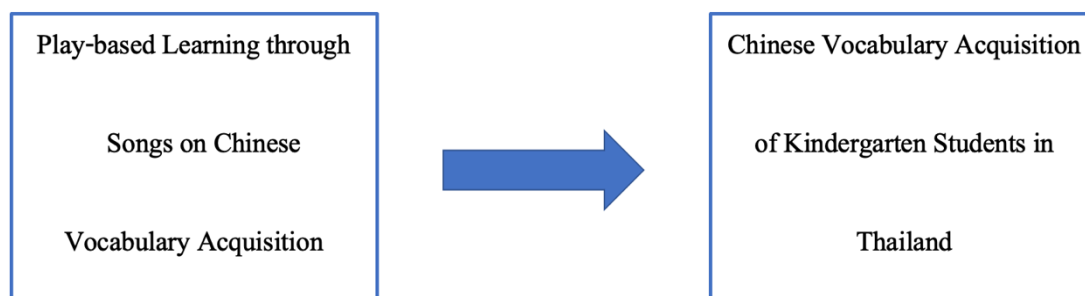

Figure 1 Research Framework

3.3 Research Hypotheses

Play-based Learning through songs was able to improve the Chinese vocabulary acquisition of kindergarten students in Thailand.

4. Research Methodology

4.1 Research Design

The present study adopted the quasi-experimental research design employing a quantitative research method approach which aimed to investigate the effectiveness of play-based learning through songs to improve Chinese vocabulary acquisition of kindergarten students in Thailand. The research is posttest-only control group design.

The experiment included 17 students from two classes of K1 out of 82 students in the Ratchaphruek campus of Double Trees International School. The students were divided into two groups, Group A and Group B, according to their respective classes. Group A was the experimental group using play-based learning through songs approach to teach Chinese vocabulary, and Group B was the control group, which used the traditional vocabulary teaching method. Since the students in the study had already mastered the theme vocabulary of the five senses and the body, the corresponding10 verbs "see, hear, eat, drink, smell, touch, run, jump, walk, and stop" were selected as the target vocabulary for teaching Chinese vocabulary acquisition to kindergarten students. A total of three children's songs with light melody, moderate speed and easy to remember were selected for the study. The experiment lasted 5 days and took 300 minutes last 5 days, every 30 minutes is one lesson. At the end of the experiment, students were required to take a Chinese vocabulary test. They were asked to answer questions based on flashcards one by one and match Chinese characters with corresponding images to get the test results. The test results were analyzed using descriptive statistics, mean, SD, and t-test. And the researcher interviewed the colleagues about the test results.

4.2 Target Group

The target group was three- to four-year-old K1 students from Double Trees International Kindergarten Ratchaphruek campus in Bangkok. The students were all Thai nationals with Thai as their native language. There were 17 students from two classes, 10 boys and 7 girls. Class A had 8 students and Class B had 9 students. They had a similar language background and they were all beginners in Chinese at the same level. The mean scores of the final exams in the second semester of the 2021-2022 school year showed no differences between these two classes of students, so they were selected for this study. According to their class, the students were divided into two groups, Group A and Group B. Group A was selected as the experimental group because an even number of students made it easier to conduct class activities, and group B was the control group. The two study groups were kept in their existing classrooms to ensure that the children remained in a relatively safe and familiar environment.

4.3 Research Instrument

The research instrument in this study was a posttest, as shown in the Table 1. After the experiment, students were tested to get data. The test is divided into two parts. The first part is a speaking test where students say the words represented by the pictures according to the flashcards. The second part is a Chinese character matching test where students connect the pictures with the corresponding vocabulary characters.

Table 1 Research Instruments

Research questions	Purposes	Instruments	Data sources	Data analyses
To what extent does Play-based Learning through songs help kindergarten students improve Chinese vocabulary acquisition in Thailand?	(1) To assess students' Chinese vocabulary acquisition. (2) To help with the analysis of the assessment, confirm the quantitative data, and explain how Play-based Learning through songs can enhance Chinese vocabulary acquisition.	Post-test (Chinese vocabulary test)	Post-test scores	Descriptive statistics (mean, SD) and t-test

Figure 2 Chinese Vocabulary Test

Figure 2 below is the matching test and speaking test. To achieve the research objective, the researcher studied many previous studies, analyzed the theories from the researches, and finally adapted them to get an own set of teaching steps as shown in Figure 3. The first step is to start a lesson with a review. second step, play the song. Thirdly step, take out the target vocabulary flashcards with the images. Next step is to conduct the activity, which is play-based learning through songs. As a final step, spend one or two minutes assessing whether students have mastered what they have learned.
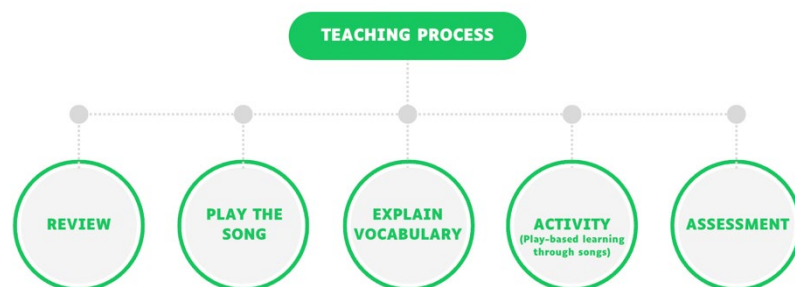

Figure 3 Chinese Vocabulary Teaching Steps

4.4 Data Collection

1. The researcher designed the research instrument and obtained the consent from the parents of the experimental participants.

2. From June 6, 2022 to June 10, 2022 at Double Trees International School Ratchaphruek Campus, the experimental group and the control group conducted the experiment simultaneously. The experiment lasted for a total of five days, with teaching conducted on the first four days and testing of the experimental results on the fifth day.

3. The researcher obtained the test results and compared the results of the two experimental groups for analysis.

4.5 Data Analysis

Table 2 Results of Independent t-test

	Group	Score	N	Mean	S.D.	Mean Difference	t	p
Speaking	A	50	8	47.38	2.39			
Test	B	50	9	40.33	3.94	7.04	4.38*	0.00
Matching	A	50	8	37.50	7.07			
Test	B	50	9	35.56	4.64	1.94	0.68	0.51
Total	A	100	8	84.88	8.41			
	B	100	9	75.89	8.24	8.99	2.22*	0.04

*$p<0.05$

As seen in Table 2, the *t*-test (also known as independent sample *t*-test) was used to investigate the differences between the two groups for Speaking Test, Matching Test, and Total Score, and it can be seen that the two groups do not show significance for Matching Test ($p>0.05$), indicating that the two groups do not differ for Matching Test. No difference exists in the Matching Test. In contrast, the two groups demonstrated significance for two items of Speaking Test, Total Score ($p<0.05$), indicating that there are differences between the two groups for Speaking Test, Total Score. Detailed analysis demonstrates that (1) Speaking Test results between the two groups were statistically significant at the 0.01 level ($t=4.38$, $p=0.00$), and the particular comparison difference indicates that the mean value of Group A (47.38) is considerably higher than the mean value of Group B (40.33). (2) Total Score was substantially different between the two groups at the 0.05 level of significance ($t=2.22$, $p=0.04$), and the difference in specific comparisons revealed that the mean of Group A (84.88) was significantly higher than the mean of Group B (75.89).

5. Research Findings

According to the results of Chinese vocabulary test, students in Group A (the experimental group) on the speaking test received a mean score of 47.38, whereas those in Group B (the control group) received a mean score of 40.33. It is clear that on the speaking test, students in the experimental group outperformed those in the control group. On the Chinese character matching test, the mean score of Group A students was 37.50, which was marginally higher than the mean score of Group B students, which was 35.56; thus, this difference was not statistically significant. From the total score of 100 points, the mean score of group A was 84.88 and the mean score of group B was 75.89. Therefore, it may be inferred that the students whose curriculum incorporated play-based learning through songs had greater post-test scores for Chinese vocabulary acquisition than those who learnt using traditional methods.

In summary, the implementation of play-based learning through songs could overall significantly enhance kindergarten students' vocabulary acquisition. When asked to answer vocabulary questions according to flashcards, students in the experimental group could do better than the control group. However, when it came to the matching test, there was no significant difference between the two groups. Therefore, the researchers interviewed two Chinese teachers about their views on this result.

"Colleague A: The inclusion of songs in your classroom do help students to memorize the pronunciation. Children enjoy songs, particularly Thai children who love to dance to songs, so if there is a song, their attention will readily follow the song and their visuals will pay little attention to the characters. As you are aware, Chinese characters are extremely complex, thus I believe that playing the song while learning Chinese characters may interfere their memory.

Colleague B: Chinese characters are mainly learnt through reading and writing, and your students are definitely too young to write. So it is inappropriate to begin learning Chinese characters at such a young age. Not until 6 years old are Chinese characters taught in China, right? If you must begin learning Chinese characters at such an early age, you will have to rely on visual memory, and I don't think

that songs will be of much assistance. However, there is no combination of writing and reading to learn Chinese characters, that is only short-term memory and does not achieve long-term memory."

These results indicate that play-based learning through songs has been shown to improve early children's ability to speak Chinese vocabulary, but there is a discussion about its effectiveness in improving Chinese character recognition skill. Combining the literature, other Chinese teachers' opinions and the researcher's observations, this is mainly because that Chinese characters are learned primarily through visual and written; hence, through songs instruction has little effect on the learning Chinese characters. Overall, the experimental group's Chinese vocabulary acquisition which conducted play-based learning through songs was superior to that of the control group through traditional method. This implies that incorporating play-based learning through songs into the curriculum is effective in improving students' Chinese vocabulary acquisition.

6. Discussion

From the results of the study, when students were asked to answer vocabulary questions with images, students in the experimental group could do better than the control group. However, when it came to the matching test, there was no significant difference between the two groups. This may indicate that play-based learning through songs can improve kindergarten students' vocabulary rather than their Chinese character recognition skills. Based on the results of the vocabulary test, it also improves their ability to listen and speak. This should be due to the fact that the students were exposed to the songs and the vocabulary in the songs mainly through listening.

The researcher followed to the "multi-sensory linkage" strategy mentioned by Wang (2020) in her work on the gamification strategy of kindergarten song teaching. By guiding children to consciously listen, look, sing, and move during the activities, we stimulate the sensory senses such as hearing, seeing, touching, smelling, and kinesthetic senses, forming a multi-sensory and multi-channel combination to feel, appreciate, express, and create songs, thus increasing the enthusiasm for participating in the activities and developing multiple intelligences such as good listening habits, observation skills, and expression skills.

After one week of the play-based learning through songs implementation, based on the statistical results of the Chinese vocabulary test, it can be interpreted and concluded that this instruction (play-based learning through songs) was effective in improving students' Chinese vocabulary acquisition. And this instruction is indeed meaningful, mainly because of the following points:

First, the students' motivation to learn Chinese has increased. Murphey (1987) stated that an interest in music and related movement was a strong motivator for language learning. The students in the experimental class asked the teacher in every class what song we were going to learn, were extremely enthusiastic about the activity.

Second, the students were able to remember the Chinese vocabulary in the lyrics more deeply and for a longer amount of time. McElhinney and Annett (1996) examined the effect of music on recall of verbal material using non-familiar tunes and lyrics. When the researcher asked the students in the control group about the

vocabulary during the review session at the beginning of the class, the most of them took a few moments to recall it, and a few were unable to respond at all. However, when the researcher went to the experimental class, the students immediately began singing along with the music.

Third, the experimental group having a more relaxed and active atmosphere. The researcher taught kindergarten K1 students, who prefer playing and singing to learning. In Pei Shen Mei's (2020) study, it was found that most of the teachers who had used the play-based teaching method believed that the playing could liven up the classroom learning atmosphere and make students acquire new knowledge in a relaxed and enjoyable atmosphere.

The present study was generally successful, because listening and speaking are the skills that early children usually develop first (Indrayani, 2016), and also are the basis for learning Chinese characters. Play-based learning through songs can effectively improve kindergarten students' ability to listen and speak Chinese vocabulary, stimulates vocabulary learning in early learners' settings and can be recommended for implementation in classrooms involving early learners.

Recently, the teaching of Chinese to young children in Thailand has been developing rapidly, but there are still many elements of the current research that need to be supplemented. For example, there is no unified standard about the content of vocabulary acquisition for young children, and the specific teaching objectives and requirements for young children's vocabulary acquisition also need to be added. Secondly, scholars can also make their own suggestions about the teaching strategies for vocabulary acquisition in Chinese as a second language for young children. Considering the local educational philosophy and teaching situation in Thailand, there are very few practical research results. Therefore, the present study is based on the above theories and seeks to fill the gaps therein.

7. Suggestions

Typically, experimental investigations often take longer to produce results that are closer to the truth. The author's present experiment took only one week, and if the experiment could be extended to a longer duration, more realistic results would be obtained. In addition, the number of students participating in this experiment was limited, as just two classes of students for the comparison experiment and class sizes were modest. This may have affected the data's accuracy. There are four suggestions for further research as follows:

(1) The songs selected should be upbeat, catchy, energetic, and relevant to the Chinese vocabulary being learned. If you choose to adapt a song, you should select one that students are familiar with and love, so that they are more motivated. And the teacher can even invent their own songs or translate Thai songs to Chinese.

(2) The teacher should speak Chinese throughout the entire process of teaching Chinese to early children. When explaining activities, it is optimal to have a teaching assistant accompany the demonstration to facilitate students' understanding and more comfortable participation in the activities. And depending on the teacher's individual teaching situation, the researcher's teaching steps can be modified.

(3) When teaching vocabulary to early children (under 6 years old) in Chinese as a second language, it is better for kindergarten teachers not to introduce Chinese characters.

(4) The number of students participating in the experiment should be increased and the duration of the experiment should be extended in order to obtain more accurate experimental data.

8. Acknowledgement

9. References

Bestchance. (2020). *The Science of Play: The Importance of Play-based Learning.* [Online]. Retrieved Jun 30, 2022, from: https://www.bestchance.org.au/blog/the-science-of-play-the-importance-of-play-based - learning/

Froebel, F. (1861). *Pedagogics of Kindergarten.* Scholar's Choice Edition. London: Scholar's Choice.

Gugielmino, L.M. (1986). The affective edge: using songs and music in ESL instruction. *Adults Literacy and Basic Education*, 10 (1), 19-26.

Ilinawati, I., & Darma, Y.P. (2018). Improving Students' Vocabulary through Songs. *Journal of English Educational Study*,1 (2),66-70.

Indrayani, N. (2016). Language Development at Early Childhood. *International Conference on Education (IECO)*, 1, 279-289.

Liu, Y.N. (2014). *Using Chinese Children Rhymes to Teach Elementary School Students Chinese as A Second Language.* Thesis of the Degree of Master of Education. Zhengzhou: Henan University.

Magnussen, E.S., & Sukying, A. (2021). The Impact of Songs and TPR on Thai Preschoolers' Vocabulary Acquisition. *Thaitesol Journal*, 34 (1),71-95.

McElhinney, M., & Annett, J. (1996). Pattern of efficacy of a musical mnemonic on recall of familiar words over several presentations. *Perceptual and Motor Skills*, 82, 395-400.

Murphey, T. (1987). English through Music: Singing TPR, Walking Labs, & Music Matter. *The Annual Meeting of the International Association of Teachers of English as a Foreign Language*, 12 April 1987 at Westende, Belgium, 1-10.

O'Leary, W. (2019). *Play-Based Learning: What It Is and Why It Should Be a Part of Every Classroom.* [Online]. Retrieved Jul 07, 2022, from: https://blog.edmentum.com/play-based-learning-what-it-and-why-it-should-be-part-every-classroom

Pei, S.M. (2020). *The Application Study of the Game Teaching Method in Vocabulary Teaching at the Primary Stage of TCSL——Take Wuqiao Acrobatic School as an Example*. Thesis of the Degree of Master of Education. Baoding: Hebei University.

Qian, M.J. (2019). Introduction strategies for singing activities in kindergarten. *Jiangsu Education Research*, 11, 70-72.

Wang, X.J. (2020). *Research on the implementation of gamification in singing teaching in kindergartens*. Thesis of the Degree of Master of Education. Zhenjiang: Jiangsu University.

DISCOVERY LEARNING ENHANCE STUDENTS' PERCEPTION OF MATHEMATICS LEARNING IN PRIMARY SCHOOL IN KUNMING, YUNNAN PROVINCE THE REPUBLIC OF CHINA

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ABSTRACT

The purposes of this study were to: 1) to design discover learning the application of learning in the process of mathematics teaching in primary school, and 2) to compare students' perception mathematics learning for students between tradition learning and discovery learning. Target group was Hongyun primary school in Kunming, Yunnan Province, China, and target group was 60 students. Research tools were interview, and questionnaire. Before the teaching experiment, the researcher used 23 structured questions to target group 60 students and divided them into 1) experimental group(discovery learning) and control group(traditional learning), with 30 students in each group. The researcher pretested the learning effect of each group before applying the discovery learning method. Then the students in the experimental group(discovery learning) and the control group(traditional learning) were given test papers to test and score the basic knowledge of mathematics and scores in the first half of the year. Statistical analysis was the total score, average score, mean, standard deviation and percentage of the data analysis.

The results showed that: 1) the discovery educational of learning can be improved the learning effect of students' mathematical knowledge. In the process of discovery learning and teaching, teachers can design the teaching mode such as construction of game scenes and teaching links from the perspective of students and, 2) primary school students can better understand and master the content of mathematical knowledge taught by teachers through better autonomous learning and knowledge exploration add more for discovery learning than tradition learning.

Keywords: Discovery Learning, Students' Perception,Traditional Learning, Primary School Mathematics Education, Perception

1. Introduction

Traditional learning overemphasizes the imparting of knowledge, neglects the cultivation of learning attitudes, the cultivation of learning habits and learning ability, and the improvement of students' overall quality. Too much emphasis is placed on accepting learning, rote memorization, and mechanical training, ignoring the subjectivity of students' learning, and ignoring students' independent learning and independent research learning methods.

This paper studies the problem is :1) How to design discover learning to enhance students' perception mathematics learning students' mathematics learning in Primary School? 2) How different for students' perception mathematics learning students'mathematics learning between tradition learning and discovery learning? Combing and summarizing the research views of previous researchers, it can be found that scholars have made relatively sufficient research on the application of discovery learning theory and stimulating students' learning motivation in the teaching process. However, at present, scholars rarely focus their research on Mathematics Education in primary school. As an important basic teaching content, primary school mathematics education has an important impact on stimulating students' learning thinking and cultivating learning habits. Therefore, this study takes the third grade mathematics of Hongyun primary school in Kunming, Yunnan Province as a case to study the application of discovery theory and teaching design in the process of primary school

2. Research Objectives

1.To design discover learning to enhance students' perception mathematics learning students' mathematics learning in Primary School.

2. To compare students' perception mathematics learning students' mathematics learning between tradition learning and discovery learning.

3. Literature Review

The relevant theoretical framework of this study and the theoretical literature review of previous researchers, so as to provide a theoretical basis and research direction for subsequent research.

3.1 Research Theories

Discovery learning theory

In the process of discovery learning, the main task of teachers is to guide students to actively think and discover knowledge through questioning. The purpose of these activities is to shape students' independent exploration ability and understanding ability, and build students' knowledge discovery environment through textbooks, teaching tools and teaching process(Serevina, Luthfi, 2021).

Traditional learning means that textbook educators and knowledge recipients form a closed learning environment in which students receive the knowledge taught by teachers. As the owner of knowledge, teachers will sweat students into a container of knowledge, and students need to remember the knowledge points as firmly as possible (Swetnam, 2018).

Instructional design refers to the process and method of planning knowledge teaching process and system. Learning theory and communication theory have become an important basis for the development of instructional design theory. In the process of teaching design, educators need to analyze and sort out the teaching needs and possible problems in the teaching process through systematic thinking. Under the guidance of teaching objectives, establish teaching strategies that match educational objects, educational environment, and educational tools. Then through analysis and research, the teaching design scheme is constantly optimized, and the teaching results reach the most ideal level. Teaching design includes curriculum design, unit design, classroom activity design, courseware design and teaching media design(Zeedick, 2020).

3.2 The application of discovery learning

Discovery learning theory has been concerned by educational researchers. Some scholars have found through psychological experiments and teaching experiments that learning methods can better stimulate students' thirst for knowledge and encourage them to explore unknown knowledge. In this process, students' enthusiasm and initiative are fully mobilized, and students also develop creative thinking and critical thinking in the process of acquiring knowledge (Svinicki, 2018).

4. Research Methodology

4.1 Research design

This study used the content of fraction, addition, and subtraction in the second volume of grade 3 mathematics of primary school approved by the Ministry of education of China as the teaching experiment content- discovery and carries out the Teaching comparative experiment through the way of control group (discover learning).
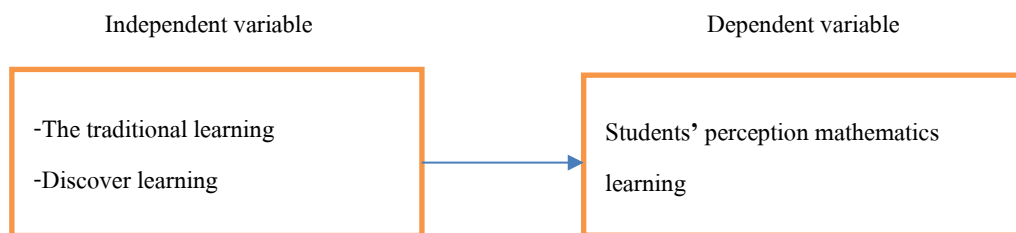

Figure 1.1 The Process

1. The researcher used target group selected 60 students in grade 3 of Hongyun primary school in Kunming, Yunnan Province.

2. Divided the students into two groups with 30 students in each group. The first group was the experimental group (discover learning)and the second group was the control group(traditional learning).

3. Before the teaching experiment, the researcher used 3 structured questions to pre‐test the learning effect of students before the application of mathematical discover method.

4. During the experiment, the experimental group(discover learning) was taught by the method of discover learning, and the students in the control group(traditional learning) were taught by the traditional learning method. The survey was conducted using 14 structured questions.

5. After the experiment, the researchers used the form of interview and 6 structured questions to record and study and score and compare them.

4.2 Population and Sample

The researcher used target group selected 60 students in grade 3 of Hongyun primary school in Kunming, Yunnan Province from Hongyun primary school in Kunming, Yunnan Province, China.

Tradition learning - 30 students in the experimental group(discovery learning) participated in the primary school mathematics teaching control activities mainly given by teachers. After the traditional learning and teaching activities, the researchers conducted a survey on the learning effect of mathematics knowledge and verified the difference in learning effect with the control group(traditional learning) of 30 students.

4.3 Research Instruments

The main tool was used in the experimental group(discovery learning) of this paper is the questionnaire. The questionnaire was evaluated by five primary school math experts for IOC. Five experts were Gu Tingting, Liu Bei, Pi Guofeng, Houchun, and Han Jiazhi.

In the process of discovering learning, teachers use games to create problem situations, ask questions that students are interested in, and make students conflict in this situation, so as to propose problems that need to be solved or must be solved.

In the traditional learning process, a teacher uses textbooks and chalk on the podium to write down knowledge, students keep taking notes, then review, and then take the test.

4.4 Research process

In order to build a free exploration teaching environment for students and help educators better use discovery learning theory in the process of education, this study uses life-oriented games to build learning scenes and carry out teaching design. The following steps will be implemented:

1. Selection of teaching content

In order to better stimulate students' learning motivation and active exploration spirit in the learning process, according to the provisions of the 2022 primary school syllabus issued by the Ministry of education of the people's Republic of China, this study selected the elementary school fraction addition and subtraction operations, which meet the requirements of the third grade students' education stage and are difficult and exploratory, as the teaching content.

2. Construction of game scenes

In order to start from the life perspective of primary school students and build interesting activity scenes for students, this study selects the life scene of fruit selling in the fruit supply station as the learning situation of this time, and endows students with the theme role of participating in the game by recruiting small assistants and consumption experience members in the fruit supply station, which can stimulate students'

enthusiasm to explore score knowledge and learning ability in familiar life scenes, Let students actively think about the operation process of fractional addition and subtraction, and improve their learning effect by attracting students' attention.

4.7 Lesson Plan was evaluated by five experts.

This lesson plan was evaluated by five experts, the IOC are Gu Tingting, Liu Bei, Pi Guofeng, Hou Chun, and Han Jiazhi from China.

4.8 Research method

The experimental group(discovery learning) and the control group(traditional learning) used the following two experimental methods:

Empirical analysis refers to the study of the quantitative relationship between survey data to obtain the development law of things with universal significance. This paper used the empirical analysis method and mean, standard deviation and percentage to make a descriptive analysis of the survey data as the evidence to draw a conclusion.

Action research method is an important method in the field of education. Researchers need to design educational situations and educational programs, organize the implementation, and evaluate the results by observing the implementation process and effect. This method can be directly applied to teaching activities. Guided by the idea of data discovery, this paper designs and implements the research project, teaching scheme and teaching activities, analyzes the learners' learning process, learning effect and emotional attitude through the results of the experimental process, and then uses SPSS software to verify the effectiveness of the design scheme.

4.9 Research Instruments

The main tool used in the experimental research of this paper was the questionnaire. The questionnaire students' perception mathematics learning includes four aspects: demographic elements, students' learning process, learning results and students' evaluation. Each aspect includes six indicators, a total of 24 indicators. Each indicator has a maximum of five points and a minimum of zero points. The full score of the questionnaire is 120 points. In order to ensure the validity and reliability of the questionnaire, the researchers used 23 structured questions to pre-test the students' learning effect and students' evaluation of the educational process before the application of mathematical discovery method.

4.10 Data analysis

1. Use mean, standard deviation and percentage to statistically analyze the elements of the questionnaire.

2. Compare and analyze the evaluation results of the two groups of data.

5. Experimental Analysis

5.1 Learning effect teaching experiment

In order to design discovery learning in primary school mathematics teaching and compare the mathematics learning of traditional teaching and discovery learning. Before the teaching experiment, researcher

used two target groups as experimental group(discovery learning)and control group(traditional learning), with 30 students in each group using 23 structured questions to teach mathematics, while the control group(traditional learning) used traditional learning methods. The researcher pretested the learning effect of each group before applying the discovery learning method. Each student answered "yes" with a weight of 1, answered "no" with a weight of 0, and the highest score was 30. Then the students in the experimental group(discovery learning)and the control group(traditional learning) were given test papers again for posttest to test and score the basic knowledge of mathematics and scores in the first half of the year.

The experimental group(discovery learning) before the learning process, most students predict that they are very interested in the addition and subtraction of primary school grades, and the knowledge difficulty of this learning module is not high, so they are very confident to master it this part of the knowledge. While the control group(traditional learning), it can be seen that before the learning process, most of the students predict that they are interested in learning this part of knowledge and are confident that they can overcome the difficulties in learning and master this

The learning process. Experimental group(discovery learning) most students predict that they can well follow the teacher's teaching ideas and understand the concepts and knowledge taught by the teacher. Most students predict that they can master the rules of score addition and subtraction and complete the example exercises smoothly. At the same time, most students think the teacher's guidance is very important. They are more willing to master knowledge through understanding rather than reciting. Control group(traditional learning) most students predict that they are very confident in following the teacher's teaching ideas and understanding the concepts taught by the teacher. Most students predict that it is easy for them to master knowledge points and classroom exercises. At the same time, most of the students in the control group(traditional learning) also believe that the teacher's guidance is very important for students to learn mathematical knowledge, and understanding and memory is more popular than recitation.

Through the above investigation and analysis, it can be found that before the teaching experiment, the students in the control group(traditional learning) and the experimental group(discovery learning)have roughly the same prediction about the learning of score addition and subtraction method. The students are full of confidence in mastering this part of mathematical knowledge and getting good results in classroom exercises, homework and future exams. Compared with reciting and explaining concepts, students prefer to understand memory and example teaching. Students generally believe that teachers' teaching methods and models will affect students' news effect.

5.2 After teaching experiment

After the teaching experiment, the researchers used an interview format to ask students about the knowledge content of the lesson, and the last 6 structured questions in the questionnaire to investigate the experimental group (discovery learning)-discovery learning and control group(traditional learning)-traditional learning students. The researchers recorded the students' subjective responses by recording, and then analyzed and summarized them.

After the learning process. Experimental group(discovery learning) most students predict that they can successfully complete the after-school homework of score addition and subtraction method independently, maintain a high accuracy, and get better results in the future exams. Control group(traditional learning) most of the students in the control group(traditional learning) also predicted that they could complete their homework smoothly and correctly under the condition of independence, and predicted that they could obtain ideal academic results in the later exams.

The prediction of the teaching process of 30 students in the experimental group (discovery learning).

1) 19 students of the students think that the teaching process of the score addition subtraction method should adopt the guidance method. The proportion is 63.33%.

2) 4 students of the students think that the teaching process of the score addition and subtraction method should adopt the way of explaining and reciting concepts. The proportion is 13.33%.

3) 7 students of the students do not predict the teacher's teaching methods. The proportion is 23.34%.

The results of the investigation on the prediction of learning initiative of the experimental group(discovery learning):

1) 20 students of the students prefer to explore actively with the help of the teacher. The proportion is 66.66%.

2) 5 students of the students think they want the teacher to impart knowledge directly. The proportion is 16.66%.

3) 5 students of the students think that both self-exploration and direct teaching by the teacher are acceptable. The proportion is 16.66%.

The prediction survey results of the teaching environment of the experimental group(discovery learning):

1) 22 students of the students think that teachers should help them understand knowledge through more practical cases. The proportion is 73.33%.

2) 5 students of the students think that teachers should emphasize the accuracy of concepts. The proportion is 16.66%.

3) 3 students of the students think they have no more opinions on the teaching environment. The proportion is 10.01%.

The prediction of the teaching process of 30 students in the control group(traditional learning) shows :

1) 19 students of the students think that the teaching process of the score addition and subtraction method should adopt the guidance method. The proportion is 63.33%.

2) 4 students of the students think that the teaching process of the score addition and subtraction method should adopt the way of explaining and reciting concepts. The proportion is 13.33%.

3) 7 students of the students do not predict the teaching methods of the teachers. The proportion is 23.34%.

The prediction survey results of the learning initiative of the control group(traditional learning):

1) 22 students of the students prefer to explore actively with the help of the teacher. The proportion is 73.33%.

2) 4 students of the students think they want the teacher to impart knowledge directly. The proportion is 13.33%.

3) 4 students of the students think that both self-exploration and direct teaching by the teacher are acceptable. The proportion is 13.33%.

The prediction survey results of the teaching environment of the control group(traditional learning).

1) 23 students of the students think that teachers should help them understand knowledge through more examples in life. The proportion is 76.66%.

2) 6 students of the students think that teachers should emphasize the accuracy of concepts. The proportion is 20%.

3) 1 student of the students think they have no more opinions on the teaching environment. The proportion is 3.34%

From the above analysis, it can be seen that the students in the experimental group(discovery learning)and those in the experimental group(discovery learning)have basically the same expectations for the teaching process. Most students believe that teachers should encourage students to study independently through guidance and build a happy learning environment by being closer to life examples. A small number of students accept the process of direct explanation and passive acceptance of knowledge.

5.4 Teaching experiment implementation

Teaching and experimental process of experimental group(discovery learning)-discover learning

In this study, 30 students in the experimental group(discovery learning)carried out a learning teaching process with score addition and subtraction as the teaching content. The implementation place of this experimental teaching process is the first teaching observation room. The following is the implementation process:

(1) Five minutes before class, the research assistant will bring 30 students in the experimental group(discovery learning)into the classroom and arrange seats. Then remind students to check the textbooks and stationery they need to prepare for class.

(2) After class, the teacher leads out the first example through the observation room computer and constructs the scene. Xiao Ming's mother took a box of apples, a total of 16. Xiao Ming said he wanted two, and Xiao Ming's brother said he needed four. Xiaoming's sister said she needed eight, so Xiaoming's mother took out two, four and eight in the apple box. Through the above examples, the teacher helps the students review the concepts of integer, fraction, denominator and numerator, and the relationship between 2 / 16, 4 / 16, 8 / 16 and

1 / 8, 1 / 4 and 1 / 2. Through the above examples, the teacher stimulates the students' interest and attention to scores and improves the students' attention. The process is controlled in about 5 minutes.

(3) The teacher began to lead the students to play games. The background of the game is that Hongyun primary school in Kunming, Yunnan Province has set up a fruit supply station for the convenience of students and teaching staff. Teachers and students can choose their favorite fruits here. Now the teacher will select two fruit supply station assistants from the student group to help sell the fruit.

The teacher actively invited the students to sign up and told the students to raise their hands if they are willing to act as little assistants. The teacher is choosing a male student and a female student to sell fruit according to the students' enthusiasm.

Then the teacher invited other students to form a consumption experience team to carry out the consumption experience and score and evaluate the newly established fruit supply station and small assistants. Similarly, if the teacher tells the students that they are willing to join the consumption experience team, please raise your hands and select three students according to their enthusiasm.

The teacher began to build a consumption scenario. There were 16 apples in a box in the fruit supply station. He told the first consumer experiencer that he now needed to buy four apples. The first consumer experiencer and his assistant performed the process of buying apples and bargaining.

Then the teacher tells the second consumer experiencer that he needs to buy two more apples, and the second consumer experiencer and his assistant perform the process of buying apples and bargaining.

Then the teacher asked the whole class what percentage of the box of apples the two consumers had taken, and the method of score calculation in the process. The teaching included method 1: 4+2=6, and then divided by 16. Method 2: 4/16+2/16 process, denominator unchanged, numerator added. In this process, teachers need to help students understand the concept of fractional addition in the process of examples. The process is controlled within 10 minutes.

(4) Under the guidance of the teacher, the students will complete this part of the after-school exercises, and the students will talk about which method has been applied. The process is controlled within about 5 minutes.

(5) The teacher once again put the students into the game situation of fruit supply station consumption. The teacher told the members of the consumption experience team that the purpose of this consumption is to experience and investigate the service level of the supply station and small assistants. In order not to waste things, we need to return the apples. First, the third consumer will return four apples, and then the teacher will return two apples, Then the students can understand the arithmetic of fraction subtraction by explaining the inverse operation of fraction addition.

The teacher invited the little assistants and consumers to express their feelings in the consumption experience, and the consumption experience team and the little assistants evaluated the service level and improvement measures of the supply station. The process is controlled in about ten minutes.

(6) Under the guidance of the teacher, the students complete this part of the after-school exercises, and the students speak about how to carry out the inverse operation of addition. The process is controlled in about 5 minutes.

(7) Through the way of students' speech, the teacher guides students to summarize the knowledge points of this course and assign homework after class. The process is controlled in about ten minutes.

Control group(traditional learning) teaching experiment process

In this study, 30 students in the experimental group (discovery learning) carried out the traditional teaching process with the score addition and subtraction method as the teaching content. The implementation place of this experimental teaching process is the second teaching observation room. The following is the implementation process:

(1) Five minutes before class, the research assistant will bring 30 students in the control group(discovery learning)into the classroom and arrange seats. Then remind students to check the textbooks and stationery they need to prepare for class.

(2) The teacher showed the concepts of integer, fraction, numerator and denominator on the computer, and the students read them aloud. Then students will speak to explain their understanding of these concepts. The process is controlled in about ten minutes.

(3) The teacher led the students to read the arithmetic of addition and subtraction of fractions, and explained the addition and subtraction through the process of 4 / 16 + 2 / 16 and inverse operation to help the students understand. Then the students ask their doubts and the teacher answers them. The process is controlled in about 20 minutes.

(4) After class exercises are assigned by the teacher and completed by the students independently, and their application of calculation rules is explained through the students' speech. The process is controlled in about 5 minutes.

(5) The teacher will guide the students to review and summarize the knowledge learned in this course. The process is controlled in about ten minutes.

5.5 Questionnaire data analysis

The descriptive statistics of the questionnaire of the experimental group(discovery learning)-discover learning. It can be seen from the table that the average and median scores of the students in the experimental group(discovery learning)on the learning process are 23 and 25 respectively, which shows that the students are more interested in the discovery learning mathematics learning process. At the same time, the average and median learning results of the experimental group(discovery learning)are 24 points, and the highest score reaches the full score of 30 points, which shows that learning mathematics teaching has made students obtain good learning results. In terms of student evaluation, the average score is 20 and the median score is 23, which shows that students are generally satisfied with the discovery of learning mathematics model.

The descriptive statistics of the questionnaire of the control group(traditional learning). It can be seen from the table that the average and median scores of the students in the control group(traditional learning) on the

learning process are 16 and 17 respectively. Although they exceed 15, it shows that the students have low interest in the traditional mathematics learning process. At the same time, the average learning result of the control group(traditional learning) is 14 points, and the median is 15 points, which shows that the learning effect of traditional mathematics teaching for students is not good, close to the middle level. From the aspect of student evaluation, the average is 15 points and the median is 15 points, which shows that the students' satisfaction with the traditional mathematics teaching mode is at the middle level.

Table 5.1 descriptive statistics of the questionnaire of the control group(tradition learning)

	Dimension	Mean	Median	Maximum	minimum	Std.Dev.	N
control group(traditional learning)	learning process	16	17	23	12	1.45	30
	Learning results	14	15	30	11	2.96	30
	Student evaluation	15	15	24	9	3.23	30

According to the above data, it can be found that there are significant differences in learning process, learning results and student evaluation between the experimental group(discovery learning)and the control group(traditional learning). Students have a higher interest in the score addition and subtraction learning process of discovering learning methods. People welcome the active discovery of learning environment and learning process with situational guidance as an important means, while the traditional learning model based on concept understanding and memory has gained lower recognition. From the perspective of learning results, it is found that the learning teaching process has achieved better learning results, and students have a stronger understanding and mastery of relevant knowledge. The students have performed very well in the accuracy and speed of answering questions in the operation process of fraction addition and subtraction. The teaching process of traditional learning methods makes the learning results obtained by the students seem not good enough. In fact, the learning results of the students have only reached the general level. From the perspective of students' evaluation, students' evaluation of the learning process of discovering learning methods is better than the teaching process of traditional learning methods. Students have achieved good results in terms of the difficulty of accepting knowledge, the exploratory initiative of knowledge and the sense of knowledge acquisition. However, the performance of traditional education methods in these aspects has only reached the middle level.

5.6 Summary

Through the analysis of the prediction and investigation results of the students in the experimental group(discovery learning)and the control group(traditional learning) on the learning effect and teaching process, it can be seen that before the discovery learning experiment, the students in the experimental group(discovery learning)and the control group(traditional learning) had the same learning effect and expected performance in the teaching process of the relevant knowledge of the addition and subtraction method of primary school scores, and the students showed confidence in learning this part of mathematical knowledge, And think they can well accept the guidance of teachers and successfully absorb relevant knowledge. They also think they can get satisfactory

results in future tests. Most of the students in the two groups prefer to obtain a more free and active way of learning in the process of learning the mathematical knowledge. Understanding and guidance are more popular than passive acceptance and forced recitation. The students in the two groups did not have the same basic performance as the students in the control group(traditional learning) in the teaching process. In this case, the difference of learning discovery teaching experiment results will be mainly affected by the teaching process.

6. References

Serevina,V., Luthfi,K.(2021). Development of discovery learning-based on online learning tools on momentum and impulse., *Journal of Physics: Conference Series, 27*(3), 111-126.

Zeedick,D.M.(2020). The modified delphi method to analyze the application of instructional design theory to online graduate education. *The George Washington University., 35*(2), 1096-1112.

Svinicki,M.D.(2018). A theoretical foundation for discovery learning., *Advances in physiology education, 12*(2), 87-93.

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LEGAL ISSUES REGARDING THE RIGHTS OF COMMUNITY PARTICIPATION IN SUSTAINABLY MANAGING NATURAL RESOURCES AND ENVIRONMENT IN THAILAND

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ABSTRACT

This article aims to investigate the laws guaranteeing the rights of community participation in sustainably managing natural resources and environment. At present, there are several laws stating roles and duties in managing natural resources and environment; however, it has been found that the communities rarely play roles in performing this task, which is partly due to a lot of laws related to the management of natural resources and environment. Moreover, laws have stated roles and duties in performing this task to several of and many levels of governmental organizations consisting of the organizations under central, provincial, and local administration. Besides, most of legal statements have been expressed meanings broadly without clearly specifying the details necessary to the sustainable management of natural resources and environment. This results in the practical problems about the rights of community participation. Therefore, it is advisable to urgently make a subordinate legislation to guarantee the rights of community by determining roles and duties of the community in participate sustainability of natural resources and environment management.

Keywords: Rights of Community Participation, Management, Natural Resources, Environment

1. Introduction

Natural resources management is a procedure or practice in order to increase the existence of natural resources and not to become exceedingly destroyed whether directly or indirectly, prevention, treatment or correction (Mahatien, 2016 : 131). According to the previous management of natural resources and environment, the public sector has established the policy to accelerate the economic development; as a result, it has made investments in infrastructure and a lot of large-scale projects which lacks of environmental impact analysis, extravagantly makes use of resources as a production base, and exceeds the recovery rate of natural system. This has an impact on environment and sustainability of ecosystem which leads the rapid degradation of. Therefore, it leads to a call from the society both domestically and internationally to push forward the government to take measures on the conservation and restoration of natural resources and environment, make legal amendments and review the related governmental policies (Suktam, 2017: 106).

A decrease in natural resources and environment may partly come from the problems of the outdated policy in managing forest resources without unity, frequent changes in the government policy in solving the forest land conflicts according to the political changes or the government administrator changes, and the master plan for forest development encountering failure in practice because it is primarily based on the foreign conceptual framework. Preparing the database which is inconsistent with the principles and deviates from reality whether the case of the borderline of forest land and other kinds of governmental land with the overlapped mapping causes inefficiency of area classification for management or the case of preparing the incorrect data of utilizers and tenants of forest land and other kinds of governmental land, which leads to the conflicts between general public and government officials in land right verification. More importantly, the legal provisions contribute to easily make use of the forest land and leading to forest encroachment to get the legal rights, as well as the process lacks stakeholders' participation. The organizations in natural resources management lack of unity which is unfavorable to provide services and promote local people's participation (National Legislative Assembly, Standing Committee on Natural Resources and Environment, 2017: 5-12).

Local people's participation is one of important mechanisms and contributes to the sustainable conservation of natural resources and environment. The rights of community participation according to the Constitution of the Kingdom of Thailand B.E. 2560 state the community rights under the Section 43 by specifying that people and community have rights to conserve, revive or promote wisdom, arts, culture, tradition and good customs at both local and national levels, as well as manage, maintain and utilize natural resources, environment and biodiversity in a balanced and sustainable manner, in accordance with the procedures as provided by law. Besides, people and community have rights to sign a joint petition to propose recommendations to a state agency to carry out any act which will benefit the people and community, or refrain from any act which will affect the peaceful living of the people or community, and be notified expeditiously of the result of the consideration thereof, provided that the State agency, in considering such recommendations, shall also permit the people relevant thereto to participate in the consideration process in accordance with the procedures as provided by law.

However, the problem is the community rarely plays roles in performing tasks to participate in conserving natural resources and environment, which partly draws from several laws related to natural resources and environment management. Furthermore, laws specify roles and duties in performing tasks to several of and many levels of governmental organizations consisting of the organizations under central, provincial, and local administration. Besides, most of legal statements have been expressed meanings broadly without clearly specifying the details necessary to the sustainable management of natural resources and environment.

Therefore, the aforementioned problems lead to the study of the laws guaranteeing the rights of community participation in sustainably managing natural resources and environment in order to support the community participation in natural resources and environment management.

2. Concepts of the Rights of Community Participation in Sustainably Managing Natural Resources and Environment

2.1 Community Participation in Natural Resources and Environment Management

Previously, communities in Thailand have the fundamental rights to community management, rights to maintain natural resources and environment in the community which is called de facto right, not de jure right. The person exercising power by the legal rights is the leader or king in the past. Using the legal rights by the person with supreme power of the society does not cover all areas; therefore, de facto right has existed in the community for a long time just like acceptance of community de facto right (Ponok, 2014: 19).

The government also has certain mechanisms to get benefits from the community, such as, tax or tribute collection. This reflects that previously the central state does not have strength enough to thoroughly govern the community. Until the state has more power, it lessens the importance of de facto right because the central state tends to control all areas of the communities. It can be seen in the form of local administrative organizations, the Accession to International Covenant on Civil and Political Rights 1996 being put into effect for Thailand as of January 30, 1997, and the Accession to International Covenant on Economic, Social and Cultural Rights in 1999 being put into effect for Thailand as of December 5, 1999. It can be said that the conceptual trend of the community right in the international levels leads to attentiveness of the community right in Thailand which establishes the provision in the Constitution B.E. 2540 to guarantee the legal entity and results in this entity having the right according to the constitution (Ponok, 2014: 19).

2.2 Natural Resources and Environment Management

Natural resources and environment management aims to conserve the degrading environment due to human encroachment on nature by the management process as planned and law enforcement. More importantly, it is required for local people to participate in management, build networks in the community to be aware of natural environment on the basis of conserving, maintaining and developing natural resources (Mahatien, 2016: 133-134).

Borrini-Feyerabend, G. (2000:15) proposed the important principles of co-management as follows:

(1) have different values but have mutual interests and involvement in resources and environment management both inside and outside the community;

(2) be the diversity in natural resources management under the same law;

(3) have transparency and equity in natural resources and environment management;

(4) encourage local people to participate in responsibility and play important roles in natural resources and environment management;

(5) differences of ability and mutual benefits of each party acting as an important element of co-management;

(6) rights and responsibility acting as an important context in natural resources and environment management;

(7) management process being more important than output; and

(8) learning by doing leading to improvement and development of natural resources and environment management

Therefore, it can be concluded that the sustainability of natural resources and environment management is the management process as planned and law enforcement. More importantly, it is required for local people to participate in natural resources and environment management.

3. Laws Related to the Rights of Community Participation in Sustainably Managing Natural Resources and Environment

3.1 United Nations Declaration on the Rights of Indigenous Peoples 2007

Article 9 states that indigenous peoples and individuals have the right to belong to an indigenous community or nation, in accordance with the traditions and customs of the community or nation concerned. No discrimination of any kind may arise from the exercise of such a right.

Therefore, it can be concluded that indigenous peoples and individuals have the right to belong to an indigenous community or nation with no discrimination. Nevertheless, it does not emphasize the community right in general.

Article 13 1 states that indigenous peoples have the right to revitalize, use, develop and transmit to future generations their histories, languages, oral traditions, philosophies, writing systems and literatures, and to designate and retain their own names for communities, places and persons.

Therefore, it can be concluded that indigenous peoples have the right to retain their own names for communities. This is not the community right in general but it is the right of indigenous peoples.

Article 14 3 specifies that states shall, in conjunction with indigenous peoples, take effective measures, in order for indigenous individuals, particularly children, including those living outside their communities, to have access, when possible, to an education in their own culture and provided in their own language.

Therefore, it can be concluded that children and indigenous individuals living outside their communities have access to an education. This case is not the community right.

Article 35 specifies that indigenous peoples have the right to determine the responsibilities of individuals to their communities.

Therefore, it can be concluded that indigenous peoples have the right to outsiders.

3.2 Constitution of the Kingdom of Thailand

The right of community participation in natural resources and environment management according to the Constitution of the Kingdom of Thailand B.E. 2560 specifies the community right in the Section 43 as "A person and a community shall have the right to

(1) conserve, revive or promote wisdom, arts, culture, tradition and good customs at both local and national levels;

(2) manage, maintain and utilize natural resources, environment and biodiversity in a balanced and sustainable manner, in accordance with the procedures as provided by law;

(3) sign a joint petition to propose recommendations to a state agency to carry out any act which will be beneficial to the people or to the community, or refrain from any act which will affect the peaceful living of the people or community, and be notified expeditiously of the result of the consideration thereof, provided that the state agency, in considering such recommendations, shall also permit the people relevant thereto to participate in the consideration process in accordance with the procedures as provided by law;

(4) establish a community welfare system. The rights of a person and a community under paragraph one shall also include the right to collaborate with a local administrative organization or the State to carry out such act.

3.3 Sub-district Council and Sub-district Administrative Organization Act B.E. 2537

The Sub-district Council and Sub-district Administrative Organization Act B.E. 2537 specifies the authority of the local administrative organizations in retaining natural resources in Section 67(7) provided that sub-district administrative organizations have the duties in the area of sub-district administrative organizations, such as, protecting, sustaining and retaining natural resources and environment.

Section 71 specifies that sub-district administrative organizations may issue the provision of sub-district administrative organizations to enforce in the area of sub-district administrative organizations on condition that it does not violate the laws in order that the operations conform to the authority of sub-district administrative organizations or in case that a law regulates or empowers sub-district administrative organizations to issue the provision. In this case, it can determine the collected fees and the fines for violators but it cannot be fined more than one thousand baht provided that there is other law stated otherwise.

Therefore, it can be concluded that the local administrative organizations have authority in retaining natural resources in accordance with the criteria of Sub-district Council and Sub-district Administrative Organization Act B.E. 2537.

4. Conclusion

At present, natural resources and environment in Thailand has been deteriorated because the problems of rapid economic expansion in terms of industries, agroindustry, and services causes deterioration in several aspects of natural resources and environment, especially for land, forest, and water resource. This has made a great impact on the decline of environment in the rural areas, the big cities encountering air pollution due to emissions from automobiles and industrial factories, solid wastes problems due to a large number of wastes, and lacking appropriate methods of waste disposal. The performance inefficiency of government policies reflects duties and responsibilities of each organization. Besides, there are several legal problems related to natural resources and environment management and laws also determine roles and duties in performing tasks to several of and many levels of governmental organizations consisting of the organizations under central, provincial, and local administration. Besides, most of legal statements have been expressed meanings broadly without clearly specifying the details necessary to the sustainable management of natural resources and environment. This results in the practical problems about the rights of community participation.

Nevertheless, in case of the community right to natural resources and environment management, Section 43 of the Constitution of the Kingdom of Thailand B.E. 2560 specifies the community right that people and community have rights to conserve, revive or promote wisdom, arts, culture, tradition and good customs at both local and national levels, as well as manage, maintain and utilize natural resources, environment and biodiversity in a balanced and sustainable manner, in accordance with the procedures as provided by law. Besides, people and community have rights to sign a joint petition to propose recommendations to a state agency to carry out any act which will benefit the people and community, or refrain from any act which will affect the peaceful living of the people or community, and be notified expeditiously of the result of the consideration thereof, provided that the State agency, in considering such recommendations, shall also permit the people relevant thereto to participate in the consideration process in accordance with the procedures as provided by law.

It was found that Sections 67(7) and 71 of the Sub-district Council and Sub-district Administrative Organization Act B.E. 2537 specify the local administrative organizations have the duties in protecting, sustaining and retaining natural resources and environment.

According to the criteria of the Constitution of the Kingdom of Thailand and the Sub-district Council and Sub-district Administrative Organization Act B.E. 2537, when compared to the United Nations Declaration on the Rights of Indigenous Peoples 2007, it adopted the word "community" which is similar to the community right by applying the principles of protecting the rights of indigenous peoples and their communities as the collective right. However, this declaration aims to protect only the community right of indigenous peoples. If it is not the community of indigenous peoples, it is not protected as stated by this declaration.

Therefore, it can be concluded that laws empower the governmental organizations to solely manage, control, and supervise the organization without giving importance to the community in natural resources management. It can be obviously seen that laws related to resources management do not accept customs of the community as provided by law although the community right is considered as a fundamental right to community

management. This includes the right to retain natural resources and environment in the community or so-called de facto right. It is not the legal right but it is the acceptance of community de facto right.

5. Suggestion

The Constitution of the Kingdom of Thailand B.E. 2560 specifies the rights of community participation and the Sub-district Council and Sub-district Administrative Organization Act B.E. 2537 empowers the local administrative organizations to retain natural resources but there are apparent criteria specifying community participation in sustainably managing natural resources and environment. As a result, the community rarely plays roles in performing this task. Therefore, it is advisable to urgently make a subordinate legislation to guarantee the rights of community participation in sustainably managing natural resources and environment, a local provision, by determining roles and duties of the community in participate sustainability of natural resources and environment management as follows:

(1) building awareness among the community to retain soil, water, and forest resources, promoting and retaining the quality of community environment,

(2) allowing the community to manage and make use of soil, water, and forest resources fairly and sustainably,

(3) building networks with partnerships in conserving and retaining soil, water, and forest resources, and

(4) building strengths and developing potential of management among peoples, groups, and community organization in sub-districts.

6. References

Borrini-Feyerabend, G.. (2000). *Co-management of Natural Resources: Organising, Negotiating and Learning by Doing*. IUCN, Yaoundé, Cameroon.

Constitution of the Kingdom of Thailand B.E. 2560. (2022). [Online]. Retrieved August 20, 2022, from: https://www.krisdika.go.th/librarian/get?sysid=774606&ext=pdf.

Mahatien, Chariya. (2016). Natural Resources and Environment Management. *Journal of Educational Review*, 3(2).

National Legislative Assembly. (2017). *The Wisdom of the Monarch: A World Leader in Sustainable Development: Laws Supporting Royal Initiated Projects of King Bhumibol Adulyadej*. Bangkok : The Committee of the Royal Tribute Project of the National Legislative Assembly to Compile Laws Supporting Royal Initiated Projects, National Legislative Assembly.

Ponok, Nittaya. (2014). *Community and Rights to Natural Resources and Environment*. Bangkok : King Prajadhipok's Institute.

Suktam, Wanchai. (2017). Management of the Natural Resources and Environment: From Buddhist Concepts to the Way of Sustainable Development. *Mahachula Academic Journal*, 1(1).

LAWS GUARANTEEING THE PURCHASE AGREEMENT OF

PET DOGS AND CATS

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ABSTRACT

This article aims to investigate the laws guaranteeing the purchase agreement of pet dogs and cats. At present, laws consider the purchase of dogs and cats as the purchase of movable properties according to the Civil and Commercial Code, which does not require a form, that is, it does not require a document and ask for registration before officials. The parties can make an agreement on the basis of the principle of freedom of contract. However, some kinds of people like to raise dogs and cats just like their child, which results in the widespread purchase of dogs and cats but there are no specific laws to control making the agreement, such as, controlling roles and duties of entrepreneurs, warranty, and liability after the purchase. These lead to inefficiency to enforce the parties to be liable after the purchase. Therefore, it is advisable to provide the specific laws to control making the purchase agreement of pet dogs and cats.

Keywords: Supportive Law, Making The Agreement, Purchase, Dogs and Cats

1. Introduction

In the past, human beings raised animals for labor use, such as, raising dogs for watching over the house, raising cats for preventing rats from entering the house, or raising animals for eating as food. As a result, it causes the superficial relationship between human beings and pets (Yotanyamaneewong, 2017: 139). Later, human behaviors have been changes and began to have a closer relationship with animals probably with the human's activities allowing animals to participate in, such as, running, walking, other activities in the family, etc. (Christian Ferencz-Flatz, 2017: 225). As a result, human beings have behaviors to raise animals just as a family member or known as "Pet Humanization," in which human beings do not only consider pets as friends, but someone also upgrade its status equal to their child. The raisers have a role as a parent to take care of well-being of their pets (BrandAge Online, 2022).

The forms of raising animals lead growth of the animal breeding business and the pet purchase began popular, especially for the purchase of dogs and cats. In this case, if the purchase is in line with the parties' intention, liability and claim for damages will not occur. However, what is the problem and leads to this article is that at present, the Section 456 of the Civil and Commercial Code states the purchase of real estate requiring to do a document and ask for registration before officials, as well as the purchase of ships or vessels of five tons and over, to floating houses and to beasts of burden. Besides, it includes the purchase agreement of movable properties with a minimum of 20,000 baht. According to the mentioned criteria, when the pet dogs and cats are one type of movable properties, it is not under the rule to follow the purchase agreement, that is, doing a document and asking for registration before officials. In case of defect of dogs and cats, i.e., illness, underlying disease, or physical impairment, the purchaser requires to clearly verify that it is an existing defect and the defect that can claim for the seller to be liable shall be a damage causing depreciation and breach of condition of merchantable quality or breach of condition of fitness for particular purpose according to the Sections of 472-474 under the Civil and Commercial Code.

Regarding the above criteria on the verification of defect, although the purchased pet dogs and cats are detected as illness which might not be depreciated and breach of condition of merchantable quality or breach of condition of fitness for particular purpose, the pet dogs and cats are more than general merchandise due to having the sentimental value. In case of illness or physical impairment, they will feel like their family member gets ill. When detecting illness or impairment that probably can be completely cured, it is not considered as depreciation, and breach of condition of merchantable quality or breach of condition of fitness for particular purpose. This case does not fall into the meaning of defect according to the principle and cannot claim for the seller to be liable for illness and impairment as well as treatment expenses. Moreover, the purchaser needs to clearly verify that it is an existing defect and the defect that can claim for the seller to be liable shall be a damage causing depreciation and breach of condition of merchantable quality or breach of condition of fitness for particular purpose.

According to the mentioned problem, in order to efficiently enforce the parties to be liable after the purchase of dogs and cats, providing the specific law to control making the agreement which consists of specifying roles and duties of entrepreneurs, warranty, and liability after the purchase shall be one of the important

mechanisms to efficiently solve the problems on the purchase of dogs and cats. Therefore, it is the origin of the study on "Laws Guaranteeing the Purchase Agreement of Pet Dogs and Cats."

2. Concepts of Raising Dogs and Cats

2.1 Raising Dogs and Cats

Human beings and animals have had relationship since the ancient times. At the beginning, human beings raised wild animals for animal hunting use and protecting human beings, such as, watching over their possessions, watching over their pets, etc. Human beings would feed them as a reward and then because the human's society and lifestyle has been changed, it leads purposes of raising animals changing from the past. Human beings raise animals to relieve their loneliness and some raise animals as their child just like a family member. As a result, pet dogs and cats are not considered as a property (movable property) but it is a living thing and there is a concept of protecting animals. For example, at present Thailand contains several laws to protect animals, such as, the laws on animal cruelty prevention and animal welfare provision (Phanwattana, 2018: 32).

2.2 Movable Property

The Section 140 of the Civil and Commercial Code defines the movable property as "things other than immovable property, including rights connected therewith." According to the above meaning, the movable property consists of (1) things other than immovable property, that is, tangible or intangible property which is not immovable property shall be movable property; (2) rights related to movable property referring to both property right and right over the individual, such as, ownership of movable property, copyright, right of pledge, possessory right of movable property, special preferential right as registered shall be the property right and partnership right shall be the right over the individual (Sucheva, 2016: 21-22). Regarding the above meaning, dogs and cats are considered the movable property.

2.3 Principle of Freedom of Contract

Principle of freedom of contract refers to the freedom of contract that the parties are free to enter into contracts without any restriction or governmental intervention (Andrew Taylor, 2015 : 2).

Tedoradze Irakli (2017) expressed his opinion that entering into contracts is a matter that the parties are willing to make a contract and agree to enter into contract. Making a contract without anyone to force them, if the parties think it is unfair or the contract is unjust, they do not need to enter into contract. However, when agreeing to make a contract, the contract is considered as fair and any party cannot claim the other party takes advantage of the agreed contract (Tedoradze Irakli, 2017: 63).

Sakda Thanitcul commented that in order to create fairness and economic efficiency, laws specify approaches and manners of entering into contracts as follows (Sakda Thanitcul, 2559: 54-55):

(1) Parties' abilities are people with no defects in abilities;

(2) Intimidation refers to the actions making the intimidated parties to choose what they consider Pareto Inferiority. For example, Mr. A uses a gun to threat Mr. B to sell a luxurious car to him in only 500 baht and it causes Mr. B to clearly have decreased property;

(3) Offer and acceptance refer to an important symbol of willingness to enter into contracts and willingness often goes together with the contract enabling the resource allocation more efficiently. The law principle will enforce the offer to clearly specify the description;

(4) Reward in the contract law of the United States is considered very important because the contract shall not happen without any rewards. The law principle adhered to for a long time is called Peppercorn Theory, that is, when there is a reward to the other party, the court will not consider whether the reward is valuable to act as a reward in terms of laws.

In conclusion, freedom of contract is the principle to bring about negotiation or offer which the contractor has freedom to make a contract with any people. When the contract is made, it means creation of legal relations or liability between parties. Therefore, the contract shall result in the parties to have no freedom to change the contract completion.

3. Laws on Raising Dogs and Cats

3.1 The Civil and Commercial Code

Section 453 denotes "Sale is a contract whereby a person, called the seller, transfers to another person, called the buyer, the ownership of property, and the buyer agrees to pay to the seller a price for it."

Section 456 denotes "A sale of immovable property is void unless it is made in writing and registered by the competent official. The same rule applies to ships or vessels of five tons and over, to floating houses and to beasts of burden.

An agreement to sell or to buy any of the aforesaid property, or a promise of sale of such property is not enforceable by action unless there is some written evidence signed by the party liable or unless earnest is given, or there is part performance.

The provisions of the foregoing paragraph shall be applied to a contract of sale of movable property where the agreed price is twenty thousand baht or upwards."

Section 472 denotes "In case of any defect in the property sold which impairs either its value or its fitness for ordinary purposes, or for the purposes of the contract, the seller is liable.

The foregoing provision applies whether the seller knew or did not know of the existence of the defect."

Section 473 denotes "The seller is not liable in the following cases:

(1) If the buyer knew of the defect at the time of sale, or would have known of it if he had exercised such care as might be expected from a person of ordinary prudence.

(2) If the defect was apparent at the time of the delivery, and the buyer accepts the property without reservation.

(3) If the property was sold by public auction."

Section 474 denotes "No action for liability for defect can be entered later than one year after the discovery of the defect."

According to Sections 453, 456, and 472 – 474 under the Civil and Commercial Code, laws specify the property to follow the stated laws, such as, immovable property and special movable property, as well as a contract of sale of movable property where the agreed price is twenty thousand baht or upwards. The above criteria exclude a sale of pet dogs and cats, which is considered as movable property resulting in a sale of dogs and cats not required to make a contract of a sale. Besides, in case of any defect in the property sold, it is a duty of a buyer to verify the defect in accordance with Sections 472 – 474 in order to get protection according to the above criteria.

3.2 Foreign Laws

California of the United States provides laws to protect a sale of pet dogs and cats, which aims to specifically protect a buyer by clearly specifying the duty of entrepreneurs to abide by before a sale of pets to a buyer. It is in the form of certification, warranty, and prevention of a problem to a buyer prior a sale, i.e., California Code, Health and Safety Code, Sale of Dogs and Cats, Retail Sale of Dogs and Cats, Section 122140 "Every pet dealer shall deliver to the purchaser of each dog and cat at the time of sale a written statement in a standardized form prescribed by the Department of Consumer Affairs containing the following information:

(a) For cats:

(1) The breeder's and broker's name and address, if known, or if not known, the source of the cat. If the person from whom the cat was obtained is a dealer licensed by the United States Department of Agriculture, the person's name, address, and federal dealer identification number.

(2) The date of the cat's birth, unless unknown because of the source of the cat and the date the dealer received the cat.

(3) A record of the immunizations and worming treatments administered, if any, to the cat as of the time of sale, including the dates of administration and the type of vaccine or worming treatment.

(4) A record of any known disease or sickness that the cat is afflicted with at the time of sale. In addition, this information shall also be orally disclosed to the purchaser.

(b) For dogs:

(1) The breeder's name and address, if known, or if not known, the source of the dog. If the person from whom the dog was obtained is a dealer licensed by the United States Department of Agriculture, the person's name, address, and federal dealer identification number.

(2) The date of the dog's birth, and the date the dealer received the dog. If the dog is not advertised or sold as purebred, registered, or registerable, the date of birth may be approximated if not known by the seller.

(3) The breed, sex, color, and identifying marks at the time of sale, if any. If the dog is from a United States Department of Agriculture licensed source, the individual identifying tag, tattoo, or collar number for that animal. If the breed is unknown or mixed, the record shall so indicate.

(4) If the dog is being sold as being capable of registration, the names and registration numbers of the sire and dam, and the litter number, if known.

(5) A record of inoculations and worming treatments administered, if any, to the dog as of the time of sale, including dates of administration and the type of vaccine or worming treatment.

(6) A record of any veterinarian treatment or medication received by the dog while in the possession of the pet dealer and either of the following: …"

According to the laws to protect pet dogs and cats of California, the laws determine forms of a sale of dogs and cats specifically to protect a buyer and define the duties of a seller leading a sale of dogs and cats to abide by the regulations of the laws. If any parties break the law, he shall be liable.

4. Conclusion

Regarding making a contract of a sale of pet dogs and cats, when analyzing the content of Section 456 under the Civil and Commercial Code, it is found that the laws determine the criteria of making a contract of a sale as a requirement of making a document and registering before officials, especially for the case of immovable property and special movable property, as well as a contract of sale of movable property where the agreed price is twenty thousand baht or upwards. According to the above criteria, a contract of a sale of digs and cats where the agreed price is twenty thousand baht or downwards is not under Section 456 which requires a document and registration before officials.

Although the Civil and Commercial Code of sale does not force a sale of dogs and cats to make a document and register before officials. In practice, a sale of dogs and cats are done generally, that is, a seller delivers a dog or a cat to a buyer, whereas a buyer accepts a dog or a cat, including making a payment of a dog and a cat, which is considered a complete sale without taking any further actions. However, the problem is in case the dog and cat sold having physical illness after that, such as, underlying disease or physical impairment, a buyer needs to clearly verify that it is an existing defect and the defect that can claim for the seller to be liable shall be a damage causing depreciation and breach of condition of merchantable quality or breach of condition of fitness for particular purpose according to the Sections of 472-474 under the Civil and Commercial Code.

According to the defect analysis, Sections 472 – 474 of the Civil and Commercial Code have specified the defect verification. However, regarding the above criteria of verification of a dog and a cat having illness, underlying disease or physical impairment, a buyer needs to clearly verify that it is an existing defect and the defect that can claim for the seller to be liable shall be a damage causing depreciation and breach of condition of merchantable quality or breach of condition of fitness for particular purpose. In this case, the verification requires an expert to prove the claim, such as, veterinarian, which causes a burden to a buyer. Moreover, in case of liability, the laws do not clearly specify how to be liable for defect in case of a dog and a cat but it adopts the liability of debts to this matter.

The analysis of the Civil and Commercial Code of sale which is the law related to a sale of dogs and cats finds that there are some restrictions leading a buyer not get actual protection on a sale of a dog and a cat. This leads the difficulty to get a cure or compensate for damages when the defect occurs. As a result, providing a specific law to control a contract of a sale of dogs and cats shall be one of mechanisms to enable a buyer to get

protection and claim for rights in accordance with a contract of a sale. It corresponds with freedom of contract which lays the foundations that entering into contracts is a matter that the parties are willing to make a contract and agree to enter into contract. Making a contract without anyone to force them, if the parties think it is unfair or the contract is unjust, they do not need to enter into contract. At the same time, if any party breaks a contract, the other party can enforce compliance with the contract.

In case of a contract of a sale of dogs and cats, comparing to foreign laws, such as, the United States, California of the United States provides laws to protect a sale of pet dogs and cats, i.e., California Code, Health and Safety Code, Sale of Dogs and Cats, Retail Sale of Dogs and Cats, Section 122140. It specifies the duty of entrepreneurs to abide by before a sale of pets to a buyer. It results in a sale of dogs and cats in the form of certification, warranty, and efficient prevention of a problem to a buyer prior a sale. Moreover, in case of breaking the contract terms, a buyer can enforce compliance with the contract. This is different from Thailand because at present there are no specific laws to control a sale of dogs and cats but it adopts enforcements in accordance with the Civil and Commercial Code and other related laws.

5. Suggestion

The Civil and Commercial Code Book III Title 1 Sale does not provide the criteria to specifically control a contract of a sale of dogs and cats which causes the parties can make an agreement in accordance with freedom of contract but it lacks inefficiency to enforce the parties to be liable after the purchase. Therefore, it is advisable to provide the specific laws to control making the purchase agreement in case of pet dogs and cats as follows:

1. Definitions of a contract of a sale of dogs and cats

2. Rights and duties of the parties

3. Contract terms consist of the important contents as follows:

3.1 Duties of seller

3.2 Duties of purchaser

3.3 Quality of dogs/cats

(1) Age

(2) Sex

(3) Breed

(4) Record of vaccination

(5) Record of medical treatment

(6) Record of disease, sickness, congenital defect or genetic defect

(7) Warranty of dogs and cats after sale

3.4 Liability

6. References

Andrew Taylor. (2015). A Comparative Analysis of US and English Contract Law Interpretation and Implied Terms. *International In-house Counsel Journal.*

BrandAge Online. (2565). *Pet Humanization: The Era of Pets Equal to Family Member*. (Online) Retrieved from https://www.brandage.com/article/29294/Pet-Humanization- [20 August 2022]

Christian Ferencz-Flatz. (2017). *Humanizing the Animal, Animalizing the Human: Husserl on Pets*. . [Online]. Retrieved August 20, 2022, from: https://d1wqtxts1xzle7.cloudfront.net/57082787/Human_

Phanwattana, Pitsarn. (2018). The Animal Protection and the Right to Inherit of Pet. *Ramkhamhaeng Law Journal,* 7(2).

Studies_2017-with-cover-page-v2.pdf?Expires=1661529638&Signature=POB8fcH09Rg7w4RbKYG-QCEq3hqwjPGlPnNDqpmdzYOwmRADqhsKHrv4RHBfDU0T8T3XW8oMpA6IQziCLRGxBbrvaU xU3Yg7DNRtKtr4njiFptkVNwYo8NOGhAEYsvH5Sq0bD4wNt2-RjbPfiIroNqH4FTHUlV8rUZED7bv159YLq9SrIUO1hHNl3ghpYHWou9ukOOfFWKxgOr-sUu3Xq9YBGSitvclQHnLKRWRgKIzAwsL8hb~6n8vb2mtquNv7oUs7Kaq4H0DMs770gYzlFbCR2 lu-I4gFml4rO7uVHjRv2ZcxiPaLW1FyF7t-EvYOx4aZrE96t~DTGHs6NmazAg__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA.

Sucheva, Banyat. (2016). *Description of Property Laws*. Bangkok: Institute of Legal Education of the Thai Bar.

Tedoradze Irakli. (2017). The Principle of Freedom of Contract, Pre-Contractual Obligations Legal Review English, EU and US Law. *European Scientific Journal February 2017 edition, 13.*

Thanitcul, Sakda. (2016). *Law and Business*. Bangkok: Nititham.

Yotanyamaneewong, Saengduean. (2017). Do companion animals enhance social and emotional development in children?. *Chiang Mai Veterinary Journal, 15*(3).

POLITICAL ASTRONOMY: SOUTH KOREA SPACE DEVELOPMENT

UNDER THE INTERNATIONAL POLITICAL DIMENSION

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ABSTRACT

Human Knows about space technology development since 1950s era during that time U.S. and Soviet Union were main actors in "Space race" war. Space technology development of U.S. and Soviet Union in proxy war era were emphasized to develop for competition of political ideology and power of military. At the present time the purpose of space technology development different from the past, many countries that try to develop space technology for economic benefit, technology benefit, communication benefit or hidden connotation others. South Korea was the one that have potential and interesting to develop space technology because of the conflict with North Korea. Although, South Korea have potential of technology to develop own space technology but actor of South Korea in international level is only middle power state so, the co-operation is better way for South Korea space development.

Keywords: Astronomy, Outer Space, Space Technology Development, Korea

1. Introduction

In the past each country in the world were competition by the power in wars, trading and others hard power because pillaged the wealth of resource from others that called western colonial era. But in 1945 the conflict between Communism ideology group that leads by Soviet Union and Liberalism ideology group that leads by U.S. had begun. Among the Cold war each country not only direct encountered with opponent troops but also that spread own ideology, soft power to others country and both sides had a contended develop hi-technology weapons because both sides want to intend to warn or intimidate an opponent and to showcase one's own capability. Space technology is the one technology that Soviet Union and U.S. always used to intimidate between each other it that called Space race". At the present time, although the war that flight with face to face was hardly to found but this not meant that all of country were alliance between each other.

Besides the competition of trade, economic, culture, hard power, and soft power, for in this thesis the researcher has been interested in Space issue because this issue it seems like inapplicable to ordinary people, but many countries have been developed Space technology such as U.S., Russia, France, China, Japan and even South Korea. In 2020 South Korea had plan to launched space probe name "Korea Pathfinder Lunar Orbiter" to the moon under the project Korean Lunar Exploration Program, this can indicate that South Korea have future vision

to develop space technology. Space technology that conducted in many parts such as space activity, space exploration, satellites, space vehicles, space services and communication etc. In South Korea have been many institutes that research about Space technology such as Korea Astronomy and Space Science institute 한국항공우주연구원 (KASI), Korea Aerospace Research Institute 한국항공우주연구원 (KARI), Korea Space Science Society 한국우주과학회 (KSSS). South Korea had many space projects such as KSLV‑ I, ARGO‑M, Lunar exploration, STSAT-2, KITSAT-1 etc. According to above that represented South Korea want to develop space technology conscientiously. How space technology development important to South Korea? What South Korea received benefits from space technology development? Economic, Technology or hidden connotation others. This study focuses on relation between South Korea space technology development with international political and Development of space technology in South Korea since South Korea started to develop space technology until current day and future direction. Currently when the world enters a new phase of the Space Age, it is an essential gateway for the country to secure space development technology and foster the space industry to solidify its position as one of the space powerhouses. From many reasons pushed forward to South Korea developed space technology such as they want to be a technology leader, Economic, politics and others national interest. Although, South Korea had potential that can develop space technology, but all the satellites developed in South Korea have been launched using foreign space launch vehicles and space technology development is delicate issue because space technology development for some state that impact to eternal wide-ranging so, the international space law for regulation about space activity for avoid conflict. In Outer space treaty emphasized "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies" that mean space technology development and space activity must be for only exploration. Besides, space development effect to environment directly. In this era is golden age of space technology many countries that want to development technology but each country that have different potential and limitation to develop space technology such as latency, budgets, or politics polarity. Although, South Korea have a technology potential but cannot decline South Korea remain supported by others. South Korea have a plan to develop space project since Korean space organizers were founded until present day South Korea did many thing about space project such as space vehicle, sounding rockets, KSLV‑I,KSLV‑II, Naro project, Nuri project, Lunar orbiter project . This is significance of this issue that researcher want to study. This study focuses on relation between South Korea space technology development with international political and Development of space technology in South Korea since South Korea started to develop space technology until current day and future direction.

2. Objective of the Study

The aim of the study Political Astronomy: South Korea space technology development under the international politics dimension are

(1) To study procedures of space technology development in South Korea.

(2) To study affectation of space technology development in South Korea in politics term.

3. Literature review

Most of articles in space technology issue that only study in science side but nowadays that started to study in space technology related to others issue whether economic, law, politics, communication more than in the past. This is mentioned to the benefits in space technology not only related to science but also related to many issues around human.

Pongnakorn Nakornsantipap (2004) studied about "Politics in Outerspace": the politics in outer space, has three important objectives. First, to study the progressing of space technology, the development direction and the effect that may occurred from that space technology development. Secondly, to analyze to compare with from and core of order arrangement to use benefit from space at present; besides, to expect the trend in the future. the co‑technology education concept to study the effect from space technology development. This thesis also emphasized on answering the main question of this research how does the space technology development effect politic, economic, society and environment. The research result found that nowadays, the world has many conflicts that take effect from benefit using in space. The conflicts trend to more expand and will take to necessarily arrange the relation of politic, economic, society in the world again to terminate the conflict crisis and order or rule problems, which relate with conduct activity in space.

In this thesis researcher that studied about politics and outer space in overall image and occurred at the moment, studied for 18 years ago so, the information was old. Besides, the study in this side has a little and most of all study that studied in science field. Hence, I want to study outer space or space technology related with Politics in middle power state.

Doo Hwan Kim studied about "Space Law and Policy in the Republic of Korea": Korea now has a rapidly expanding space programmer with exploration aspirations. The government is giving priority to the aerospace industry and, to put it on a better footing, enacted an Aerospace Industry Development Promotion Act in I987, a Space Development Promotion Act in 2005 and a new Space Damage Compensation Act in 2007. the legislative history, comment for these three space acts including especially launch licensing, registration of space objects, use of satellite information, astronaut rescue, liability for compensation, third party liability insurance, financial support for the aerospace industry and establishment of committee and plans to assist the Korean space effort.

In this article emphasize study in Law of space in South Korea, from this article indicated South Korea that try to develop many spaces project so, the government could launch policy or law that support to space technology development or space act, each government have a different policy about space project because South Korea space technology development remained a limitation from international relation and the contrast in Korean peninsula. The article weakness was old information and studied in only about law and policy which can change fellow the government.

Phan‑orn Powcharoen (2022) studied about "North Korea and the Crisis on the Peninsula" Among problems causing tension in the Northeast Asian region is North Korea's nuclear development programmed. It is believed that North Korea began a nuclear development programmed in the 1950s, and soon after the dissolution

of the Soviet Union in 1991, it became a threat to world community peace and security. Since the early 1990s, tensions on the Korean peninsula caused by the nuclear development programmed elevated into two crises. Efforts to resolve the crises through bilateral and multilateral negotiations failed to convince North Korea to denuclearize. Negotiations made North Korea feel insecure about national security in addition to maintaining the threat perception of North Korea. Therefore, despite negotiations, North Korea continued to advance its nuclear development programme and eventually declared itself to be a nuclear state in 2012.

In this research studied the relation of North Korea nuclear development and Korean peninsula situation. North Korea was developed nuclear weapons because concern about intervention from others so, probably the North Korea nuclear development will a cause of South Korea must development space technology.

Sivapol Laongsakul (2016) studied in "The China-U.S Power Struggle in 21th Century" This article will study the power struggle between China and U.S in this century. Our conceptual framework is the changing world power structure. This approach proposes that when the world power structure changes, the relationship between the dominant power and emerging power will usually be conflictual and violent, while the dominant state tries to maintain the old order that preserve its strategic interests and influence the emerging new power want to change the existing order to match its legitimate interests.

In this article explained about the competition between superpower state that compete in economic, culture and balance of power in world politics.

From the literature review that seen because of outer space were limitless and space technology have a new development technology everyday so, the legislative for space never covered every outer space and every space performance. Every space performance risk to have a problem such as interest, environment, and international relation but in the other hand space technology seem like have a benefit more than average, so many countries or states that have an enough budget almost interesting about the investment in this technology. Not only for show rattling like in proxy war era, but also use benefit from the leading of technology to developing a convenient life, developing armament military. At the present time that have a developing technology competition such as cyber armament, fasting and precising of information intelligence. So, it not a new trend that many states want to develop own space technology. At the present 2022 South Korea that pass about president election and have a new leader form conservative party. From now on the world must be focus about conflict of North Korea and South Korea.
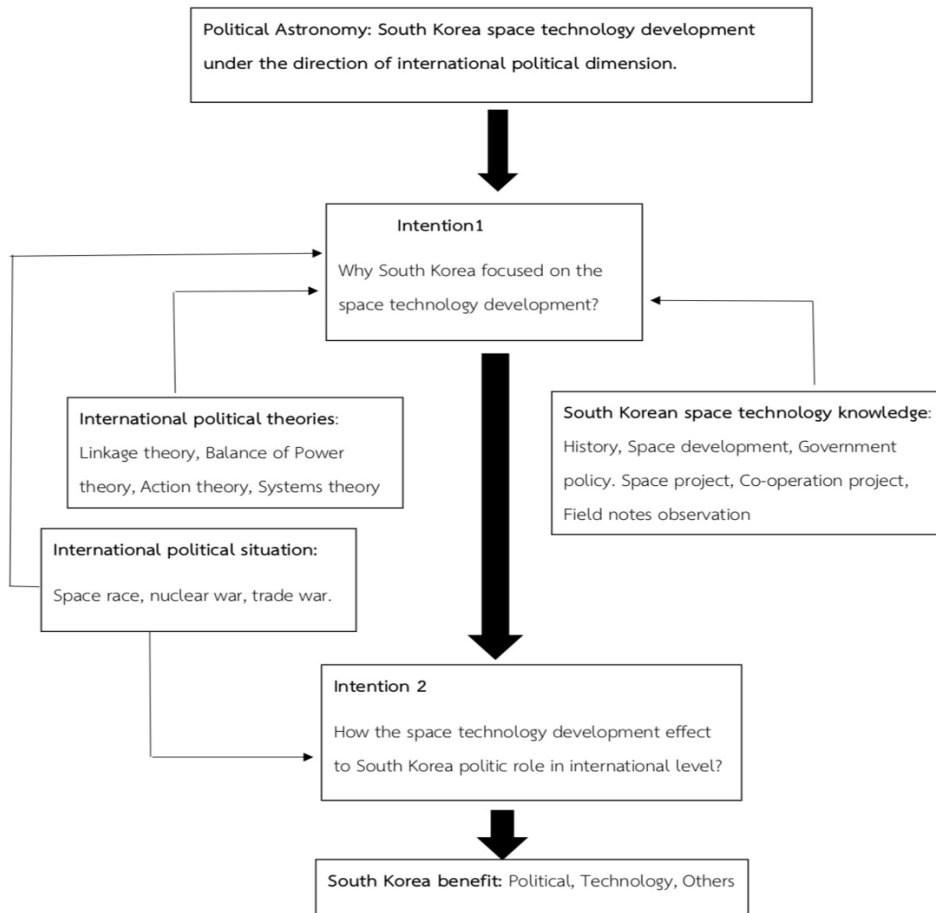
3.1 Conceptual Framework

Figure 1 Conceptual Framework

3.2 Hypothesis

South Korea intended to developed space technology because South Korea been farsighted to benefits of this issue whether in economics term, communication technology, etc. Although space technology development that use country capital in high abundantly rate but at the present time South Korea reminded develop space technology relentlessly. From successful of economic development that in the next step South Korea will set target to are leader in technology. Moreover, space technology development effected in South Korea role of international politics. For competition issue of international level which space technology development was called "Space race" because each country that had space technology development which divided between by U.S. polarity a China polarity. In addition to relation between U.S. and South Korea so South Korea will participate with U.S. space project more than China space project.

Although, South Korea have potential to develop space technology but from balance of power theory, South Korea is a middle power states so, because of budgets and international relation, South Korea cannot develop space technology more than superpower state because of threaten stability. Hypothesis conclusion for my question of study: Why South Korea focused on the space technology development? In Researcher hypothesis

can separate in 2 issues: Politics issue ,1.1 State stability- because situation in Korea peninsula that made South Korea been on the alert to self- defense. 1.2 International relationships- space technology development that had high price and using advanced level technology, so each country will be cooperation for develop this technology, so South Korea can get an alliance and connection.

4. Research Methods

This Study was qualitative research which analyzing about phenomenon and data that found in scope of relation of South Korea space technology development and international politics role. Moreover, using documentary research from primary documents and electronic documents such as Books, articles, news in South Korea space technology, Korean peninsula situation and international political theories such as Linkage theory, Balance of Power theory, Systems theory, Realism theory. Afterwards bring all data to analyzing with context analysis method, descriptive method and use inductive research to find keys of question in this study. Attached with field notes from Korean Astronomy Science institute (KASI) South Korea and National Astronomical Research Institute of Thailand (NARIT) Thailand.

5. Result

(1) To study procedures of space technology development in South Korea.

(2) To study affectation of space technology development in South Korea in politics term.

In Korea history appeared around many studies of astronomy this indicated Korea interested to study about astronomy since, in history. From Korea studying of astronomy knowledge that make many astronomies invention. Since Korea was divide states because of politic conflict, the study of astronomy that also divided. In addition to nuclear problem on Korean peninsula tension that makes both Korea compete to developing in many internal issues such as facility, public utility, living live, economic. For North Korea case, North Korea have study in space technology and had own space administration that name "National Aerospace Development Administration or NADA" (국가우주개발국). In addition to space development technology that have high budgets so, North Korea depend on international organization. NADA have mission statement to research, take responsibilities, security, and compensation about space project. In 1980 KCST started to research and develop about satellites such as earth observation satellites, weather observation satellites, communication satellite. From the tension in Korean peninsula that forced both North Korea and South Korea developed own technology, arms. Space technology is technology that can show country potential. From In political side, most of space development could use co- operation from others country or organizer because in space development use a lot of budgets and advance technology so, interest in big project that effected to internal state and external state. When government interest in space project that meant government decreased to interest in others side such as facility, education, public health which has a resistance from population besides, space development project that effected to alliance country and enemy country. Although, at the present the relationship of North Korea and South Korea

that getting better in the past, but polarity and state relationship of North Korea and South Korea were rather fragile and can change follow a new leader policy.

Since North Korea was not develop nuclear technology to flight with North Korea because of agreement so, this is a one point that make South Korea was develop space technology for use in military section and build a relation with alliance. Both Korea wants to counterbalance each other. After divided state, North Korea and South Korea always competition in every side – Economic, technology, facility, living. For South Korea hard power that developed for defend the state because of North Korea still develop nuclear technology until today so, South Korea use developing space technology for balance to power to North Korea like a space race situation. In addition to South Korea that is have democracy in political system so, indubitably the alliance of South Korea is U.S. for international system when South Korea develop space technology as U.S. is alliance with South Korea, U.S. support about prototype technology and budgets. In international level, South Korea expected to be a superpower state. From the purpose of South Korea in space technology development and co‑operation project with alliance and others that make South Korea got benefit in many sides. Alliance country might get benefit from co‑operation, but enemy country might be suspicious about big development project. For North Korea and South Korea case might be paranoid situation, when North Korea developed space technology, South Korea and alliance country that mistrust because South Korea think apart from space technology, North Korea also develop missile, ballistic and nuclear development. From action theory that explained about action and re-action between state, because of the South Korea alliance is U.S., this point that make North Korea distrust South Korea after Korea state were divided. U.S. were conduct North Korea in U.S. List of State Sponsors of Terrorism because of North Korea withdraw from Treaty on the Non‑Proliferation of nuclear weapons since 1993 and experiment missile, ballistic and nuclear weapon. From tension in Korea peninsula forced Korea could develop technology for national security such as arms, nuclear (North Korea) included space technology. This situation can compare with proxy war era through space race between North Korea and South Korea not fiercely than U.S. and Soviet Union. South Korea develops space technology because South Korea want to develop potential of state – South Korea interested technology and want to be a leader of technology that make South Korea more growing up and decrease to import technology from others. Anxious of Korea peninsula situation, although North Korea and South Korea make a Korean Armistice Agreement but both Korea distrust each other, Space technology development can show the latency and create a good image for the state. Space technology development is high technology that most use co‑operation with alliance others state. From co‑operation that use good relationship. U.S. is one of supporter that support South Korea to develop space technology.

South Korea wants to preserve national security from enemy, space technology can help to develop military technology. South Korea was affected from develop space technology was South Korea have co-operation space project with others, South Korea will get many benefits also advantage. Although, South Korea want to develop space technology, but South Korea is not a superpower state that can do anything and not without supporter and shareholder or without observation from alliance, enemy and superpower state so, South Korea

want to develop space technology, but each South Korea space project could collaborate with others such as Russia, U.S., Japan the co-operation project makes benefit to South Korea whether advance technology.

Since South Korea develop space technology that can use many benefits from space technology whether communication, economic technology and political. In technical way South Korea have independent to develop space technology because South Korea is one that readiness in technology, budget, and supporter but in real situation South Korea cannot develop space technology in indulge way, South Korea must be developed space technology related with Space development agreement, country or state that was for peace, responsibility, and sustainability

For external political, South Korea has a superpower alliance such U.S. and have a surveillance neighborhood such North Korea so, South Korea realized about national security because North Korea was developed missile and ballistic technology through South Korea cannot develop about missile because of treaty so, South Korea want to develop about space technology instead for balance power with North Korea. When North Korea development and experiment missile and nuclear that vibrate to world politics so, South Korea must preserve national security but cannot directly to develop missile or ballistic for balance power with North Korea so, space technology development when use in military side that can fight with North Korea missile technology. Korea peninsula tension depend on direction of both Korea leader and intervention from superpower states. In political issue, South Korea have an important alliance such U.S. When North Korea and U.S. have the more conflict, not only South Korea concern about missile development but North Korea also concern about superpower intervention through South Korea international relation. the political benefit that South Korea gets from space technology development was more unilateral alliance for resist with North Korea and for internal political, South Korea be proud of Korean nationality and potential of Korean people.

North Korea and South Korea are hate-love relationship because the different regime, Although, at the present the relationship of North Korea and South Korea that getting better in the past, but polarity and state relationship of North Korea and South Korea were rather fragile and can change follow a new leader policy. In 2018 North Korea leader Kim Jong Un and Moon Jae In (previous South Korea president) that meeting in third summit in Pyongyang. In the third meeting comes as the diplomatic efforts to get North Korea to discharge nuclear weapons and ballistic missiles. Since North Korea was develop nuclear technology, this is a one point that make South Korea was develop space technology for use in military section and build a relation with alliance. Both Korea wants to counterbalance each other. After divided state, North Korea and South Korea always competition in every side – Economic, technology, facility, living. For South Korea that have a famous soft power such as food, culture, K-pop but in competition between North Korea and South Korea, South Korea soft power have little effect to North Korea because North Korea not accepting pop culture from others state anymore. For South Korea hard power that developed for defend the state because of North Korea still develop nuclear technology until today so, South Korea use developing space technology for balance to power to North Korea like a space race situation. From May 2022, South Korea that have a new leader "Yoon Seok Yeol" his direction policy is conservative that completely different from Moon Jae In (previous leader). From the third meeting

between North Korea and South Korea in 2017 after South Korea changed leader, the relation of both Korea that have estrangement.

6. Discussion of the Findings

South Korea interested technology and want to be a leader of technology and has a future plan to develop space technology because South Korea want to find a resist way with North Korea. Anxious of Korea peninsula situation, although North Korea and South Korea make a Korean Armistice Agreement but both Korea distrust each other, Space technology development can show the latency and create a good image for the state. Space technology development is high technology that most use co-operation with alliance others state, but South Korea cannot develop space technology indulgently because of limitation from superpower state. Because of the national security of A state might threaten to others state.

7. Acknowledgement

In this study only studied in case about political astronomy of South Korea space technology with international relation. Although, space development did not a new thing but purpose of space development in each state was different. The main purpose of space development is got benefits from advance technology but many state that have hidden agenda in space development such as use space technology in wrong way so, the regulation in space development were specify. At the present, space technology is interesting issue that have many state and private sectors invest and develop in this technology. In addition to Thailand case direction might be interest to develop space technology like South Korea or not, and If Thailand interested to develop space technology, what benefits Thailand will get from space technology development.

8. References

Pongnakorn Nakornsantipap. (2004). "Politics in Outerspace", Dissertation, Collage of interdisciplinary studies, Thammasat university, Thailand.

Doo Hwan Kim, "Space Law and Policy in the Republic of Korea", Korean Association of Air and Space Law, Seoul, South Korea.

Won-Hwa Park. (2009). "Outer Space Activities and an Observation of Related Laws of Korea", Department of air and space law, Korea Aerospace University, Koyang, South Korea.

Keum-Oh Lee, Junseong Lee, Soon-Young Park, Woong-Rae Roh, Sung-Hyuck Im   Gi-Won Nam and Daeban Seo. (2021). "Korean Reusable Launch Vehicle Development Strategy Using SpaceX's Strategy", Korean Society of Propulsion Engineers, Korea Aerospace Research Institute, South Korea.

Il-seong Nha. (1997). "Astronomy in Korea", The third pacific rim conference on recent development of binary star research, *ASP conference series, 3*, Yonsei university, South Korea.

Phan-orn Powcharoen, Department of Political Science, Faculty of Political Science and Law, Burapha University,Thailand.

Korea Astronomy Institute and news website, 21 April 2022

From: https://www.kasi.re.kr/eng/pageView/52

From: South China Moring post, 4 July 2022, https://youtu.be/TjJUN7VCsl8

From: https://spacenews.com/south-koreas-first-lunar-orbiter-on-way-to-the-moon/

From: https://www.kari.re.kr/eng/sub03_04.do

From: https://www.springnews.co.th/digital/826235 4 July 2022

From: https://spaceth.co/cnsa-and-roskosmos-ilrs/ 16 July 2022

From: https://www.gistda.or.th/news_view.php?n_id=1484&lang=EN 8 August 2022

From: https://edition.cnn.com/2022/06/21/asia/south-korea-nuri-satellite-rocket-launch-intl-hnk-scn/index.html

STRENGTHENING ENGAGEMENT WITH THE ORGANIZATION OF MILITARY OFFICIALS UNDER THE INFANTRY CENTER, ROYAL THAI ARMY

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ABSTRACT

The purpose of this research is 1) study the level of the engagement with The Organization of Military Officials Under the Infantry Center, Royal Thai Army. 2) study the influencing factors to the engagement with The Organization of Military Officials Under the Infantry Center, Royal Thai Army. The questionnaire was used as a tool to collect data from 360 military officers under the Royal Thai Army Infantry Center. The statistics used for data analysis were mean and standard deviation and multiple regression analysis. The results showed that 1) engagement organizational of military officials under the Infantry Center the Royal Thai Army is at a high level. When considering each aspect, it was found that the honesty of the organization was the highest average. Following that are organizational unity, organizational loyalty, and organizational dedication to work. 2) organizational culture factor, organizational leadership, motivation for government service, and happiness in government service are affect the engagement organizational of military officials under the Royal Thai Army Infantry Center.

Keywords: engagement, The Organization of Military Officials under Royal Thai Army

1. Introduction

The Royal Thai Army is a government organization that must reform its operational system in accordance with the Strategic Plan for the Development of the Thai Government System and the Royal Decree on Good governance of the country from the 20-year National Strategic Plan, which has established 6 strategies and guidelines for developing the country towards stability, prosperity, and sustainability. The first strategy, "Security Strategy" and "Strategy on Balancing and Developing Government Management System", require that the role structure be improved. The mission of the agency to be of an appropriate size and develop a manpower management system, public service system. Including focusing on the development and strengthening of personnel capacity to be ready to maintain internal, security, and national defense. As well as to combat corruption

and misconduct. To develop and strengthen the capacity of personnel in creating innovation and cultivating digital culture to support the national economic development policy according to the Thailand 4.0 model. (Office of the Prime Minister, 2017) In practice, the National Economic and Social Development Council has issued the 12th National Economic and Social Development Plan (2017-2021) with ten strategies. The Army is Strategy 5: Strengthening national security for the development of the country towards prosperity and sustainability with the goal of developing and enhancing national defense capabilities and strategy 6, management in the public sector Prevention of corruption, misconduct, and good governance in Thai society with the goal of improving the development of the structure and government administration to be efficient, modern, transparent, and fair. (Office of the National Economic and Social Development Board, 2017) as a result, the Royal Thai Army, which is a government agency and has a mission to maintain the security of the Kingdom, must carry out its strategic goals.

Engagement to the organization is an important factor that can determine the success or failure of the organization. Therefore, the organization must seek to create a bond between the staff and the organization to achieve the organization's work to achieve the goals that have been set. Affiliation with the organization that the staff operators present themselves as one with the objectives of the organization, have the same values as other members organizations, and willing to work hard to carry out the mission of the organization, so that people with high engagement organizational can perform better than those with low engaged organizational. In addition, engagement organizational can also be used to predict the migration rate job change or resignation from organization as well. (Phichit Pitakthepsombat, 2017) Employees who are engage with the organization have behaviors that are aware of the importance and are inspired by their roles and responsibilities towards the work to the fullest, which affects their willingness to stay with the organization. (Suchart Adulbutr, 2018) Engagement with the Organization is a strong relationship between members of an organization with a commitment to work and behavior in harmony with the organization and dedication to physical strength and morale. (Tanyathipa Kaewsang and Prasopchai Phasunon, 2016) Engagement with The Organization Of Military Officials follows concept of Meyer, Allen and Smith (Allen & Meyer, 1990) It consists of 3 aspects: affective commitment, continuance commitment and normative commitment. Psychological engagement refers to a positive attitude and feeling towards the military from being at one with the military or being a member of it. Personal career goals aligned with Army goals. Psychological engagement to the military is due to the fact that individuals experience activities that meet their expectations, which leads to a desire to remain in the military.

In addition, Mahal, (2012) pointed out that the psychological engagement was due to the employee's attitude towards the personal values of the military. Therefore, psychological engagement is a positive attitude towards the military. Commitment persistence in the job refers to the need for employees to stay with the military on an ongoing basis. This arises from evaluating and comparing the benefits that will be gained from working in the military compared to the benefits that will be lost after leaving the military. (Singh,Singh, Kumar, & Gupta, 2015) Engagement to the Army for persistence comes from the reward of staying with the Army or the perception that there is no alternative to joining another Army. including the perception of the difficulty of finding a new job make people need to stay with the army. (Yanee Lertkrai, 2013) together with the urgent policy of the Minister

of Defense for the fiscal year 2022 (1 October 2021 – 30 September 2022). All government agencies under the Ministry of Defense as well as state-owned enterprises under the control and regulatory agencies of the Ministry of Defense to focus on driving urgent government policies to continue Guidelines for driving the country under the policy "Together Thailand to Build a Nation" of the Government and the Development of the Ministry of Defense's Potential and Integration with All Sectors By adjusting the operating model to support the long-term control and prevention measures of the coronavirus disease 2019 (covid - 19) so that Thailand can continue to develop stably, safely and sustainably. The Ministry of Defense still has an urgent policy that must be implemented continuously to achieve concrete results.

Engagement organizational is one of the indicators of organizational efficiency and it is desirable when a government official has a high level of commitment to the organization. It will make government officials wish they were members of the organization. The government officials will be determined and willing to work for the organization to the best of their ability, including devoting themselves to the performance of duties for the organization to achieve its objectives. The organization attaches importance to the recognition of one's own abilities. It is self-efficacy because it is a person's belief that people can organize behaviors that lead to goals. (Bandura, 1997) People with high self-efficacy are more successful in their work. Friendly, fearless, risk-taking, a leader in organizational reforms, and an innovator, he brings a positive perspective on his abilities to control situations that affect work. In addition, personnel with high self-efficacy tend to have good performance, work satisfaction, and engagement with the organization.

It is a challenge to make personnel in the organization committed to the organization, and it is necessary that the executives pay attention to the quality of personnel within the organization and how many ties to the organization they have. It will cause the desire to remain a member of the organization. No idea or desire to resign or transfer to work in other organizations. (Steers, 1977) It also devotes and develops knowledge. 146 Year No. 25 Issue 3 September - December 2020. The ability to work to the fullest resulted in the organization's development effectively and still be able to maintain personnel with the knowledge and have these qualities anyway.

This is because the personnel are affiliated with do not fully devote their knowledge, abilities, skills, or attitudes to their duties and responsibilities. Lead to problems and gaps arise with the organization. The development of human resources should therefore be considered in the dimension of employee engagement or commitment. Therefore, supervisors and related parties should create a feeling of good, satisfaction, engagement, and loyalty to the organization to happen from the aforementioned problem. The researcher is interested in studying the guidelines for strengthening engagement with the organization of military officials under the infantry center, Royal Thai Army.

2. Objectives

(1) to Study the level of the engagement with The Organization of Military Officials Under The Infantry Center, Royal Thai Army.

(2) to Study the influencing factors to the engagement with The Organization of Military Officials Under The Infantry Center, Royal Thai Army.

3. Literature review

3.1 Theory and related research

Concepts and theories related to organizational engagement.

The relationship between organizational commitment and job change is very important. If members of the organization have strong ties to the organization, there will be less resignation. Higher organizational engagement is associated with less absence from work, work more efficiently and tend to focus on meeting the goals of the organization. (Porter, McGrath, Davenport & Iansiti, 2021)

Engagement organizational are persistence commitments, psychological attachment, and normative engagement differed in performance behavior and performance. In particular, emotional, and normative engagement were as positively correlated with performance as (Asbari, Purwanto, & Santoso, 2019) discussed the importance of attitudes and behaviors that affect organizational engagement. It can be expected that the commitment can produce 4 results as follows 1) Personnel who are genuinely engaged to organizational objectives and values show a higher level of participation in organizational activities and a lower rate of absenteeism than those with less engagement. 2) Employees who are engaged to the organization will have a desire to stay with their employers. the research gives the example that engagement likes a proxy for resignation is more evident than satisfaction. 3) People who have a sense of unity and trust in the organization's purpose will become more involved in their work. 4) Personnel with a high engagement to the organization are willing to make efforts that are considered for the organization. In some cases, such efforts can turn into great results.

It can be concluded that the commitment to the organization will produce good results in the dedication to work and efforts to achieve the organization's goals as a binding force for the members of the organization to have common goals. It can also create morale and encouragement. This creates satisfaction at work and reduces the turnover rate of employees. As well as being a link to the needs of personnel in the organization with the goals of the organization together.
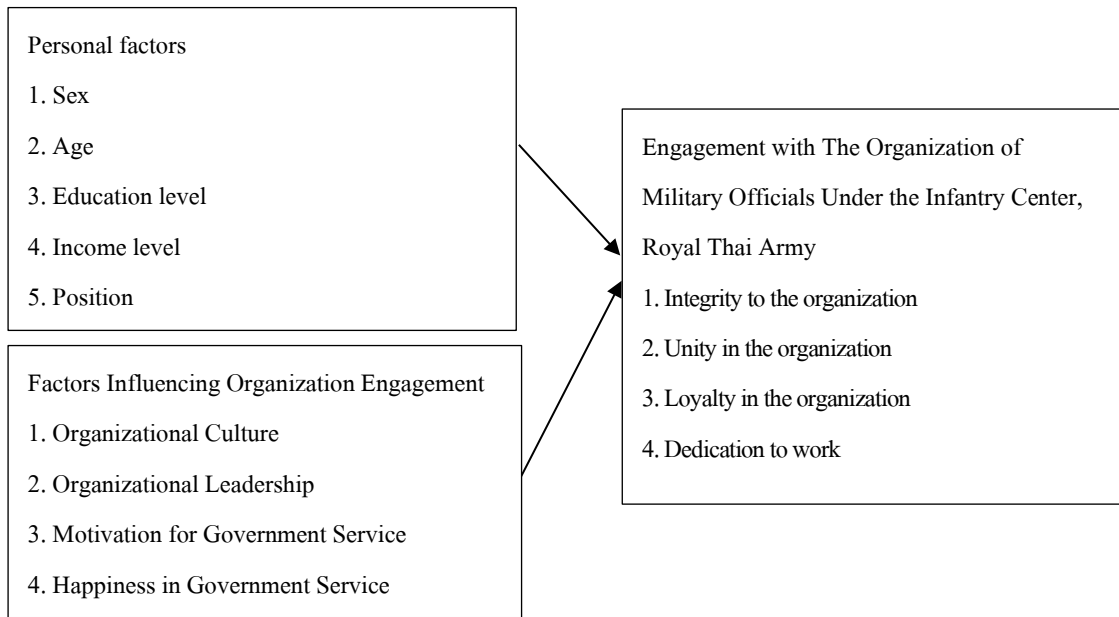
3.2 Conceptual framework

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┌─────────────────────────────────┐
│ Personal factors                │
│ 1. Sex                          │
│ 2. Age                          │              ┌──────────────────────────────────────┐
│ 3. Education level              │              │ Engagement with The Organization of  │
│ 4. Income level                 │──────┐       │ Military Officials Under the Infantry │
│ 5. Position                     │      └──────▶│ Center, Royal Thai Army              │
└─────────────────────────────────┘              │ 1. Integrity to the organization     │
                                                 │ 2. Unity in the organization         │
┌─────────────────────────────────────┐          │ 3. Loyalty in the organization       │
│ Factors Influencing Organization     │          │ 4. Dedication to work                │
│ Engagement                           │──────────▶                                      │
│ 1. Organizational Culture            │          └──────────────────────────────────────┘
│ 2. Organizational Leadership         │
│ 3. Motivation for Government Service │
│ 4. Happiness in Government Service   │
└─────────────────────────────────────┘
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Diagram 1 Conceptual Framework

3.3 Research hypothesis

Organizational culture factor, organizational leadership, motivation in the performance of government service, and happiness in government service influence engagement organizational of military officials under the Royal Thai Army Infantry Center.

4. Research methodology

4.1 Research design

This research was quantitative research using questionnaires to collect data.

4.2 Population and samples

The population in this research was 3,598 military personnel under the Royal Thai Army Infantry Center (Infantry Center, 2021) and the sample group is 360 military personnel under the Royal Thai Army Infantry Center were obtained from the sample group calculation formula. of Taro Yamane (Yamane, 1970) at 95 percent confidence and using a stratified random sampling method.

4.3 Research instruments

The tool for this research was a questionnaire consisting of 3 parts as follows:

Part 1: The respondents' personal factors questionnaire included gender, age, education level, income level, and job position. The questionnaire was a multiple choice.

Part 2: The second part of the questionnaire on factors influencing engagement organizational is organizational culture, organizational leadership, motivation in the performance of the government service, and happiness in the performance of the civil service. The questionnaire was based on a rating scale of 5 levels, Very

good, Good, Fair, Poor, Very poor. The scoring criteria are as follows: Very good = 5 points, Good = 4 points, Fair = 3 points, Poor = 2 points and Very poor = 1 point.

Part 3: Engagement Organizational Questionnaire of Military Officers of the Royal Thai Army Infantry Center. The questionnaire was based on a rating scale of 5 levels, Very good, Good, Fair, Poor, Very poor. The scoring criteria are as follows: Very good = 5 points, Good = 4 points, Fair = 3 points, Poor = 2 points and Very poor = 1 point.

4.4 Data collection

The researcher conducted the data collection according to the following steps:

1. The researcher requested a letter from the Graduate School. Suan Sunandha Rajabhat University and contacted the commander of the Royal Thai Armed Forces for assistance in collecting information with the infantry officers.

2. The researcher conducted the data collection by himself. The researcher received the questionnaire back after the respondents filled out the information.

3. The returned questionnaires were taken for integrity checks for data analysis.

4.5 Data analysis

1. The personal factors of the respondents classified by gender, age, educational level, income level, and job position. Frequency and percentage

2. Information on engagement organizational of military officials under the Royal Thai Army Infantry Center and factors affecting engagement organizational. The mean and standard deviation were analyzed. Decision Criteria and Consideration Criteria. The researcher determined the interpretation of employee feedback scores. It is divided into 5 levels and uses a 5-level estimation scale as follows:

Average score 4.21 – 5.00 Very good

Average score 3.41 – 4.20 Good

Average score 2.61 – 3.40 Fair

Average score 1.81 – 2.60 Poor

Average score 1.00 –1.80 Very poor

3. Multiple regression analysis by using enter method to determine the influence of factors influencing engagement organizational of military officers under the Royal Thai Army Infantry Center by determining the statistical significance at the 0.05 level.

5. Data conclusion

1. Most of the respondents were male, 86.01 percent. Age 31‐40 years or 58.32%. 64.13% of respondents had a bachelor's degree. Income level 20,001‐30,000 baht and job position of non‐commissioned police officer 69.83 percent.

2. Factors influencing organizational engagement are of high importance ($\overline{X}$=3.96, S.D.=0.54). When each aspect was considered, it was discovered that the leadership aspect had the highest average ($\overline{X}$=4.03,

S.D.=0.50). Following with organizational culture ($\overline{X}$=4.00, S.D.=0.50) happiness in government service ($\overline{X}$=3.92, S.D.=0.53）and motivation for government service （$\overline{X}$=3.92, S.D.=0.53) respectively, with details in Table 1.

Table 1 Mean and Standard Deviation of Factors Influencing Organizational Engagement

Field	Name List	$\overline{X}$	S.D.	Result
1.	Organizational culture	4.00	0.42	Good
2.	Organizational Leadership	4.03	0.50	Good
3.	Motivation for Government Service	3.89	0.52	Good
4.	Happiness in government service	3.92	0.53	Good
	Total	3.96	0.54	Good

3. The engagement organizational of military officials under the Royal Thai Army Infantry Center was at a high level ($\overline{X}$=4.00, S.D.=0.50). When considering each aspect, it was found that the honesty to the organization was the highest average ($\overline{X}$=4.02, S.D.=0.48). Followed by unity in the organization ($\overline{X}$=3.98, S.D.=0.54), loyalty in the organization ($\overline{X}$=3.95, S.D.=0.50), and dedication to work ($\overline{X}$=3.92, S.D.=0.51) respectively, as detailed in Table 2.

Table 2 The Mean and Standard Deviation of the engagement with The Organization of Military Officials Under the Infantry Center, Royal Thai Army.

Field	Name List	$\overline{X}$	S.D.	Result
1.	Integrity to the organization	4.02	0.48	Good
2.	Unity in the organization	3.98	0.54	Good
3.	Loyalty in the organization	3.95	0.50	Good
4.	Dedication to work	3.92	0.51	Good
	Total	4.00	0.50	Good

4. The results of the study revealed that organizational culture factors, organizational leadership, motivation for government service, and happiness in government service are influence on the engagement organizational of military officials under the Royal Thai Army Infantry Center by 73.11%. Follow details in Table 3.

Table 3 The results of multi factorial regression analysis on organizational engagement

Factor	Unstandardized (b)	SE	Standardized (β)	t	Sig.
Constant Value	1.121	0.106		10.632	0.000
Organizational culture	0.043	0.021	0.317	7.865*	0.000
Organizational Leadership	0.092	0.042	0.142	2.402*	0.007
Motivation for Government Service	0.068	0.035	0.132	2.485*	0.005
Happiness in Government Service	0.142	0.025	0.235	4.132*	0.000
R = 0.782	Adjusted R^2 = 0.731				
R^2 = 0.730	SE = 0.162				

* Statistical significance at the 0.05 level

6. Summary and Discussion

(1) Engagement organizational of military officials under the Infantry Center, The Royal Thai Army is at a high level. When considering each aspect, it was found that the honesty to the organization was the highest average. Followed by unity in the organization, loyalty in the organization, and the dedication to work, respectively. This is because the military officials are organizations that promote love and unity among the ranks, with the same practice, thus creating more love and engage to the organization. The study is consistent with the research results of Thitima Lakthong (2018) studied the relationship with the engagement organization of the company's employees, one of the automotive industry parts manufacturers in Amata Nakorn Industrial Estate, Chonburi province. The results showed that the engagement organizational of employees of an automotive parts manufacturing company in Amata Nakorn Industrial Estate, Chonburi Province at a high level.

(2) Organizational culture factor, organizational leadership, motivation for government service, and happiness in government service are affecting the engagement organizational of military officials under the Royal Thai Army Infantry Center. This may be due to the agency and the commander in the infantry center have activities and projects to enhance organizational values, allowing military officials to learn about organizational culture. The supervisor has leadership in leading the organization to the goals set. As well as enhancing motivation and happiness in working for subordinates which the study results are consistent with the research results of Wararak Leelertphan (2017) studied the factors affecting the engagement organizational of the staff of the programming department and the advertising department of Nation Broadcasting Corporation Public Company Limited. Factors of organizational culture, leadership, motivation, and happiness at work affect employee engagement.

7. Suggestion

7.1 Suggestions for applying the research results

(1) The agency and the commander in the infantry center should support and organize activities for the subordinates to perform their duties with strict honesty to the organization.

(2) The agency and the commander in the infantry center should have activities to strengthen love, unity among the group, such as party activities sporting events, etc.

(3) The agency and the commander in the infantry center should encourage civil servants to be more loyal to the organization.

(4) The agency and commanding officers under the Infantry Center should promote and develop military personnel to have the capacity to work to be dedicated to working according to their own knowledge and abilities even more.

7.2 Suggestion for further work

The next study should be a combination of both qualitative studies. In-depth interviews were conducted with supervisors who were responsible for promoting organizational engagement to gain insights to enhance organizational engagement as efficiently as possible.

8. References

Allen, N. J. , & Meyer, J. P. (1990). The measurement and antecedents of affective, continuance, And normative commitment to the organization. *Journal Of Occupational Psychology*, *63*(10),1-18.

Asbari, M., Purwanto, A., & Santoso, P. B. (2019). Influence of Leadership, Motivation, Competence,Commitment and Culture on ISO 9001:2015 Performance in Packaging Industry. *Scholars Journal of Economics, Business and Management*, *8*(5), 577–582.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. W H Freeman/Times Books/ Henry Holt & Co.

Beshlideh, K., Sharifi, R., Hashemi, S. E., & Naami, A. (2018). Testing a model of perceived organizational support, citizenship behavior, commitment, job satisfaction and leader-member exchange as concequences of servant leadership in cement factory employees in Kermanshah. International. *Journal of Psychology (IPA), 12*(2), 86 -96.

Cheah, C. S., Pee, V. S. W. C., Yeo, S. F., & Wei, K. (2016*). An Empirical Study on Factors Affecting Organizational Commitment Among Generation X*. Procedia - Social and Behavioral Sciences.

Mahal, P.K. (2012). HR practices as determinants of organizational commitment and employee retention. *IUP Journal of Management Research*, *11*(4), 37-53.

Nithat Sirichotirat. (2016). *Principles of human resource management in the 21st century.* 2nd printing. Bangkok: Chulalongkorn University Press.

Office of the National Economic and Social Development Board. (2017). *The 12th National Economic and Social Development Plan (2017 - 2021)*. Bangkok.

Phichit Pitakthepsombat, Parichart Pongchaisri and Chichaya Changrian. (2009). *Research report on happiness of Thai people in rural areas.* Faculty of Public Administration, National Institute of Development Administration.

Porter, McGrath, Davenport & Iansiti. (2021). *HBR's 10 Must Reads on Leading Digital Transformation*. New York: Catalyst.

Prime Minister's Office. *Cabinet policy statement.* Cabinet Publishing and Government Gazette. Bangkok. September 2017.

Singh, A. K., Singh, A. P., Kumar, S., & Gupta, V. K. (2015). Role of perceived organizational support in the relationship between role overload and organizational citizenship behavior. *Journal of the Indian Academy of Applied Psychology*, *41*(1), 77-85.

Steers, R. M. (1977). Antecedents and outcomes of organizational commitment. Administrative Science Quarterly*, 22*(1), 46–56.

Suchart Adulbutr. (2018). Organizational commitment of employees and employees of the Veterans Affairs Organization. *Kasem Bundit Journal, 1*(19), 201-212.

Thitima Lakthong. (2018). *Organizational commitment of employees of an automotive parts manufacturing company in Amata Nakorn Industrial Estate.* Master of Public Administration in Public and Private Sector Management Burapha University.

Wararak Leelertphan. (2017). *Factors Affecting Organization Engagement of Programming and Advertising Employees of Nation Broadcasting Company Corporation Public Company Limited.* Master of Business Administration Nation University.

Yanee Lertkrai. (2013). *The creator of happiness, the organization of the mechanism of happiness.* Bangkok: social research institute Chulalongkorn University.

THE ROLE OF ICT IN URBAN DEVELOPMENT AND ITS IMPACT ON MENTAL HEALTH: THAILAND CONTEXT

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ABSTRACT

The objectives of this article are to present the role of ICT in urban development, its impact on working life and way of life of urban dwellers, to explain the relationships between urbanization and economic growth, and to explore the impact of heavy use of ICT in urban area on the mental health. The urbanization trend has been accelerated since the 20th century. Urbanization in Thailand has proceeded after World War II with a relatively modest annual growth rate of 2.0%. ICT potentially plays an important part in achieving sustainable urban development. Governments of many countries including Thailand are taking the lead in developing the next generation of cities: smart cities driven by technological solutions. Urbanization and economic growth are very much related to each other. It brings new opportunities and challenges for sustainable development. However, urbanization has given rise to major health issues. Physically and mentally, the urbanites are becoming the sufferers due to various environmental degradation, pollution, fast-living culture, etc. Unemployment and economic conditions can lead to an increase in mental disorder. The technology access variable had a positive effect on mental disorder. In Thailand, the growing addiction to social media has left many users stressed and less patient. Youngsters are also addicted to internet games. Youngsters who spend a lot of time on the internet tend to perform poorly at school. Video game addiction is a mental health disorder.

Keywords: Urbanization, ICT, Economic Growth, Urbanites, Mental Disorder

1. Introduction

By 2030, according to the projections of the United Nations (UN), each of the major regions of the developing world will hold more urban than rural dwellers; by 2050 fully two-thirds of their inhabitants are likely to live in urban areas. Thailand has shifted from 36 percent urban to almost 50 percent urban, which means that half of the population now lives in cities and urban areas. In 2020, 51.8% of Thailand's population lives in urban

centers, while 48.2% lives in rural areas. With the Bangkok urban area accounting for nearly 80% of the total urban area in Thailand, urbanization is dominated by Bangkok (Statista Research Department, 2022).

Significant investments are required to meet urbanization demands. Global spending on urban development and building infrastructure is expected to grow. The role of Information Communication Technologies (ICTs) is recognized by businesses and government in meeting the goals of urban infrastructure provisioning. In previous centuries, urban development was evident in industrial infrastructure such as railways, roads, and telephone lines, preparing the way for new cities and new connections. This century's urbanization is based on the integrated management of the economic, social, and infrastructure aspects of urbanization via the use of networked information. Governments of many countries are developing the future cities driven by technological solutions.

However, there is still controversy in the literature about the exact association between health and information and communication technology (ICT), with some evidence suggesting links between ICT usage and health problems (Berg-Beckhoff et al., 2017). Symptoms of mental overload among ICT users has been reported (Bondanini et al., 2020), for example. Fatigue has been linked the condition involving a strong and persistent form of mental and/or physical tiredness, pain, weakness, exhaustion, and inability to concentrate (Sumanth, 2021).

2. Objectives

The objectives of this article are

1. To present the role of ICT in urban development, its impact on working life and way of life of urban dwellers.

2. To explain the relationships between urbanization and economic growth.

3. To explore the impact of heavy use of ICT in urban area on the mental health

3. Urban Societies in Transition

Most countries have tendency to develop the city as the center of government and business, rather than developing rural areas. As a result, the urban areas are equipped with infrastructure, public facilities and offer more job opportunities compared to the rural areas. This situation has attracted more people from rural areas to migrate and live in the city to get a job to improve their lives and eventually leads to many urbanization issues.

Significant social changes are also taking place in the urban areas. Urban societies are becoming more diverse and complex, with greater regional connectivity set to accelerate this process. Those cities able to harness social transformation, in creating open, tolerant, and inclusive societies, are more likely to benefit and progress. Despite the many and varied reasons for rapid urban growth, all growing cities face similar challenges of having to quickly adjust and develop solutions to rising housing, transportation, and basic services demand (United Nations, 2015). Their role in economic development has driven and benefitted from integration, large-scale investment, and employment generation. This has lifted millions of people out of poverty, forged growing middle

classes and transformed the urban physical landscape. Estimates of the contribution of cities to the GDP demonstrate their economic importance, as well as the relatively high productivity of urban populations. For example, in South-East Asia, cities contribute 48 percent of national GDP, while representing only 21 percent of the population. The dominant and growing importance of cities to economic performance is evident across the Asia and Pacific region. (United Nations, 2015).

4. Urban Development in Thailand

Urban growth in Thailand is dominated by the Bangkok urban area, which was the fifth largest in East Asia in terms of area and the ninth largest in terms of its population. Urbanization in Thailand, as in many other developing countries, has proceeded rapidly after World War II, but growth has been highly uneven with a relatively modest annual growth rate of 2.0% (World Bank, 2015).

The Bangkok Metropolitan Area and its vicinity, Samut Prakan and Nonthaburi, remains the dominant and only major urban center in the country. Like most large urban areas in the region, Bangkok is administratively fragmented, with more than 60% of the urban area located outside the boundaries of the Bangkok Metropolitan Administration. Demographic expansion and economic development in Thailand are concentrated in and around the capital Bangkok. The Bangkok Metropolitan Region (BMR) is host to almost half of the urban population. When the Eastern Seaboard, the area adjoining the metropolitan region, is included, the combined area would account for nearly 80 per cent of the country's urban population (World Bank, 2015).

At present, BMR is facing with the issues and problems concerning environment, social, transportation, economy, and many others. These issues which frequently occurred in developing countries are mainly caused by the discrepancy of development in cities and villages. This imbalanced development between the urban and rural areas is believed to cause some economic and social problems.

5. Information Communications Technology (ICT) and Urban Development

The process of urbanization and the rapid application of information and communications technology are interrelated. Society depends more and more on ICT for many of its activities. There is a need to make ICT infrastructure an essential component of city development. The cities of the future will require information management, knowledge workers, and telecommunications infrastructure. Multiple service providers for data and telecommunications are important. ICT is not a remedy for all the problems that the country faces, but ICT can certainly act as a catalyst in the social and economic development process (Harter et al., 2010).

ICT has been affecting cities and the spatial arrangements of activities within cities. City boundaries are no longer physical; rather communications technology defines the extent of a city. It is the conventional telephone networks, cable networks, mobile telephone, Internet, satellite communication systems and data and video networks that are creating extensible information highways. Newer ways of working and changes in nature of jobs to information intensive services and knowledge economies demand investment in ICT infrastructure and the 24×7 availability of connectivity. Mobile technologies and the easy availability of mobile devices imply that

the potential to do business, interact and learn is no longer to be limited to a place and a time. The immediate need for cities in developing countries is to provide adequate urban infrastructure to meet the increasing pace of urbanization. One of the key value propositions of ICT in a smart city is the ability to capture and share information in a timely manner. If the information is provided in real time and is accurate, sustainable urban development could be achieved.

ICT was supposed to free people from the constraints of place. With everyone wired digitally, we could work from anywhere. However, this did not happen. What is found today is that creative, highly educated, and skilled workers are moving to the cities. People are choosing cities that suit their lifestyles. The standard of living has been better in urban than rural areas. With high levels of infrastructure coupled with better access to information networks, living in the cities has improved the lives of the people (Mansi, 2013).

During the 2019 ASEAN Summit, Thailand introduced the Eastern Economic Corridor (EEC) initiative to transform Thai provinces into smart cities with the aim to create a center for trade, investment, regional transportation, and a strategic gateway to Asia. The focus on smart cities is a core pillar of the government's Thailand 4.0 initiative which aims to transform the kingdom into a high-income nation with vastly improved quality of life in urban centers. Seven provinces have been committed to pursuing smart city development. They include those in Phuket, Chiang Mai, Khon Kaen, Chon Buri, Rayong, Bangkok, and Chachoengsao. Recently, the Thai government decided to participate in the Smart Green ASEAN Cities project jointly coordinated by the European Union (EU) and ASEAN. The project's framework aims to support sustainable urbanization in the region, reduce the environmental footprint of urban areas and improve the quality of life of residents (Iamtrakul & Klaylee, 2019).

6. Urbanization and Economic Growth

The benefits from the growth of big cities are already well known, greater employment opportunities, higher wages and salaries, a lower cost of living owing to scale economies, higher productive capacities owing to spatial agglomeration, more and better social services, more varied cultural and spiritual opportunities, and so on. Economic growth and urbanization are closely related to each other. Mansi (2013) suggested that economic growth and urbanization have an element of dual causality, that is urbanization can cause economic development, and yet, without economic progress there may not be urbanization. Urbanized areas have become the hub of socioeconomic activities.

It is well known that urbanization provides several advantages to the economics of scale and division of labor, boosting productivity and competition. It helps in accessing the labor force and input materials to the production process, decreasing the geographical distance between firms, reducing transaction costs, and fostering competition. These urbanization advantages, investment in infrastructures and market structure, are intangible attributes and capabilities that a country needs to drive economic growth and innovation (The ASEAN Post Team, 2021). It could be concluded that urbanization leads to productivity gains, which are enabled by new technologies, the globalization of information and technology and to the liberalization of world trade and capital markets.

Nguyen & Nguyen (2018) found that urbanization positively impacts economic growth. However, the relationship between urbanization and economic growth is non-linear. The urbanization reaches a threshold after which it may impede the economic growth.

Thailand with a GDP of 16.316 trillion baht (US$505 billion) in 2018, the 8th largest economy of Asia, according to World Bank. National income statistics from the NESDB have shown that Bangkok and its vicinity has GDP per capita of 435,356 baht, the highest in the country, was about 5 times that of the northeast region 86,233 baht. National income statistics from the NESDB have shown that, with only 24.4 percent of total population in 2020, Bangkok and its vicinity generated 47.5 per cent of the gross domestic product. Its GDP per capita was about 5.6 times that of the northeast region. In addition, the GDP per capital in the BMR was 1.97 times higher than the national average of 228,398 baht (Statista Research Department, 2022).

Thailand is planning to build a $37 billion smart city in an industrial hub near Bangkok that's already drawn billions of dollars of investment pledge; it is set to draw investments of about 2.2 trillion baht over the next 5 years. The project will comprise five business centers for companies to rent as commercial areas including a hub to house regional headquarters of firms, a financial center, and areas for precision medicine, international research and development, and future industries such as clean energy and 5G technology (Statista Research Department, 2022).

7. Urbanized Daily Life and Work Life

Extensive use of ICT and digital transformation result in significant changes in urbanites' daily life and in workplace. With the rapid development of mobile technology and smart devices, internet, social media, and instant messaging have penetrated people's daily life. These tools can be used for socializing, entertainment, self-promotion, communication, and information seeking by almost anyone, anywhere, at any time. Attracted by their prevalence and convenience, ICTs are now becoming an indispensable part of urban life. The growth of technology has affected urbanites' work and influenced the way they communicate and interact. Work is no longer bound to a certain time or place, and this is expected to have negative consequences on workers' mental health: stress, anxiety, depression.

ICT influences urban dwellers psychologically and/or socially. ICT-related factors help describe individuals in relation to their social environment and how these affect physical and mental health. Although ICT improves productivity and communication possibilities, it creates adaptation demands on the person and the tasks performed. Intensive use of ICT requires more work time and work speed, enhances multi-tasking, and causes disturbances to working routines and over exposure to information, which cause anxiety and frustration that potentially leads to burnout over time.

Psychosocial consequences emerging from the use of ICT are often described as technostress, defined as one's discomposure, fear, tenseness, and anxiety when learning and using computer technology directly or indirectly, ultimately resulting in psychological and emotional problems (Ushu & Wang, 2011). Technostress is commonly described in association with an individual's role in the workplace and the tasks the individual is

assigned to perform with technology as part of that role (Bondanini et al., 2020). Technostress occurs when an individual has a negative evaluation of their experience when carrying out tasks using technology at work. Technostress may be described as ineffective coping with technology that results in distress. Use of ICT, such as cell phones, voice mail, e-mail, and instant messaging, can challenge employees by creating a range of stressors, including overload, role ambiguity, and job insecurity.

8. The Impact on Mental Health

The outcomes of urbanization have been a complex mix. Urban areas are centers for economic growth, businesses, and employment opportunities; standards of living are increasing. However, aspects of the physical and social environment are degrading, water availability and quality, air and water pollution, slum housing, traffic congestion, for instance. Nevertheless, this paper focuses the impact of urbanization and ICT on the psychological aspects. Cities are pools of inequality, injustice, crime, violence, poverty, and social disintegration. The movement of people to urban area needs more facilities to be made available and infrastructure to grow. Lack of adequate infrastructure increases the risk of poverty and exposure to environmental adversities. As the number of nuclear families increases, the social support decreases. Poor people experience environmental and psychological adversity that increases their vulnerability to mental disorders. Social problems, such as stress, grief and loss, and other adverse situations resulting in a lack of confidence, are also causes of depression. Moreover, income inequality was also found to be associated with other mental problems, such as thoughts of and attempts at suicide.

The explosion of Internet, emails, e-marketing introduce new phenomenon such as receiving too much information. In this regard, information becomes ineffective, resulting in difficulties to process the message and confusion in the mind of the recipient. This results in psychological stress. Cyberbullying can be done via email, web pages, and by mobile phone, and includes misuse of picture taking. Cyberbullying victims were reported of mental diseases: stress, depression, anxiety, for instance. Mental diseases and mental instability are a typical urban phenomenon as instability and insecurity of life.

When considering mental health of urbanized work life, ICT forces users to work faster and longer. Employees potentially can be reached anytime, thus enhancing the feeling for employees to be constantly connected. The employees feel threatened about possible job loss as a result of a new ICT or better ICT trained staff replacing them. the complexity associated with ICT makes employees feel inadequate in relation to their skills and forces them to spend time and effort to learn various aspects of ICT. Continuous changes and upgrades in ICT unsettle users and creates uncertainty, which results in their having to constantly educate themselves. Sumanth & Hiremath (2021) mentioned that the psychosocial consequences may result in anxiety disorders, frustration, job dissatisfaction, and low job performance, and may develop into burnout and mental health problems.

Video games are the most popular form of media entertainment. They have been the subject of frequent controversy and censorship, due to the depiction of graphic violence, sexual themes, consumption of illegal drugs

or alcohol in some games. Video games have been accused of causing addiction and even violent behavior. The excessive use of video games makes it more damaging effects on a young mind. Some video game players have disturbed their studies and health by playing the video games for many hours. Human psychology has relation with video games and becoming an addictive person is one such behavior of human mind. Getting the inner desires of doing violent things, which is not possible in real life is also part of such addiction (Ahmed, & Ullah, 2013). The Radio and Media Association for Children and Youth (RMACY) studied 3,056 Thais aged between 15 and 18 and found that during weekends and holidays, 32.6 percent of respondents spent three to five hours a day playing online games. Adolescents in Bangkok played the longest – more than eight hours a day on weekends (Khidhir, 2020).

Citing statistics on Thai people's use of the internet, Dr. Kiatiphum Wongrajit, Director-General of the Department of Mental Health said 82% of the population or 57 million Thais have daily access to the internet. Of them, 51 million regularly engage with social media. Daily usage of the internet per person often exceeds nine hours, he said. Dr Kiatiphum said growing addiction to social media has left many users stressed and less patient. Youngsters are also addicted to internet games. Youngsters who spend a lot of time on the internet tend to perform poorly at school, resulting in them being reprimanded by their parents, which builds stress (The ASEAN Post Team, 2021).

Lerskullawat & Puttitanun (2020) used secondary data of mental disorder cases in all 77 provinces in Thailand during the period 2015 to 2017, which were collected from the Department of Mental Health, Thailand. They found that the technology access had a significantly positive effect on mental disorder rates. This is possibly due to the fact that when people spend too much time on the internet, use it excessively for work, or become addicted to social networks, in the process receiving wrong information, or being bullied on social media, they can suffer negative impacts. This can therefore increase their stress levels, leading to higher mental disorder rates.

9. Conclusion

As countries become more reliant on manufacturing and services and less on agriculture, urban areas are more to become important hub for innovation and trading. In addition, urban areas are human capital accumulation. Governments of many countries including Thailand are developing the next generation of cities, smart cities, driven by ICT solutions. ICT influences every area of our lives; technology has opened links for individuals to readily access information, help and support. However, there are significant risks associated with its increased usage. We have also seen several negative effects of technology on mental health. Internet addiction, particularly among teenagers, is becoming a widespread issue. It has been linked to depression, low self-esteem, and loneliness – symptoms that often lead to diagnosable mental illnesses. The passive use of social media sites, such as Instagram, Twitter, and Facebook, is specifically linked to being a risk factor for increased levels of depression. Additionally, in working age population ICT use forces employees to accomplish more tasks in less time, results in the elimination of manual jobs, and affects relationships with colleagues, leading to stress. Hence, there is a need to spread awareness about the mental illnesses across the society.

10. Suggestions

Urbanization and economic growth have had a strong correlation. However, the mere presence of so many people in a concentrated area could not result in economic growth and increased quality of life. The city administrators and policy makers should improve infrastructure, employment, and professional cooperation. Investment in infrastructure could help create economic opportunities for urban development and make urbanization and economic growth synonymous. Urban investments in infrastructure including ICT can enable the designing of smarter cities that offer a better quality of life for urbanites while being more sustainable and cost efficient.

However, the other side of the coin that administrators should be aware of mental disorders could also be caused by the economic and social factors associated with living in urban areas. Economic and social conditions together with living standards in urban areas are possible factors which result in mental disorders. Income inequality normally found in urban areas was a factor leading to depression. Social problems, such as unequal opportunity, social inequality, and ICT related social problems: privacy, cyberbully and fraud are also causes of depression.

11. References

Ahmed, U. & Ullah, I. (2013). *Video Games Addiction: Positive and Negative Effects of Playing Video Games on Youth and Children*. Retrieved from https://www.diva-portal.org/smash/get/diva2:1309141/FULLTEXT01.pdf.

Berg-Beckhoff, G., Nielsen, G. & Larsen, E. (2017). Use of information communication technology and stress, burnout, and mental health in older, middle-aged, and younger workers – results from a systematic review. *International Journal of Occupational and Environmental Health. 23*(2), 160-171. https://doi.org/10.1080/10773525.2018.1436015.

Bondanini, Giorgia et al. (2020). Technostress Dark Side of Technology in the Workplace: A Scientometric Analysis. *International Journal of Environonmental Research and Public Health, 17*(8013), 2-23. doi:10.3390/ijerph17218013.

Harter, G., Sinha, J., Sharma, A. & Dave, S. (2010). *Sustainable Urbanization: The Role of ICT in City Development.* Booz & Company. www.booz.com.

Iamtrakul, P. & Klaylee, J. (2019). Lesson Learns of Success factors from 10 Smart Cities Development: Thailand Context. *IEEE Xplore.* Conference: 2019 First International Conference on Smart Technology & Urban Development (STUD). DOI:10.1109/STUD49732.2019.9018765.

Khidhir, S. (2020). *Gaming: The latest Thai addiction.* Retrieved from https://theaseanpost.com/article/gaming-latest-thai-addiction.

Lerskullawat, A. & Puttitanun, T. (2020). *Economic Conditions and Mental Health in Thailand.* Research Square. https://orcid.org/0000-0003-1301-0892

Mansi Bosamia. (2013). *Positive and Negative Impacts of Information and Communication Technology in our Everyday Life*. International Conference On "Disciplinary and Interdisciplinary Approaches to Knowledge Creation in Higher Education: CANADA & INDIA (GENESIS 2013)", At: Swami Sahajanand Group of Colleges, Bhavnagar. https://www.researchgate.net/publication/325570282_Positive_and_Negative_Impacts_of_Information_and_Communication_Technology_in_our_Everyday_Life.

Nguyen, H.M. and Nguyen, L.D. (2018), "The relationship between urbanization and economic growth: An empirical study on ASEAN countries", *International Journal of Social Economics, 45*(2), pp. 316-339. https://doi.org/10.1108/IJSE-12-2016-0358)

Shu Q, Tu Q, Wang K. (2011). The impact of computer self-efficacy and technology dependence on computer-related technostress: a social cognitive theory perspective. *International Journal Human-Computer Interact, 27*(10), p.923–939.

Statista Research Department. (2022). *Share of the urban population in Thailand from 2010 to 2021.* Retrieved on Jan 13, 2022. https://www.statista.com/statistics/761131/share-of-urban-population-thailand/

Sumanth S. Hiremath. (2021). Impact of Urbanisation on Mental Health: A Critical Appraisal. *Journal of Alzheimer's Parkinsonism & Dementia, 5*(1), 1-4.

The ASEAN Post Team. (2021). Retrieved on 24 January 2021 https://theaseanpost.com/article/developing-thailands-smart-cities

The World Bank. (2015). *Urbanization in Thailand is dominated by the Bangkok urban area.* https://www.worldbank.org/en/news/feature/2015/01/26/urbanization-in-thailand-is-dominated-by-the-bangkok-urban-area.

United Nations. (2015). *The Millennium Development Goals Report 2015.* United Nations, New York.

DEVELOPMENT OF A LIVEABLE CITY IN CHIANG MAI PROVINCE: PERSPECTIVES OF LOCAL GOVERNMENT OFFICIALS

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ABSTRACT

This research aims to 1) study the perspectives of local government officials on the level of development of a liveable city in Chiang Mai Province. 2) study the perspectives of local government officials on the factors influencing the development of a liveable city in Chiang Mai Province. A questionnaire was used as a tool to collect data from the administrations of the local administrative organizations in Chiang Mai province, amounting to 400 people. The statistics used in the data analysis were mean, standard deviation, and multiple regression analysis. The results showed that 1) the perspectives of local government officials on the development of a liveable city in Chiang Mai Province is at a high level. When considering each aspect, it was found that basic utilities had the highest average. Followed by recreational facilities, environmental scenery, and pollution and waste management, respectively. 2) executive leadership factors, government policies, motivation enhancement and public participation affecting the perspectives of local government officials on the development of a liveable city in Chiang Mai Province.

Keyword: Liveable City, Local Government Officials

1. Introduction

Currently, Thailand faces an ecological vulnerability of cities because of the undisciplined urbanization and economic development of the country with the adoption of modern technology in livelihoods and occupations in the process. The production and consumption patterns of the people have changed, the use of limited resources is lavish, which is a major cause of environmental destruction both quantitatively and qualitatively until the environment deteriorates without discipline affects overall public health. As a result of the above problems, all countries around the world have turned to focus on the development of new urban developments and industries, along with the development of liveable cities by emphasizing on the development of the population, resources, natural environment of the community of each area. As well as the development of other built environments,

artistic and cultural resources, which is the application of traditional knowledge and science. Modern applications to blend in, especially focusing on the efficient use of natural resources, support the process of rehabilitation and development of degraded resources to recover and replace, provide for the conservation of the appropriate environment. By enhancing people's consciousness to love, cherish, and maintain good traditional arts and culture to remain as unique for each locality in a sustainable way. In addition, the locals are involved in the development process to enhance their own potential, helping to be immune to the pressures of Western culture and technology that influence changes affecting various aspects of Thai society all the time. The result of the new organization of the world society in terms of trade and technology with a strategic framework for a sustainable city. (Pridi Buranasiri, 2017, pp. 52 – 57)

Thailand has initiated projects and policies for liveable cities - liveable communities which have been approved by the Cabinet on 25 April 2000 in accordance with the provisions of the Constitution of the Kingdom of Thailand BE 2540 in Article 76 which stipulates that The State must promote and support the participation of the people in formulating the policy framework for social and economic development planning. Including the examination of the use of state power at all levels, it is a good opportunity to listen to the ideas and needs of the people in each area, to play a role as a stakeholder and to directly receive the results of development. The 9th Social and Economic Development Plan focuses on the development of liveable cities and liveable communities with the following key issues: 1) strengthening of families and communities, as well as promoting the integration of the community, having a community at all levels, and being connected as a network. 2) promoting the process of participation in the development of urban and rural communities for liveable, healthy, and safe environments. 3) There must be planning for area development and urban planning that is appropriate, efficient, and practical with the participation of the community. 4) improve and develop urban and community environments to have a good environmental management system, using motivation and legal measures in parallel. 5) Campaign and create awareness for children, youth, and people in the community to love and have local ownership, to take part in caring for the environment and using local resources. 6) improving the quality of life, emphasizing the efficiency of providing adequate and thorough health care services, ensuring the safety of life and property and the development of public utilities in urban and rural communities. 7) have a good, efficient management system, focus on decentralization and decentralization of budgets to the localities and communities for urban development and quality of life management in accordance with the needs and the real environment in the area; and 8) there is a determination and development of concrete and abstract tools to measure and come to liveable communities and under the 12th National Economic and Social Development Plan under Strategy 9, which focuses on the distribution of prosperity and the uplift of people's income and reducing the distribution of development in Bangkok, the central and the eastern regions to other regions of the country. It turns out that the development has not been as successful as it should be. Therefore, in (draft) the 13th National Economic and Social Development Plan, Thailand has been given importance to areas and smart cities that are liveable, safe, and capable of growing. Sustainability to empower local communities to develop self-reliance and self-management to create a quality society and a strategy of building growth based on environmentally friendly quality of life in the goal, utilization

and growth based on Balance natural resources and the environment within the capacity of the ecosystem. (Office of the National Economic and Social Development Council, 2021)

Chiang Mai is the second largest city in Thailand after Bangkok in year 2018, the Ministry of Culture pushed Chiang Mai to be the most liveable city in the world. The government places importance on working local culture to people by emphasizing on bringing cultural heritage in each region to generate income for tourism, goods, and services, and create new things for future costs. The province must find the identity of the city and create a means of driving to generate local income. Recently, it has accelerated the operation powered by Chiang Mai Province. Besides being the northern capital of Thailand in terms of arts and culture, it is also a city of creative arts and culture, ready to maintain the potential of the city, find a way to prevent destruction in parallel with the development of increasing the number of tourists. As well as being prepared to push into a world heritage city, including temples, ancient sites, architecture, arts, crafts, food, and culture. Distinctive traditions and promote Chiang Mai as the most liveable city in the world and as a hub for Lanna tourism as soon as possible. There is a survey and action plan driven through civil society to agree with all parties. (Ministry of Culture, 2018)

The role in making the city liveable local government organizations, whether they are provincial administrative organizations, municipalities, sub-district administrative organizations or special administrative districts such as Bangkok. and Pattaya City. It is considered the most important pillar in playing a role in making the city liveable now and in the future. Because local governments have roles, duties, and responsibilities in accordance with the laws provided for in economic, social, environmental development in every aspect in the scope of all local governments and supported by the conditions in the Constitution, Municipal Act, Act establishing the distribution process, power, etc. In addition to the responsibilities and legal duties that are important conditions that the local government organization is the main pillar, in terms of politics, these administrators and councils of local government organizations are elected by the representative democracy. There is a righteousness to act to make such a liveable city. (Department of Health, 2018)

The National Urban Development Board has established a framework for liveable city development and liveable communities to serve as an example and to help foster the idea of developing liveable cities or liveable communities in which each city or community can be applied as appropriate and may be developed into a new liveable city development concept or liveable community. (Office of the National Urban Development Board, 2018)

From the importance of liveable cities above. The researcher, as an executive under the jurisdiction of the local government organization in Chiang Mai, where Chiang Mai is a world heritage city, including temples, ancient sites, architecture, arts, and crafts, as well as food, culture, traditions are outstanding, there are many tourists traveling and visits each year. Therefore, the importance of developing a liveable city or community in Chiang Mai that requires leadership factors of local administrative organizations, government policies, strengthening motivations, and public participation. Therefore, interested in studying the subject "Development of a liveable city in Chiang Mai Province: Perspectives of local government officials" to apply the findings from

the study to the local government organizations as a guideline in formulating policies for developing liveable cities to be more sustainable in Chiang Mai in the future.

2. Objectives

(1) Study the perspectives of local government officials on the level of development of a liveable city in Chiang Mai Province.

(2) Study the perspectives of local government officials on the factors influencing the development of a liveable city in Chiang Mai Province.

3. Literature review

3.1 Theory and related research

Concepts and theories related to liveable cities

A liveable city is a process that makes people realize the importance of physical, mental, and social health. People are ready to work together to create a suitable environment for living both physically and socially. Including the expansion of community resources by allowing people in the community to participate and help each other about their lives to achieve the best potential or quality.

Liveable cities and communities refer to residential communities in both urban and rural areas with a good environment and quality of life, a caring society with a strong community, comfortable and safe life and property, a stable economic system with culture and spirit. The unique spirit of the city and community. (Office of the National Economic and Social Development Board, 2021)

World Health Organization. (2013) giving the meaning of a liveable city that is a city which constantly striving to create and improve both physical and social environments to be in good condition. Also, they try to expand the resources of these communities to be enough to encourage people to help each other in every way of living so that they can develop each person's potential to the maximum possible.

Elements of liveable cities development are as follows (National Urban Development Board, 2015) 1) Pollution and waste management is the management of waste control of enterprises and communities by preparing a management plan for wastewater treatment systems, factory sewage control, check the noise level of the airport. 2) The scenery of the environment is to adjust the landscape of the environment to be orderly, beautiful, giving importance to environmental safety. 3) In terms of recreational places, it is the arrangement of places for recreation for people to relax, exercise, play sports ,and 4) In terms of basic utilities, it is the development of basic infrastructure, such as the development of roads, trains, and public vehicles, etc.

The management of livable cities depends on the following factors. (Jiranan Inthachim and colleagues, 2015, p. 8) 1) Executive leadership means that leaders must have leadership that has to formulate policies and develop concrete plans for liveable cities. 2) Government policy means that the government sector has to formulate policies and strategies for developing liveable cities for each province, covering various stages in accordance with the changing context. 3) Enhancing incentives means enhancing motivation for subordinates or

policy recipients to manage liveable cities clearly. The project is clearly organized , and 4) Public participation means encouraging people and all sectors to participate in the management of liveable cities.

In conclusion, liveable city refers not only to cities with good environment and traffic, cities with the least pollution, but also to cities where people have good physical and mental health, jobs, make and earn enough to live, peaceful social conditions. As well as having a stable economic and political system in which people in the area participate and create new ideas by collaborating, co-working, and following up on success under serious and continuous support and cooperation to maintain a liveable city to be sustainable forever and from studying the concept of elements of livable city development of National Urban Development Board, 2015, concept of (Jiranan Inthachim and colleagues, 2015, p. 8) it has been applied as a conceptual framework in research as follows.
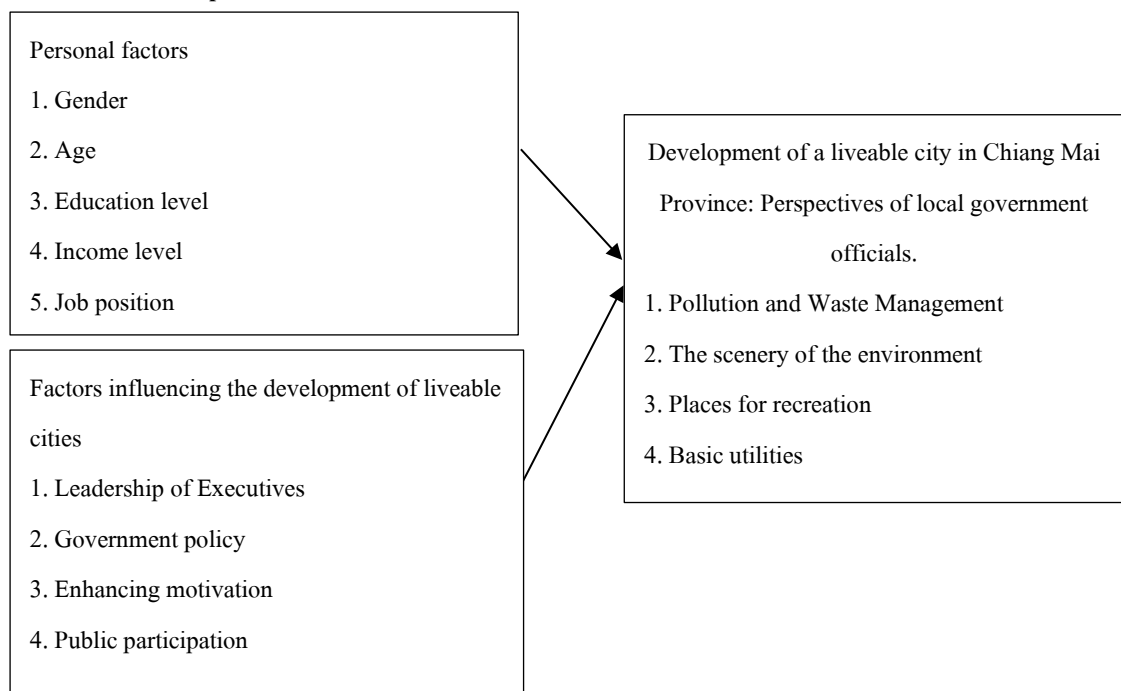
3.2 Conceptual framework

Personal factors

1. Gender

2. Age

3. Education level

4. Income level

5. Job position

Factors influencing the development of liveable cities

1. Leadership of Executives

2. Government policy

3. Enhancing motivation

4. Public participation

Development of a liveable city in Chiang Mai Province: Perspectives of local government officials.

1. Pollution and Waste Management

2. The scenery of the environment

3. Places for recreation

4. Basic utilities

Diagram 1 Conceptual Framework

3.3 Research hypothesis

Leadership of executives, government policy, enhancing motivation, and public participation affect the perspectives of local government officials on the development of a liveable city in Chiang Mai Province.

4. Research methodology

4.1 Research design

This research was quantitative research using questionnaires to collect data.

4.2 Population and samples

The population in this research was 8,320 people from the administration of local government organizations in Chiang Mai. The sample group consisted of 400 people from the management of the local government organization in Chiang Mai. It was obtained from the formula for calculating the sample of Taro Yamane. (Yamane, 1970) at 95 percent confidence. The stratified random sampling method was used by random sampling units classified by sub-district administrative organizations and municipalities in Chiang Mai Province.

4.3 Research instruments

The tool for this research was a questionnaire consisting of 3 parts as follows:

Part 1 The questionnaire on personal factors of respondents include gender, age, education level, income level, and job title. The questionnaire was a multiple choice.

Part 2 The questionnaire on factors influencing the development of liveable cities were executive leadership, government policies, enhancing motivation, and public participation questionnaire. The questionnaire was based on a rating scale of 5 levels, i.e., very good, good, fair, poor, very poor.

Part 3 The questionnaire on the development of liveable cities of local administrative organizations in Chiang Mai Province was based on a rating scale of 5 levels, i.e., very good, good, fair, poor,very poor.

4.4 Data collection

The researcher conducted the data collection according to the following steps:

1. The researcher requested a letter from the graduate school of Suan Sunandha Rajabhat University to the administration of the Chiang Mai provincial local administrative organization for assistance in data collection.

2. The researcher conducted the data collection on their own and the questionnaire was returned after the respondents filled out the information.

3. The returned questionnaires were used to verify their integrity for data analysis.

4.5 Data analysis

1. Respondents' personal factors classified by gender, age, education level, income level and job position. Frequency and percentage.

2. Information about the development of liveable cities of local administrative organizations in Chiang Mai and factors influencing the development of liveable cities. The mean, standard deviation, decision criteria and consideration criteria were analyzed. The researcher defined the interpretation of employee feedback scores into 5 levels and used a 5-level estimation scale as follows:

Average score 4.21 – 5.00 Very good

Average score 3.41 – 4.20 Good

Average score 2.61 – 3.40 Fair

Average score 1.81 – 2.60 Poor

Average score 1.00 –1.08 Very poor

4. Multiple regression analysis by using enter method to determine the influence of factors influencing liveable urban development of local administrative organizations in Chiang Mai province by setting statistical significance at 0.05 level.

5. Data conclusion

1. Most of the respondents were male, 76.05 percent. Most respondents were aged 41 - 50, 68.39 percent. They had a bachelor's degree, 68.19 percent. Most of the respondents had income of 30,001 -40,000 baht for 57.06 percent, and they hold the position of vice president of the local government organization for 69.83 percent.

2. Factors influencing the overall development of the liveable city should be at a high level ($\overline{X}$=3.98, S.D.=0.50). In terms of government policy, the average was the highest ($\overline{X}$=4.05, S.D.=0.51). Public participation ($\overline{X}$=4.02, S.D.=0.44) ,leadership of executives ($\overline{X}$=3.99, S.D.=0.43) and enhancing motivation ($\overline{X}$=3.87, S.D.=0.50) respectively, with details in Table 1.

Table 1 Mean and Standard Deviation of factors influencing the development of liveable cities

Field	Name List	$\overline{X}$	S.D.	Result
1.	Leadership of Executives	3.99	0.43	Good
2.	Government policy	4.05	0.51	Good
3.	Enhancing motivation	3.87	0.50	Good
4.	Public participation	4.02	0.55	Good
	Total	3.96	0.50	Good

2. The results showed that overall, it was found the perspectives of local government officials on the development of a liveable city in Chiang Mai Province was at a high level ($\overline{X}$=3.88, S.D.=0.52). When considering each aspect, it was found that basic utilities had the highest average ($\overline{X}$=3.97, S.D.=0.55). Followed by places for recreation are: ($\overline{X}$=3.95, S.D.=0.43) the scenery of the environment ($\overline{X}$=3.86, S.D.=0.50) and pollution and waste management ($\overline{X}$=3.75, S.D.=0.45) respectively, with details in Table 2.

Table 2 Mean and Standard Deviation of the perspectives of local government officials on the development of a liveable city in Chiang Mai Province.

Field	Name List	$\overline{X}$	S.D.	Result
1.	Pollution and Waste Management	3.75	0.45	Good
2.	The scenery of the environment	3.86	0.50	Good
3.	Places for recreation	3.95	0.43	Good
4.	Basic utilities	3.97	0.55	Good
	Total	3.88	0.52	Good

3. Factors of executive leadership, government policies, enhancing motivation, and people's participation affect the perspectives of local government officials on the development of a liveable city in Chiang Mai Province by 68.91% respectively, with details in Table 3.

Table 3 Multiple regression analysis of factors affecting the development of liveable cities

Factor	Unstandardized (b)	SE	Standardized (β)	t	Sig.
Constant Value	1.121	0.106		10.632	0.000
Leadership of Executives	0.040	0.021	0.318	7.860*	0.000
Government policy	0.098	0.042	0.144	2.412*	0.006
Places for recreation	0.078	0.035	0.142	2.486*	0.004
Basic utilities	0.245	0.025	0.238	4.138*	0.000
R = 0.830	Adjusted R^2 = 0.689				
R^2 = 0.829	SE = 0.152				

* Statistical significance at the 0.05 level

6. Summary and Discussion

1. The perspectives of local government officials on the development of a liveable city in Chiang Mai Province is at a high level. When considering each aspect, it was found that basic utilities had the highest average. Followed by recreational places, environmental scenery, and pollution and waste management, respectively. This is because the Chiang Mai Provincial Administration Organization has seen the importance of developing a liveable city. Since Chiang Mai is a province that tourists are interested in traveling to travel more and more, with a densely populated population, the local government has projects and activities to develop liveable cities. The results of the study of conformity with the concept of the World Health Organization (2013) said that liveable cities are cities that are constantly striving to be creative and improve both physical and social environments to be in suitable conditions. We also try to expand the resources of these communities to be enough to encourage people to help each other in every way of living so that they can develop each person's potential to the maximum possible and research results of Mongkol Sathengram (2561) has studied about the development of the liveable city of the Hanna Ngam subdistrict administrative organization, Sibunruang district, Nong Bua Lamphu province. The results of the study revealed that the liveable city development of the Hanna Ngam subdistrict administrative organization, Sibunruang district, Nong Bua Lamphu province is at a high level.

2. Executive leadership factors, government policies, motivation enhancement and public participation affects the perspectives of local government officials on the development of a liveable city in Chiang Mai Province. This may be due to the development of liveable cities; the government has supported policies on liveable city development. The administration of the local administrative organization has high leadership and the people play an important role in participating in the development of liveable cities. In addition, the

administration has strengthened the motivation for the committee to undertake projects or activities to develop liveable cities to have more motivation to develop liveable cities, which the study results are consistent with the research results of Kamolrat Raksutsri (2017) studies of factors affecting sustainable urban development of Saensuk Municipality, Muang District, Chonburi Province. The results of the study revealed that the leadership of executives, government policies, enhancing motivation, and public participation affect the sustainable development of liveable cities of Saensuk Municipality, Muang District, Chonburi Province.

7. Suggestion

7.1 Suggestions for applying the research results

(1) Local government organizations in Chiang Mai should focus on laying out concrete pollution and waste management policies in Chiang Mai, such as managing traffic congestion, emissions from factories, etc.

(2) Chiang Mai Provincial Administration Organization should have a policy to develop the scenery and environment in Chiang Mai to be beautiful in order to impress visitors even more.

(3) Local government organizations in Chiang Mai should focus on the development of recreation places for people to relax and exercise to cover more Chiang Mai.

(4) Local government organizations should promote policies to develop basic infrastructure to be sufficient for the number of people in Chiang Mai and their residents.

7.2 Suggestion for further work

The next study should be a combination of both qualitative studies. Interviews were conducted with government agencies that promote policies on liveable urban development and policy recipients are local governments that play an important role in developing liveable cities to gain insights to guide or organize activities or projects to develop liveable cities to be as efficient as possible.

8. References

Department of Health. (2018). *"A liveable city" from the perspective of the Department of Health.* [online] Retrieved April 20, 2022, from http://advisor.anamai.moph.go.th/main.php?filename=cities01.

Jeeranan Inthachim and others. (2015). *Sustainable Urban Development of Phichit Municipality, Mueang Phichit District Phichit Province.* Master of Public Administration Department of Public Policy, Faculty of Political Science, Naresuan University.

Kamonrat Raksutsri. (2017). *Factors Affecting Sustainable Urban Development of Saensuk Municipality, Muang District, Chonburi Province.* Master of Public Administration Burapha University.

Ministry of Culture. (2018). *Nice city, liveable community.* [online] Retrieved July 23, 2022, from https://www.m-culture.go.th/th/

Mongkol Sathengram. (2561*). The development of a liveable city of the Hanna Ngam Subdistrict Administrative Organization Sibunruang District Nong Bua Lamphu Province. Journal of Kaensarn Acad*emi, 6(8), 108-120.

Office of the National Economic and Social Development Council. (2564). *National Economic and Social Development Plan No. 12*. Bangkok: Office of the Prime Minister.

Office of the National Urban Development Board. (2018). *Office of the National Urban Development Board. (2018).* Bangkok: Office of the Prime Minister.

Pridi Buranasiri. (2017). *Liveable city.* Bangkok: Mortgage Association.

World Health Organization. (2013). *liveable City*. WHO Obesity Technical Report Series 894. Geneva, Switzerland: World Health organization

Yamane Taro. (1973). *Statistics: An Introductory Analysis*. (3rd Ed). New York. Harper and Row Publications.

FACTORS AFFECTING THE SATISFACTION LEVEL ON MARKETING AND SERVICES OF THAI LOW-COST AIRLINES CASE STUDY: THAI ELDERLY PASSENGERS

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ABSTRACT

As a result of entering into a phase of an aging society in Thailand, the ratio of Thai elderly is getting higher each year. This will generally reflect trends of Thai consumer behavior which will vary according to a change in the percentage of the aging population. Elderly people, then, become a new customer base to which several business organizations are paying attention. The aviation industry, like many others, is paying a lot of attention to the increasing ratio of elderly passengers, especially the low-cost airlines. The Airlines business, itself, basically is a business that relies heavily on customer satisfaction. The purpose of this research is to study factors affecting marketing and services provided by Thai low-cost airlines towards Thai elderly passengers. Through the application of the Purposive Sampling approach, the sample used was 500 Thai elderly passengers who use low-cost airlines at Don Mueang International Airport. Descriptive Statistics and Ordered Logistic Regression were applied to analyze the factors that affect the satisfaction level in three areas: the airline's overall marketing image, the airline's personnel of the airlines and the service standard of the airlines. The findings revealed that age, income per month and physical limitation of the elderly passengers affect the satisfaction level of the passengers against low-cost airlines. These results were much advantageous that each low-cost airline may take them into its consideration to further refer to or use as the ground for continuous development of its services to maintain the customer base and good image of the airlines.

Keywords: Low-cost airlines, Elderly, Marketing, Services

1. Introduction

With the development in science and technology especially in medical and public health, medical treatment, food consumption, and lifestyles become major interests for the population in this century because the age of a healthy population is increasing. On the other hand, the birth rate is declining because of the pressing

condition of the economy, a change in lifestyles and in attitudes of different generations which is the attitude toward having a small family or being single. (National Statistical Office, 2020) As a result, the ratio of elderly people is increasingly high year by year. The National Economic and Social Development Board have forecasted that the Thai population will have increased from 66.48 million in 2008 to 70.65 million in 2025 and will later decline to 70.63 million in 2030. The ratio rates of the population are as follows:

- Children from 0-14 years will decrease from 15.9 million in 1990 to 9.54 million in 2030
- Elderly 60 years upwards will increase from 4.02 million to 17.74 million in the same period.

This can be declared that Thailand has been entering into the Ageing Society since 2004 and will completely become the Aged Society in 2024.
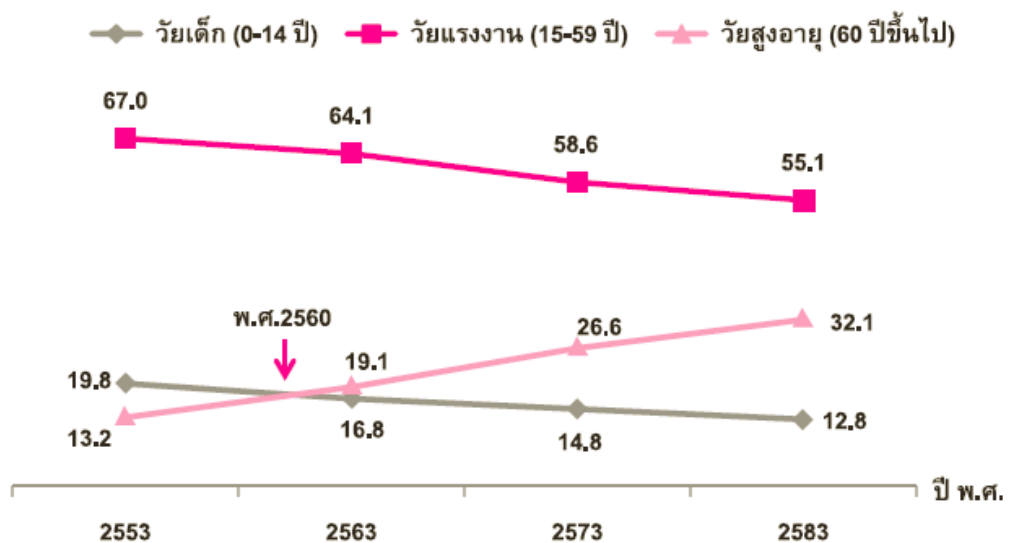
Picture 1 The ratio of the elderly when compared to child and labor age in Thailand

Source: National Statistical Office, 2020

Tourism is considered an important part of the everyday life of elderly people because the elderly love traveling (Pongyiwa, 2015). As a result, the safe and sound quality of transportation and communication will be an answer for elderly travelers. Travel by air is considered a conformity mode of travel to the limited physicality of the elderly passengers over other means of travel. It shortens the time to destinations when compared to other traveling modes at the same distance or the same destination (Nutthapol, 2016)

Low-cost airlines have developed strategies to focus mainly on minimizing the cost of operation to enable the lower-class customer to travel by airplane. Low-cost airlines' philosophy is to reduce all fringe services that it sees unnecessary for a passenger while traveling. This results in a new format of the service to air passengers who are different from other full- service or legacy airlines, for example; instead of serving food and beverage on board the flight, low-cost airlines provide passengers the inflight sales of food and beverage (Nutthapol, 2016). This is not only cutting the operation cost of the low-cost airlines but also increasing revenue from onboard sales.

Likewise, the sales of other inflight merchandise i.e., special menus, various goods, and souvenirs. Low-cost airlines do not provide lounge services to their passengers to enhance cost cutting on space rent at the departure airports. In addition, low-cost airlines generally operate only one class of service, which is economy class. This helps also reduce room between seats on the aircraft which will make more space for more seat capacity to sell on each flight. Moreover, low-cost airlines stop issuing paper tickets, using only electronic ones. They heavily rely on internet booking/reservation, to reduce the cost of issuing the paper ticket, the cost of commission for airline ticket agents, and the cost of office space for the airline representatives
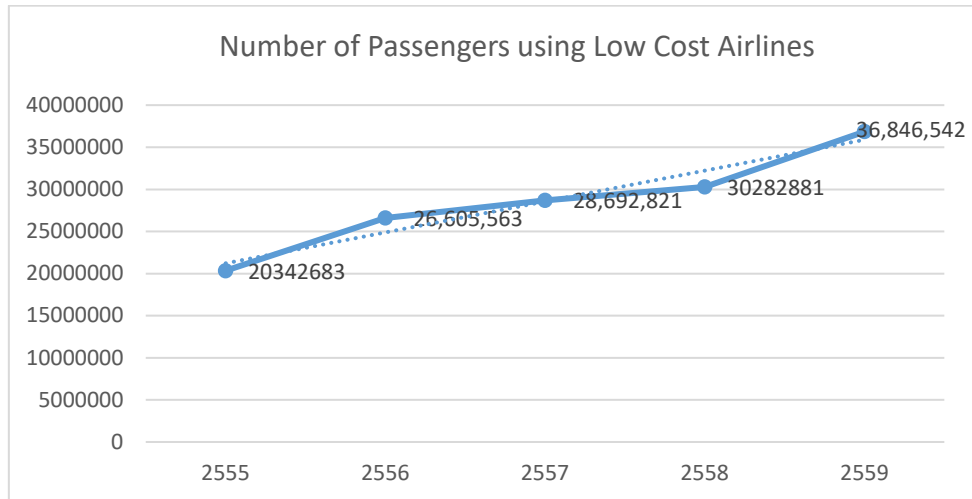
Picture 2 shows number of passengers who use low-cost airlines

Source: Department of Air Transport, 2019

From Picture 2, we can see that low-cost airlines have received increased attention from the passengers continuously and year by year and the trend has shown an upwards tendency in terms of the increasing number of passengers.

For this reason, low-cost airlines have become a popular choice, unlike the old days when air traveling is restricted to the upper class who have more disposable income to spare for air traveling. Low-cost airlines allow more chances for passengers to travel by air as another choice of traveling, which affects the traveling choice of consumer behavior leaning more towards air travel. The type of passengers who choose low-cost airlines as a form of traveling ranges from children, young adults, adults, and the elderly. Though, the environment in the cabin while flying is not so much accommodating to them, especially for elderly passengers. Air traveling is not only the safest form of transportation but also it helps save time for travel. These reasons contribute to the increase in the number of air-traveling passengers including elderly passengers. (Department of Air Transport, 2019) For the mentioned reasons, the researchers are interested to study factors that affect the satisfaction level of elderly passengers towards marketing and services provided by Thai low-cost airlines.

2. Research Objectives

1. To study demographic factors; age, gender, marital status income, human capital factors; education, a physical limitation that affects the Thai elderly passengers' satisfaction with the services of Thai low‑cost airlines.

2. To study the level of satisfaction of elderly passengers towards Thai low-cost airlines

3. To study the elderly passenger's behavior against Thai low-cost airlines

3. Conceptual Framework and Hypothesis

Independent Variables: the elderly demographic, the economic capital factors, the physical limitations, and the selection of low-cost airlines

Dependent Variables: overall marketing image satisfaction towards low‑ cost airlines, overall satisfaction towards the airline personnel, and the services of the low-cost airlines.

From the above variables, the researchers have set the assumptions for this study as follows:

The demographic

The economic capital factors

The human capital factors

The physical limitation factors

The service usage satisfaction factors of the elderly (marketing image, staff, and service)

4. Research Method

This research is survey research by using the calculation without the known population size according to Roscoe's method. The formula uses a 95% confidence level, and a tolerance of 5% from the sampling size of 500 samples. The sample group is the Thai elderly passengers who use low‑cost airlines at Don Mueang International Airport. Purposive Sampling with a self-administered method has been used to obtain the answers to the questionnaire given by the researchers. The questionnaire used consists of 2 parts,

Part 1 is the questions about the demographic of the respondent, for example, gender, age, marital status, education, income, physical limitation, and the low‑cost airlines used. The check list question style is used.

Part 2 is the questions that are designed to inquire about satisfaction and the influencing factors towards the chosen low-cost airlines used, for example, overall marketing image, personnel of low-cost airlines, and low-cost airline services. For this part of the questionnaire, the Likert Scale is employed mainly but when the respondent was not able to answer the questionnaire with reference to the Likert scale, the ask-and-answer method is used to get the answer, then the record of the answer is at the later stage verified.

All the answers from the questionnaire and ask‑and‑answer method are processed with a statistical software package and write up the result with statistic descriptive, correlation statistics with Ordered Logistic Regression analysis.

5. Results of The Study

5.1 Descriptive Statistics

1. The demographic, gender of the respondent is more of male (271 = 54.2%) than female (229 = 45.8%), the average age is 63.78 years ranging from the lowest at 60-64 years of age (271 respondents = 43.4%) to the highest at 80-84 years of age (12 respondents = 2.4%), the majority of education level is from the lowest in Bachelor Degree (273 respondents = 54.6%) to the highest Doctoral Degree (6 respondents = 1.2%), the majority of the profession of the respondent is merchant/freelancer (196 respondents) and the minority of the profession of the respondent is university officer (1 respondent), the highest income of the respondent is at 18,567.78 baht/month by the most answered is at 0-20,000 baht/month (263 respondents) and the least answered is at 200,001-300,000baht/month (1 respondent), the majority of the marital status is at married/living together (336 respondents = 67.2%) and the least answered is divorced/widowed/separated (64 respondents = 12.8%), on the physical limitation, we found that the bone problem is the highest answer (257 respondents = 51.4%) and the least answer is healthy (45 respondents = 9.0%). Last but not least, the Low-Cost Airlines frequently used, the most answer is Thai Air Asia (217 respondents = 43.4%) and the least answer is Thai Lion Air (73 respondents = 14.6%)

2. The average result of the analysis of satisfaction and influencing factors in choosing low-cost airlines found that there is substantial use of marketing factors used. Each of the 3 areas can be summed up as follows: satisfaction in air fare has the average of 2.99 which is classified as 'satisfied', satisfaction in marketing promotion has the average of 2.82 which is classified as 'satisfied', satisfaction in distribution channel of the air ticket has the average of 2.83 which is classified as 'satisfied', satisfaction in external physical environment has the average of 2.88 which is classified as 'satisfied', satisfaction in the modern of the service equipment used in servicing the passengers has the average of 2.87 which is classified as 'satisfied', the satisfaction in image of the airline used has the average of 2.93 which is classified as 'satisfied'.

Satisfaction in the personality of the airline personnel, satisfaction in the uniform of personnel has the average of 2.96 which is classified as 'satisfied', satisfaction in friendliness and hospitable attitude has the average of 2.84 which is classified as 'satisfied', satisfaction in giving suggesting/clarity of the answer towards questions asked has the average of 2.80 which is classified as 'satisfied', satisfaction of tentativeness, eagerness of providing service has the average of 2.85 which is classified as 'satisfied', satisfaction in providing solution for the passengers has the average of 2.87 which is classified as 'satisfied'

Satisfaction in the overall services given by low cost airlines, satisfaction in the quick and efficient of providing service has the average of 2.99 which is classified as 'satisfied', satisfaction in responding correctly to the passengers request has the average of 2.94 which is classified as 'satisfied', satisfaction in following through until the end of service has the average of 2.90 which is classified as 'satisfied', satisfaction in value for money has the average of 2.96 which is classified as 'satisfied', satisfaction in repeating the usage of the airline has the average of 2.97 which is classified as 'satisfied'.

5.2 Correlation statistics with Ordered Logistic Regression analysis

      1. The testing of the correlation linear multiple plural relations (Multicollinearity) of Independent Variables

      Each of the Independent Variables is tested in relation so; they can be the variables in the multiple regression analysis. The criteria in considering the suitable variables for analysis is a coefficient correlation between correlated variables that is less than 0.50 or more than or equal to 0.50 that is to say, there is a high correlation between the pair of independent variables which can be caused the problem of multicollinearity of the independent variables which from the analysis of the correlation between the pair of the independent variables found that if every independent variable has coefficient correlation (Pearson Correlation) less than 0.50, there will be no/low relation between independent variables. This means the independent variables cannot be used in finding the factors that are influencing the elderly traveling pattern.

      2. The testing of the parallel line test to see the suitability of the logistic regression analysis

      The testing of the parallel line test to see the suitability of the logistic regression analysis by using the result analysis of the O-model found that the value of prob chi2 is 0.8081 which means an insignificant value. The suitability of using the Proportional Odds Model, the model that uses the cumulative logit function by setting the fixed value of regression coefficient of each and every independent variable while setting the changeable value of intercept depending on the level of the dependent variable, is suitable and give no difference statistical result from the set model both the regression coefficient of the independent variables and/or the changeable intercept. This is to say that the use of Ordered Logistic Regression in finding the relationship between the set of independent variables and the changeable of dependent variables has statistical reliability.

Table 1 shows the value of Ordered Logistic Regression that influences the satisfaction in overall marketing factors used by low‑cost airlines, overall satisfaction in personnel of the low‑cost airlines, overall satisfaction in low‑cost airlines services

Independent Variables	Overall satisfaction in marketing factors used by low-cost airlines	Overall satisfaction in personnel of the low-cost airlines	Overall satisfaction in low-cost airline services
	Odd Ratio	Odd Ratio	Odd Ratio
Demographic Factors			
Gender			
Female (reference group)			
Male	0.9876	0.9526	0.9413
Age	1.0231***	1.0145***	1.0176***
Marital Status			
Single (reference group)			
Married/Lived in	1.7601	1.4565	1.6458
Divorced/Widowed/Separated	4.1232	4.8142	4.7654

Table 1 (continued)

Economic Capital Factors			
Profession			
Unemployed (reference group)			
Civil Servant/State Enterprise	12.0563**	14.0745**	13.4156**
Company Employee	8.4677**	7.4579**	9.6511**
Merchant/Entrepreneur	3.1245	2.4589	4.6579**
Employed	5.1456	4.9878	6.1456
Agricultural/Fishery	1.4534	1.5673	1.4564
Average Salary per month	1.0000***	1.0000***	1.0000***
Independent Variables	Overall satisfaction in marketing factors used by low-cost airlines	Overall satisfaction in personnel of the low-cost airlines	Overall satisfaction in low-cost airline services
	Odd Ratio	Odd Ratio	Odd Ratio
Human Capital Factors			
Education Level			
Doctoral Degree (reference group)	-	-	-
Lower than Bachelor Degree	1.1453	1.1263	1.1432
Bachelor Degree	1.0876	1.0659	1.0843
Master Degree	1.0055	1.0042	1.0062
Physical Limitation Factors			
Physical Limitation			
Healthy (reference group)			
Bone Problem	0.8756**	0.9154**	0.8323**
Chronic Health Condition	0.9152**	0.9232**	0.9563**
On Prescription	0.9332**	0.9155**	0.9576**
Usage of the Low-Cost Airline Factors			
Low-Cost Airlines Used			
Thai Lion Air (reference group)			
Nok Air	1.2343	1.3467	1.4545
Thai Air Asia	1.1321	1.4534	1.6786
Sample size	500	500	500
Prob>chi2	0.0000	0.0000	0.0000
Pseudo-R2	0.3153	0.3262	0.3075
Log likelihood	-452.14324	-467.18765	-449.13423

**p-value=.05 ***pvalue=.01

From **Table 1**, the conclusion can be made that the older the population is, the more satisfaction in every area with low-cost airlines. It can be seen that the highest increase in satisfaction is at 1.0237 times (significance level 0.01) towards the overall marketing factors that are used by low-cost airlines, and the second highest increase is at 1.017 times 6 (significance level 0.01) towards the low-cost airline service and the increase in the satisfaction towards the personnel of the low-cost airline is at 1.0145 times (significance level 0.01)

The conclusion of the Economic Capital Factors can be seen that the more salary the elderly earn, the more satisfaction in every area towards low-cost airlines is increased by 1.000 times (significance level 0.01). In detail, the elderly who is in the profession of Civil Servant/ State Enterprise/ Company Employee and Merchant/Entrepreneur have more satisfaction when compared to the Unemployed elderly.

The elderly who are Civil Servant/State Enterprise/Company Employee and Merchant/Entrepreneur have increased their satisfaction ratio towards the personnel of the low-cost airlines at the highest level of 14.0745 times (significance level 0.05), the second highest increase is at 13.4153 times (significance level 0.0) towards for the low-cost airlines' service and towards the low-cost airline marketing factors used by the low-cost airline is at 12.0563 times (significance level 0.05) respectively.

The elderly who are Company Employees have the highest increased satisfaction ratio towards the services of low-cost airlines at 9.6511 times (significance level 0.05), towards marketing factors used in low-cost airlines at 8.4677 times (significance level 0.05) and towards the low-cost airline's staff at 7.4579 times (significance level 0.05). For the rest of the elderly profession when compared to the Unemployed elderly, there was no significant increase in the level of satisfaction.

The conclusion on the Human Capital Factor on the level of the Elderly's Education has no significant level.

The conclusion on the Physical Limitations is founded that for every elderly who have physical limitations there is a reduction in the satisfaction ratio towards the low-cost airlines, compared with the healthy elderly.

The conclusion on the usage of low-cost airline factors is founded that there is no significant increase in the level of satisfaction statistically between Nok Air, Thai Air Asia, and Thai Lion Air towards the increase the satisfaction towards the marketing factors, the services, and the personnel overall.

6. Conclusion and Discussion

From the study, it is concluded that the first factor that affects the satisfaction of the service in Thai low-cost airlines in the case study of Thai elderly passengers is the age of the elderly. This means for every increase in the age of the elderly, there will be an increase in satisfaction with the airlines, the personnel, and the services.

The second factor is the elderly's profession, it is founded that the elderly who are in the profession of Civil Servant/State Enterprise/Company Employee and Merchant/Entrepreneur have more satisfaction towards the marketing factors, the personnel, and the service of Thai low-cost airlines than the elderly who are

unemployed which corresponds to the study of Rojanamukda (2015) and Wannaphahun (2015) that revealed the same result. This can be assumed that on a business trip of those who are Civil Servants/ State Enterprises/ Company Employees and Merchant/ Entrepreneurs, the price and reputation of the low‑cost airlines are assessed and are chosen carefully before making a purchase. This means that they are more concerned with a purchase decision of the low‑cost airlines' services than those elderly who are Civil Servants and have the requirement to 'choose Thai‑owned airlines priority' policy and all expenses paid for. Though the price of air‑ticket on Thai‑owned airlines, sometimes, is 20-50 percent higher. For this reason, elderly who are Civil Servants rarely travel by low‑cost airlines.

The influencing factors in the satisfaction of elderly passengers towards Thai low‑cost airlines also include Economic Capital Factor. The more salary the elderly earn the more satisfied with the overall low‑cost airlines, the personnel, and the services. In addition, for the Physical Limitation factor, healthy elderly have more satisfaction with the airline, the personnel, and the services when compared with those elderly who have physical limitation.

7. Recommendations

The recommendations from this study can be summed up into the following:

1. Since elderly passengers with higher aging value a higher level of satisfaction towards marketing factors and all kinds of services received from low‑cost airlines. As a result, in order to maintain a level of satisfaction, low‑cost airlines should continue to develop tailor‑made services, including marketing factors. Particularly, elderly passengers would need more and additional types of services to cater to the increasing number of the elderly population.

2. Due to the fact that the elderly who are still employed, including one with an average high salary, would indicate higher satisfaction towards various kinds of services and overall marking factors from low‑cost airlines. Low‑cost airlines, then, should take into consideration of buying power of this group of elderly passengers.

3. When some elderly passengers who have physical limitations are still not satisfied with services provided by low‑cost airlines. Low‑cost airlines, thus, should pay more attention to further improving both services and marketing factors. Particularly, when Thailand is heading towards an aging society which results in an increasing number of the elderly year after year.

References

Day, S. (2013). *Creating long-lasting relationships with clients. [Financial Times: Mastering Complete MBA Companion in Marketing]* (Chanchit Chaengkitkit, Translator). Bangkok:AR Business Press (Original publication, 1999) (In Thai

Department of Air Transport (2019). *Statistical data of Air Transportation,* Department of Air Transport. Searched on 29 June 2009 from http://portal.aviation.go.th/site/4211.jsp (In Thai)

Isariyanont N. (2014). *Satisfaction of users on low-cost airline services.* Master of Business Administration Thesis Marketing Graduate School, Phranakhon Rajabhat University (In Thai)

Kotler, P and Suwit, M. (2002). *Thinking of Marketing* [Marketing Move] (Thanyawatch Chaitrakulchai, translator). Bangkok: Manager. (2002) (In Thai)

National Statistical Office. (2020). *Population Census*. Bangkok. National Statistical Office.

Nutthapol, J. (2016). *The influence factors of passengers when selecting between low cost and full-service airlines.* Master of Science Program in Marketing (International Program). Thammasat University.

Pongyiwa, P. (2015). *Overall satisfaction and customer repeat purchase trends.* Graduate School. Srinakharinwirot University. (In Thai)

Rojanamukda, U. (2015). *Passengers' satisfaction with Air Asia services.* Master of Business Administration Thesis Marketing Graduate School, Srinakharinwirot University. (In Thai)

Samurjai, C. and Sommi, M. (2015). *Consumer behavior.* Bangkok, Expansion Net (in Thai)

Thanasupsin.K and Chaiyan S. (2017). *Factors affecting the selection of traveling modes of Low-cost airlines and Thai Airways.* King Mongkut's Institute of Technology North Bangkok Journal (in Thai)

Udomkitti, W. (2016). *Factors related to the decision-making process of purchasing Low-cost airline services in Thailand.* Master of Business Administration Degree Research Program Graduate Marketing Program University College of the Thai Chamber of Commerce (In Thai)

Wannaphahun, W, (2015). *Factors Affecting Travel Decisions by Using Low-Cost Airline Services.* Independent study, Kasetsart University. (In Thai)

THE IMPACT OF STORYTELLING TECHNIQUES ON THE RELIGIOUS BELIEFS AND VALUES AMONG THAI AUDIENCE: A CASE STUDY ON THAI HORROR FILM "THE MEDIUM"

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ABSTRACT

This study was to examine whether horror film storytelling techniques significantly impact religious beliefs and values of Thai audience by analyzing a Thai film named "The Medium" and its audience. The sample was Thai audience aged between 18 and 40 years old, who had watched this Thai horror film at least once. The sample was selected by purposive sampling and convenience sampling methods. Questionnaires were distributed and collected online among all Thai audience. The data was tabulated and Regression Analysis was employed to test the hypothesis with a confidence level of 0.05. The findings revealed that film storytelling techniques significantly impact audience's religious beliefs and values overall. In addition, the results also showed that two storytelling techniques including narrative structure and resolution are two significant positive predictors of audience's religious beliefs and values, while other six includes narrative setting or scene, character, conflict, plot, dialogue, visual do not significantly influence audience's religious beliefs and values if analyzed separately.

Keywords: Storytelling Techniques, Horror Film, Religious Beliefs and Values, The Medium

1. Introduction

As film technology keeps advancing, it is often utilized to change and shape people's outlooks, to affect people's beliefs and ideologies (Morris, 2020). Its expression function as storytelling carrier is always perfectly put to good use and performed. Hence, because of its audio-visual feature, film now is regarded as a powerful communication tool for the target audience as Sholihah (2021) mentioned, it is playing more and more significant roles in our society over time.

Why do people have emotion of fear or horror, and what is the connection with beliefs and religions? Prohászková (2012) explained in his research, it says fear is a very strong emotion that exists since beginning of human and it takes root in our mind deeply. The formation of individual's faith and religion was originated from

human's feared state of mind that comes from being afraid of unknown and mysterious phenomena. To each phenomenon that is unexplainable, human tends to attribute it a nonhuman figure or a human figure with super power, therefore various kinds of paranormal characters such as disembodied spirits, souls, devils, God, fairies are created under unlimited imagination. Stories regarding to those supernatural phenomena are made and circulated among people in different forms of arts, such as horror film.

When mention about the horror film, it is frequently associated with religion and its background more or less at different levels, Stone (2001) said that in a study, the connection between film and religion has always been a little ambiguous. The religious themes, story contents as well as metaphors were salient in the film theater, and they often carried large symbolic meaning. However, few films regard beliefs, values, and motivations with depth and complexity. In addition, discussions and studies associated with connection between film and audience's religious beliefs and values are still not much, there is more can be done in this regard.

2. Research Objective

To examine the impact of storytelling techniques of Thai horror film "The Medium" on religious beliefs and values perceived by Thai audience.

3. Literature Review

3.1 Related theories and research

3.1.1 Narrative paradigm Theory

West and Turner (2019) pointed out that "The Narrative Paradigm promotes the belief that humans are storytellers and that values, emotions and aesthetic considerations ground our beliefs and behaviors" (p. 370).

3.1.2 Cultivation Theory

Gerbner (1976) claimed that the longer time the audiences exposed themselves to media contents, the higher possibility that their attitudes and behaviors to social reality are unconsciously influenced by media in turn.

3.1.3 Social Cognitive Theory

Bandura (1986) posited that people can acquire some parts of knowledge by observing others under the environment of social interactions, individual experiences as well as media impact.

3.1.4 Media Effects Theory

Potter (2012) noted that cognitive effect, belief effect, attitudinal effect, affective effect, physiological effect, and behavioral effect are six types of media effects on person. When any of these six effects happened to a person, we need to decide if this kind of happening was impacted by the media. Once we are sure it was impacted by the media, it proves the media effect is at work.

Thus, this study used these related theories as a theoretical framework to explore how the storytelling techniques used in the horror film affect the preexisting values and religious beliefs of Thai audience, which may directly affect how they create a social reality about their personal life.

3.1.5 Related research

When Igartua and Barrios-Vicente (2012) conducted a case study on a religion-based film, they stated that "Empirical research has found that exposure to specific fictional narratives exert significant effects on attitudes and beliefs" (p.514). As Cloete (2017) said that religion is a part of culture, and so is film. Watching films could generate religious experience among audiences. If this religious experience is generated by watching a religious film, it may cause a deep impact on religious beliefs and values of audiences who live in countries with strong religious atmosphere, such as Thailand. Kubrak (2020) confirmed in his research that there is a potential positive impact on audience's attitudes after watching a film, although it's necessary to consider individual differences.

3.2 Research Framework
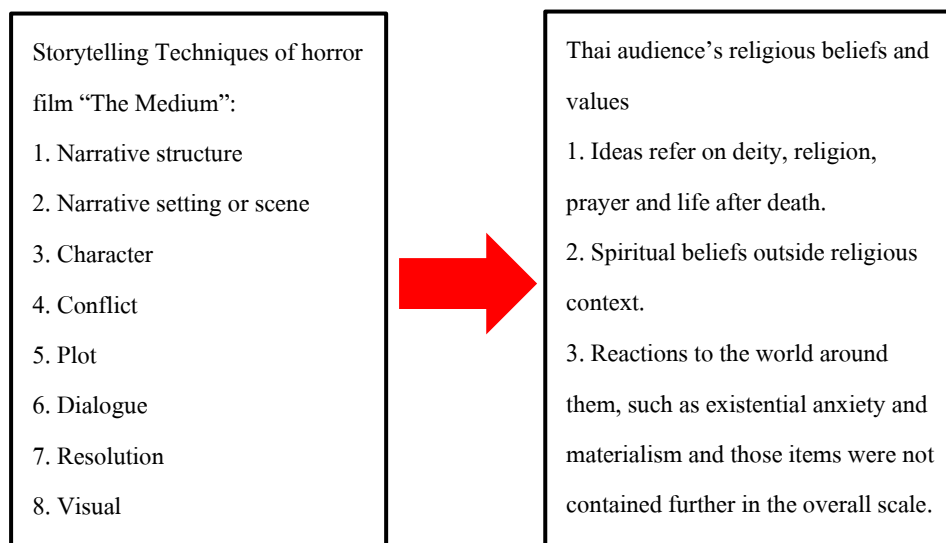
Figure 1 Theoretical Framework

3.3 Research Hypotheses

Horror film storytelling techniques (narrative structure, narrative setting or scene, character, conflict, plot, dialogue, resolution, and visual) significantly influence the Thai audience's religious beliefs and values.

4. Research Methodology

4.1 Research Design

A quantitative approach was employed for conducting this study. Questionnaires were distributed to the popular internet platforms in Thailand such as Facebook, Instagram, Pantip and Twitter etc. to let relevant respondents to join and fill in questionnaire forms before collecting and conducting statistical analysis.

4.2 Population and Sample

The target population are Thai film audiences between 18 and 40 years old including both male and female who already watched this film. One hundred and fifty seven Thai audiences were selected by using

purposive sampling and convenience sampling methods. The questionnaire has a screening question to assure that all respondents had watched the Thai horror "The Medium" already.

4.3 Research Instrument

A questionnaire with three sections was designed. Section 1 has 7 nominal- and-ordinal questions, asking about the personal information of the respondents, including marital status, nationality, gender, age range, religion, occupation. Section 2 has 24 likert- scale questions asking about the audience's perception on the film storytelling techniques in the Thai horror film "The Medium", arranging from 1 "Very low perception" to 5 "Very high perception". Finally, section 3 has 18 likert- scale questions asking about the film impact on audience's religious beliefs and values. The scale was adopted from Beliefs and Values Scale of King, et al. (2006) which aims to examine the strength of spiritual beliefs and values, measuring the degree of their beliefs from 1 "Strongly disagree" to 5 "Strongly agree."

4.4 Data Collection and analysis

The overall reliability of the questionnaire was 0.959, having 0.913 Cronbach alpha for perception of storytelling techniques, 0.965 Cronbach alpha for film impact on audience's religious beliefs and values, which are higher than 0.7. This means that the questionnaire has acceptable reliability.

5. Findings

5.1 Summary of descriptive findings

Majority of the respondents were female (55.4%, n=87) and male (44.6%, n=70), who worshipped Buddhist (78.3%, n=123), followed by no religion (7.6%, n=12), Christian (6.4%, n=10), Catholic (4.5%, n=7) and Muslim (3.2%, n=5), respectively. Most respondents were aged between 18 and 22 years old (31.8%, n=50), followed by age between 23 and 27 years old (31.2%, n=49), 28-32 years old (14.6%, n=23), 33-36 years old (13.4%, n=21) and 37-40 years old (8.9%, n=14), respectively. And, majority of them were employees 36.9%, n=58), followed by students (36.3%, n=57), government officers (14.6%, n=23), business owner (10.8%, n=17) and others (1.3%, n=2).

The descriptive findings revealed that the respondents perceived all film storytelling techniques in the film (Mean=4.42, SD=4.67) at a high level. For each storytelling technique, they perceived character (Mean=4.51, SD=.56), plot (Mean=4.51, SD=.60) at a very high level. And, they perceived resolution (Mean=4.47, SD=.68), conflict (Mean=4.47, SD=.63), visual (Mean=4.42, SD=.64), dialogue (Mean=4.41, SD=.60), narrative setting or scene (Mean=4.34, SD=.58), and narrative structure (Mean=4.24, SD=.62) at the high level, respectively. Besides, majority of the respondents agreed with the impact on religious beliefs and values (Mean=3.90, SD=0.98). When examining each construct of the King, et al.'s religious beliefs and values scale (2006), they are "agreed" with the construct "ideas refer on deity, religion, prayer and life after death" (Mean=3.86, SD=1.03), construct "spiritual belief outside spiritual contexts" (Mean=4.25, SD=.79), and construct "Reactions to the world around them, such as existential anxiety and materialism and those items were not contained further in the overall scare" (Mean=3.86, SD=1.09).

5.2 Findings of hypothesis testing

The Regression Analysis revealed that the film storytelling techniques are significant positive predictors of Thai audience's religious beliefs and values (Adjusted R^2= 0.368, p < 0.05) overall. All storytelling techniques are accountable for Thai audience's religious beliefs and values at the rate of 36.8, which is considered in the medium level. This test result found that hypothesis is significantly supported as shown in Table 1.

Table 1 Regression Analysis on the impact of overall storytelling techniques on the audience's religious beliefs and values.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.610[a]	.372	.368	.77570	.372	91.855	1	155	.000	1.926

a. Predictors: (Constant), storytelling techniques

b. Dependent Variable: Religious beliefs and values

Adjusted R^2= 0.365, p= 0.00, p< 0.05

As shown in Table 2, when examining the impact of each storytelling technique on the religious beliefs and values, eight storytelling techniques are accountable for Thai audience's religious beliefs and values (Adjusted R^2 = .494, p < 0.05) at the rate of 49.4. The findings revealed that the narrative structure (Beta=0.46*, p < 0.05), and resolution (Beta=0.37*, p < 0.05) are two significant positive predictors of Thai audience's religious beliefs and values. However, narrative setting or scene (Beta=0.06, p > 0.05), character (Beta=-0.02*, p > 0.05), conflict (Beta=-0.11, p > 0.05), plot (Beta=-0.03, p > 0.05), dialogue (Beta=0.03, p > 0.05), visual (Beta=0.08*, p > 0.05) are not significant predictors. These findings suggested that narrative structure and resolution are two main storytelling techniques of horror film that significantly influence Thai audience's religious beliefs and values.

Table 2 Regression Analysis on the impact of each storytelling technique on audience's religious beliefs and values.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-1.601	.548		-2.923	.004	-2.683	-.518
Narrative structure	.724	.123	.460	5.899	.000	.481	.966
Narrative setting or scene	.095	.133	.056	.712	.477	-.169	.358
Character	-.037	.150	-.021	-.245	.807	-.333	.260
Conflict	-.162	.139	-.106	-1.172	.243	-.436	.112
Plot	-.040	.153	-.025	-.263	.793	-.343	.263
Dialogue	.041	.167	.025	.245	.806	-.288	.370
Resolution	.528	.121	.367	4.342	.000	.287	.768
Visual	.126	.125	.082	1.005	.316	-.121	.373

Predictors: Storytelling techniques (narrative structure, narrative setting or scene, character, conflict, plot, dialogue, resolution, and visuals)

Dependent Variable: Religious beliefs and values, Adjusted R^2= .494, F= 20.019,

p= 0.000 < 0.05

6. Discussion of the Study

The findings suggested that if all storytelling techniques were examined together, they would significantly influence Thai audience' religious beliefs and values. However, when examined individually, only narrative structure and resolution are significant predictors of their religious beliefs and values. Despite the fact that Thai audience had very high perception of character and plot and high perception of resolution, conflict, visual, dialogue, narrative scene, and narrative structure. Thai audience prioritized narrative structure, because it focuses on how the story are incorporated and connected into different stages from the beginning, in the middle, and at the end. When all three of these story sections are individually compelling yet also work well in concert with each other, the resultant narrative is smooth and attractive. In addition, Thai audience might expect the horror film to clearly demonstrate the solution or outcome of the problem however, this horror film "The Medium" is different from other horror films, it left a partial opening solution offering the audience to think and give answers by themselves in a certain extent, it created a more emotional engagement with the film and permitted them to apply their religious beliefs and values.

The findings indicated that if storytelling techniques are used properly in a film, they are certain to help improve appeal of storytelling in some degree, and make it effective to influence its audience. As Saad (2018) noted that a persuasive storytelling could trigger a volunteer change of audience's attitude or behavior. Therefore, this study coincided with Narrative Paradigm proposed by Fisher (1987), who suggested that all meaningful communications are conducted by telling stories or reporting events, and storytelling is a more compelling form than arguments. Furthermore, it also coincided with the Cultivation theory. The audience's exposure to media contents they consume is possible to create a significant impact on the audience's attitudes and behaviors unconsciously.

According to context-content convergence hypothesis posited by Valkenburg and Peter (2013) when they referred to media effects theory in their research, the media effects as they stated that are strengthened if the messages align with beliefs, standards, and norms of the media user's social environment. The storytelling techniques in the film can be used as a means of creating this kind of phenomenon in order to arouse audience's resonance.

As noted by Smith (2016) in his research that Narrative theory takes roots in the importance of the structure of story, besides, he mentioned the idea of Barthes (1972) that narrative structure is the main method for immersing audience in the world of the film and preparing them to more readily accept its messages, in the meantime, he concluded that the film narrative structure positively play a role in impacting audience's perception, which the result of his research is partially in alignment with the findings of this present study. Fogg (2018) once conducted a research related to film conflicts management with violent contents and their resulting resolutions by analyzing twenty films, finally found that the violence in films do not directly cause violence among audience, but there is a trend that suggests audience's real-life problems may be impacted by resolution. That means, the film resolution could affect audience's behavioral model by influencing their mind, attitude, beliefs, etc. Therefore, the analysis result of present study that resolution is also one of significant positive predictors supports the finding of her research. In addition, the findings, in the same vein, apparently support the assumption of social cognitive theory that proposed by Bandura (1986). It assumes people can learn some knowledge by observing others under the environment of social interactions, personal experiences, and media impact. Thus, the film resolution as one of storytelling technique in media could contribute to the impact on how audience think and behave in real life, so that it may eventually influence the audience beliefs and values.

7. Suggestions

7.1 Suggestions for future research

As Saxena (2020) concluded in her study that more people are using online video streaming service through digital platforms during Covid-19 pandemic. So the researcher in the future may try to examine the impact of storytelling techniques on audience's religious beliefs and values through two separated groups of people. One group of people watch religion-based horror film in the cinema, the other group of people watch the same film on streaming media service by digital platform. A comparison of the examination results from two

groups can be conducted to see the difference, and to know whether using different service platforms to watch same horror film may affect the impact of storytelling techniques on audience's religious beliefs and values.

7.2 Suggestions for future application

The findings from this study should make an important contribution to the film industry, particularly to the horror genre filmmakers. Sometimes a popular film can mirror or cause mutual effect with social values and ethical values of dominant culture. As Hoover (2008) pointed out, the media can be a source of religion, spirituality and index of their variation, meanwhile it "articulated into religious and spiritual trends-changing religion through those interactions and also being changed by that relationship" (p.4). Filmmakers may pay attention to narrative structure and resolution to promote audience's emotion engagement. However, other storytelling techniques including character, plot, narrative setting or scene, conflict, visual, dialogue should be more highlighted and well planned too, because they are also perceived in the high to very high level in the horror film.

8. Acknowledgements

9. References

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, N.J: Prentice-Hall.

Barthes, R. (1972). *Mythologies.* NY: Hill and Wang.

Cloete, A.L. (2017). Film as medium for meaning making: A practical theological reflection. *Theological Studies, 73*(4), 1-6.

Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*, 297-334.

Fisher, W.R. (1987). *Human communication as narration: Toward a philosophy of reason, value, and action.* SC: University of South Carolina Press.

Fogg, L.M. (2018). *Conflict resolution in popular film.* Unpublished master's thesis, University of New Hampshire, Durham.

Gerbner, G & Gross, L. (1976). Living with television: The violence profile. *Journal of Communication, 26*(2), 172-194.

Hoover, S.M. (2008). *Media and religion.* CO: University of Colorado at Boulder, The Center for Media, Religion, and Culture.

Igartua, J.J., & Barrios-Vicente, I.M. (2012). Changing real-world beliefs with controversial movies: Processes and Mechanisms of Narrative Persuasion. *Journal of Communication, 62*(3), 514-531.

King, M., Jones, Louise., Barnes, K., Low, J., Walker, C., Wilkinson, S., Mason, C., Sutherland, J., & Tookman, A. (2006). Measuring spiritual belief: development and standardization of a Beliefs and Values Scale. *Psychological Medicine, 36*(3), 417-425.

Kubrak, T. (2020). Impact of films: Changes in young people's attitudes after watching a movie. *Behavioral sciences, 10*(5), 86.

Morris, S. (2020, April 9). How movies impact our societies. *Multilingual.* Retrieved January 3 2022, from: https://multilingual.com/how-movies-impact-our-societies/

Potter, W.J. (2012). *Media effects* (1st ed). Thousand Oaks, CA: SAGE Publications, Inc.

Saad, R.L.M. (2018). Storytelling and its relation with film script. *International Journal of Creativity and innovation in humanities and education, 1*(1), 1-23.

Saxena, S. (2020). A study on usage of online video streaming service during lockdown. Jaipur, India: India International School, Department of Commerce.

Sholihah, F. (2021). An analysis of plot in film the theory of everything by james marsh. *E-Link Journal*, *8*(1), 58-76.

Smith, Z.A. (2016). *Narrative structure and audience motivation in documentary film*. Unpublished master's thesis, University of Missouri-Columbia, Columbia.

Valkenburg, P.M., & Peter, J. (2013). The differential susceptibility to media effects model. *Journal of Communication, 63*(2), 221-243.

West, R & Turner, L.H. (2019). *Introducing communication theory: Analysis and application* (6th ed.). NY: McGraw-Hill Education.

TOTALITARIANISM IN KAZUO ISHIGURO'S NEVER LET ME GO

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ABSTRACT

This academic paper intends to explore the totalitarian means presented in the novel of *Never Let Me Go* written by Kazuo Ishiguro in 2005. The concept of totalitarianism is used to scrutinize the story. Totalitarianism is the absolute control by the government. The totalitarian methods found in the text are divided into four ways respectively: remote confinement, limited information and knowledge, employment of surveillance and dehumanization. However, the cloned students are dominated by two different organizations. The first one is the government who perceive them as the objects whereas Hailsham school is the place to protect them from the outside world. Although their rights are deprived during the time at Hailsham, they are safe from cruelty of the government.

Keywords: totalitarianism, dystopia, dehumanization, *Never Let Me Go*, Kazuo Ishiguro

1. Introduction

Never Let Me was written by Kazuo Ishiguro, an English author, and firstly published in 2005 (Ishiguro, 2010). This novel is well-known for its cloning issues. Ishiguro received Nobel Prize for Literature in 2017 (Grady, 2017). Ishiguro presents the dystopian society along with the cruelty of cloning in this novel. It is told by the first point of view of the unreliable narrator, Kathy H. Kathy starts to tell her story that she is a carer who takes care of the donors at the Recovery Center. However, she does not reveal any significant of the donors except for being weak after the donations. The literary techniques of foreshadowing and flashback are outstanding devices employed in *Never Let Me Go*. Ishiguro uses foreshowing to give the audience some clues which will lead to the crucial situations later on. He gradually gives the audience some jigsaws in each chapter and let them find the missing pieces by themselves. Additionally, he gives the audience more information about the protagonist's background by bringing them back to Kathy's childhood and her teenage years at Hailsham school where Kathy and her friends spend all of their lives before leaving to the outside world. The use of foreshadowing and flashback are utilized back and forth. The tension in this story is constantly increased especially when the audience realizes that those students are not like ordinary people because they are cloned by the government and they have no choices in choosing their own path. They are bred, raised and destined (Ishiguro, 2010).

Never Let Me Go is similar to George Orwell's *1984* (1949) and Aldous Huxley's *Brave New World* (1932) in many extents. "A dystopian totalitarianism" is illustrated in *1984* as well as in *Never Let Me Go*. However, the latter does not include the corporal punishment like the first one (Benia,2019,p.3). In *Brave New World,* the clones is clearly classified and given social status according to their body strength and their intelligence. Furthermore, the process of cloning through the scientific experiment is obviously seen. Unlike *Brave New World*, *Never Let Me Go* does not apparently expose the clones to the audience. We only know the brief information about them: they cannot give birth. But what gives the clones characters look more like humans is that they are "capable of feeling, loving and generating artwork"(Babubhai,2019,p.1545). Furthermore, the investigation of human creations is narrated right in the beginning of the book in *Brave New World* whereas the conditions of the cloned students in *Never Let Me Go* are gradually revealed. The issue of "ethical values in treating humans and clones" are also raised in *Never Let Me Go* (Mondal and Aravind, 2019,p.428). On the contrary, *Brave New World* does not mention any topics about ethical values at all. By contrast, it gives the sense of humans' pride for their capability of inventing the clones.

Dystopia is the presentation of the unpleasant world which would happen one day in the future. However, the depressing conditions of the dystopian society are not brought to light since the government attempts to deceive their people that they live in the perfect world. It often involves totalitarianism as the tool to manipulate their citizens. The introduction of totalitarianism was firstly launched in 1928. At first it aims to bring the absolute power to the government in order to get rid of individualism. Later on, the concept expands to include "the desire for complete control over the hearts and bodies, minds and souls, of the citizens of the nation" (Benia, 2019, p.16). The concept of totalitarianism will be explained later in theoretical framework.

Consequently, this academic paper intends to analyze the totalitarianism employed in *Never Let Me Go*. All the totalitarian methods that are used to dominate the Hailsham students will be examined and criticized.

Theoretical Framework

Totalitarianism

Totalitarianism is the absolute control of the state over its citizens in every aspect of life. It aims to manipulate the "economic, cultural, and informational resources", public and private life of their people. In order to achieve their goals, the government uses various regimes to create the loyalty among their residents. The propaganda is often seen to give the false concept to the state's members to brainwash them and to make them believe in everything the authority wants them to believe. The control of all the mass media tremendously helps the state to either insert or delete any information from its members (Bernia, 2019,pp.16-19).

In addition, indoctrination is the process to shape people's mind by controlling over their education. The government will allow the students to learn only what the state wants them to know regarding to its security and stability. The state also uses the means of terror and police control to manage its total power over its people. Besides, isolation is the key to authorize its members. When people are isolated from the outside world, the comparison which is the greatest fear for the government will never occur (Bernia, 2019,pp.16-19). And when

the comparison never happens, the members will always assume that they live in the "perfect world" and there is nothing else they should strive for. As a result, totalitarian concept will be utilized to scrutinize all of the totalitarian regimes found in *Never Let Me Go*.

2. Objectives

(1) To explore the totalitarian regimes employed in the novel of *Never Let Me Go* by Kazuo Ishiguro.

3. (1) Remote Confinement

Students at Hailsham school are not allowed to go outside the school area in order to separate them from people in the outside world. Keeping people in the restricted area is one of the totalitarian means. Traditionally in dystopian novel, there are the certain reasons for restraining people in the certain areas. Mostly, it is because of their extraordinary power or differences from the others. In this novel, Hailsham students are confined only in the school because they are cloned for specific purposes: they are destined to donate their organs to humans whose organs need to be replaced due to any physical problems. Therefore, they are kept inside the school to certify that they will be in the good care and good health before the donating time. However, the guardians who teach and train Hailsham students give them the illusive picture of Hailsham as a happy place.

In the story, there are also the cloned children in other places across the country but they are hardly mentioned. What the audience knows from the narration is that the clones who do not live in Hailsham school are suffered from their poor living condition: "…All around the country, at this very moment, there are students being reared in deplorable conditions, conditions you Hailsham students could hardly imagine…" (Ishiguro, 2005, p.255).

However, the restrictions of the cloned children seen in the text are quite diverse from other dystopian works. Unlike *1984*, *Fahrenheit 451*, *Divergent* Series, *The Giver*, the confinement of the clones in *Never Let Me Go* is not too harsh. The head of the guardian at Hailsham school, Miss Emily, reveals the true purpose of establishing this school at the end of the story that she sets up this school to help the cloned children by giving them the shelter: "…You see, we were able to give you something, something which even now no one will ever take from you, and we were able to do that principally by *sheltering* you. Hailsham would not have been Hailsham if we hadn't…" (Ishiguro, 2005, pp. 262-263) so that they are taught to be cultivated to be like ordinary human beings. Miss Emily's reason for establishing this school has put her in the positive side which confinement for the students does not seem to be the unpleasant place but help them to be in the much better positions. Furthermore, the issue of "sheltering" is quite debatable since some rules instituted in Hailsham school retain the students' rights. Nevertheless, the students' rights will be discussed further in the section of dehumanization. Additionally, the evidence to support that Hailsham is not the dismal place to live is when Hailsham students especially Kathy often think of the time they have at Hailsham school. Kathy talks about the old days at Hailsham with her old friends like Ruth and Tommy. In addition, Kathy seems to treasure her memories of Hailsham as the thing that can connect her friends and her together: "Once I'm able to have a quieter life, in whichever centre they

send me to, I'll have Hailsham with me, safely in my head, and that'll be something no one can take away" (Ishiguro, 2005, p.281). How important Hailsham school is to Kathy is clearly seen when she always look for something that reminds her of Hailsham whenever she drives along the road:

> *Driving around the country now, I still see things that will remind me of Hailsham.*
> *I might pass the corner of a misty field, or see part of a large house in the distance as*
> *I come down the side of a valley, even a particular arrangement of poplar trees up on*
> *a hillside, and I'll think: 'Maybe that's it! I've found it! This actually is Hailsham!'*
> *Then I see it's impossible and I go on driving, my thoughts drifting on elsewhere.*
> *In particular, there are those pavilions. I spot them all over the country, standing on*
> *the far side of playing fields, little white prefab buildings with a row of windows*
> *unnaturally high up, tucked almost under the eaves. I think they built a whole lot like*
> *that in the fifties and sixties, which is probably when ours was put up. If I drive past*
> *one I keep looking over to it for as long as possible, and one day I'll crash the car like that,*
> *but I keep doing it. Not long ago I was driving through an empty stretch of Worcestershire*
> *and saw one beside a cricket ground so like ours at Hailsham I actually turned the car*
> *and went back for a second look.*
>
> *(Ishiguro, 2005, p.6)*

Obviously, Hailsham school is much more pleasant to the students than the outside world. In Hailsham school, they do not suffer from the donations and what ordinary people think about them. They are all treated the same here. On the contrary, the outside world is the cruel world waiting for them to confront with no choices to choose from. They have to agonize from the donation effects and die eventually. They also will realize that they are oppressed by the ordinary people. Within Hailsham school, they do not perceive any of the horrible threats to their lives. As a result, in this sense, Hailsham school is the true "shelter" for Hailsham students. However, there is another different thought about this "shelter". These distinctive thoughts are described through Miss Lucy's perceptions, one of the guardians at Hailsham school, toward how Hailsham school organizes the entire system. The way Hailsham is constructed will be examined in the section of limited information and knowledge.

Hailsham students' extraordinary condition as the clones is reinforced by separate world the author intends to make to show how they are distinctive from real human beings. This novel demonstrates that clones are treated differently from real humans. The differences are shown in separation of their world to the ordinary world. Notably, Hailsham school is located in the remote area where people from the outside world hardly go there. There are two kinds of people described in the book that come to Hailsham school. One is Madame who comes to collect students' creative works. Another is the men who come to deliver the goods for the Sales activities. Therefore, Hailsham school is like a mysterious place to the others. Moreover, their differences are emphasized when Madame is terrified of them. She will have the strange reaction every time she meets them.

Apart from the above, the separation of Hailsham school and the outside world is emphasized by making the outside so horrible areas/spots that the students will not be curious and want to explore it. Morevoew, the

guardians who teach and train Hailsham students give them the illusive picture of Hailsham as a happy place. They do not allow to go outside the school without the permission. The guardians created the terror of the outside world for them. So when the students think that the world outside Hailsham is very dangerous, then they will not bother escaping from the school. Besides, if the students have the knowledge of the outside world, they will learn that they are ill treated by the government which will lead them to rebel against the school and the state. To create the fear of the outside world, the guardians set up the rumors of the students who dares to go outside the Hailsham school fence, cannot be back and die finally. This myth makes the students afraid to go outside the school since they do not want to end up just like those students:

> *There were all kinds of horrible stories about the woods. Once, not so long before we all got to Hailsham, a boy had had a big row with his friends and run off beyond the Hailsham boundaries. His body had been found two days later, up in those woods, tied to a tree with the hands and feet chopped off. Another rumour had it that a girl's ghost wandered through those trees. She'd been a Hailsham student until one day she'd climbed over a fence just to see what it was like outside. This was a long time before us, when the guardians were much stricter, cruel even, and when she tried to get back in, she wasn't allowed. She kept hanging around outside the fences, pleading to be let back in, but no one let her. Eventually, she'd gone off somewhere out there, something had happened and she'd died. But her ghost was always wandering about the woods, gazing over Hailsham, pinning to be let back in.*
>
> *(Ishiguro, 2010, p.50)*

This kind of rumour spread widely among Hailsham students. They keep talking about it from time to time and never find out whether it is the truth or just the made up story.

Besides, exchanges activity also marks Hailsham as the separated world since it is the only chance that students can connect to the outside world by purchasing the goods that have been delivered from the outer world. Surprisingly, they are not too curious to escape the school to see what it is like outside, although it is the mysterious place for them.

How confinement here is different from others in dystopian novels is that it turns out to be the memorable place for the students although there are many rules they have to follow. In most dystopian works, people struggles to live in the restricted places and want to escape because those places are nightmare for them. The cruelty shown in this story is, therefore, not from the confinement but from the way ordinary humans treat those clones outside Hailsham school.

4. (2) Limited Information and Knowledge

Hailsham students receive limited information and knowledge while staying in school. The guardians will inform the students only what they think it is suitable for them. This way the students will not be aware of

what is going on outside Hailsham school. This can be looked into two different ways. First, it is good for students so that they will not be upset and live their lives aimlessly if they realize that they have to suffer from donating their organs and have to die eventually. Secondly, it is not fair with the students at all since they do not know what they will face in the near future. They do not have time to prepare to accept the truth and cope with it well. As seen in the story, the limited information and knowledge is often indirectly mentioned by Miss Lucy, one of the guardians. She is very upset that the students are not told the complete information and knowledge that they are supposed to know about themselves. She often slips out some information but incomplete one to the students and brings the topic of 'told and not told' to the students.:

> *...If no one else will talk to you, then I will. The problem, as I see it, is that you've been told and not told. You've been told , but none of you really understand, and I dare say, some people are quite happy to leave it that way. But I'm not. If you're going to have decent lives, then you've got to know and know properly. None of you will go to American, none of you will be film stars. And none of you will be working in supermarkets as I heard some of you planning the other day. Your lives are set out for you. You'll become adults, then before you're old, before you're even middle-aged, you'll start to donate your vital organs. That's what each of you was created to do. You're not like the actors you watch on your videos, you're not even like me. You were brought into this world for a purpose, and your futures, all of them, have been decided. So you're not to talk that way any more. You'll be leaving Hailsham before long, and it's not so far off, the day you'll be preparing for your first donations. You need to remember that. If you're to have decent lives, you have to know who you are and what lies ahead of you, every one of you.*

> *(Ishiguro, 2010,pp.79-80)*

When Kathy recalls about this, the audience can see that all the information that the students perceive is the trivial ones but the guardians will not be straightforward with the students about the significant issues especially about the donations

5. (3) Employment of Surveillance

The guardians closely watch the Hailsham students while they are at Hailsham school to ensure that every student obeys the rules and do not cause any troubles. However, the surveillance here is not too harsh like in *1984*. Even though the students' privacy is hard to find at Hailsham school, the students do not feel so stressed about their lack of privacy. Despite their lack of privacy, the students still find some privacy in school to be alone with their close friends and talk about the issues they do not want others to know. Their privacy mentioned in the story lies in two places: the sport pavilion and the lunch queues. It is ridiculous that the lunch queues become the place to talk about the secret stories. According to Kathy, the cafeteria and the lunch queue are so loud that no

one hears or pays attention to what one says. Ironically, Tommy and Kathy have the secret conversation at the pond although they know that the pond is not a safe place for secrecy since it is the open place where people can hide behind the bush and eavesdrop their discussion.

Nevertheless, the guardians do not intend to do any harm to the students. They just want to assure that the students are in the good conditions and they do not know what they are not supposed to know about their cloning position. They just want all the students to have the healthy childhood before they face the horrible reality outside Hailsham school. As a result, surveillance here is different from surveillance in most dystopian novels which the governments closely watch their citizens for the sake of their own stability. Yet, the surveillance does not continue for the rest of the story. It ends after the students leave school.

6. (4) Dehumanization

Dehumanization is crucial issue seen in this novel. All the Hailsham students are cloned for the specific purpose. The government intends to clone them for the xenotransplantation. The cruelty from xenotransplantation is not obviously seen. The process of clone invention is skipped. Ishiguro chooses to slightly indicate that the students are cloned. What given to the audience is that they are bred and raised to be the donors so that their internal organs will be transplanted to human whose bodies are in the terrible conditions and their organs did not work properly anymore. The government cruelly treats the clones as the objects. They do not care if those clones will have side effects or suffer from their donations. All the state focuses on is to improve human's lives to a better level. However, there is no information described whether the donees know about this ugly truth.

Apart from treating clones as the objects, depriving of the human rights is another dehumanization appearing in this story. Hailsham students have no rights to know about the important information related to their life. For example, the guardians do not clearly tell them that they have to donate their internal organs for human beings. They do not allow to go outside the school without the permission. The guardians created the terror of the outside world for them. So when the students think that the world outside Hailsham is very dangerous, then they will not bother escaping from the school. Besides, if the students have the knowledge of the outside world, they will learn that they are ill treated by the government which will lead them to rebel against the school and the state. To create the fear of the outside world

5. Conclusion

Totalitarian means in *Never Let Me Go* can be classified into four ways: remote confinement, limited information and knowledge, employment of surveillance and dehumanization. Remote confinement is used to keep the Hailsham students from the outside world. Limited information and knowledge are given to the Hailsham students because the guardians do not want them to know about the cruelty they have to face in their future. For the employment of surveillance, the guardians keep the close look on the students to make sure that they stay safe and healthy. Additionally, dehumanization is indicated that the cloned students are ill treated by the government. Although their rights are deprived during the time at Hailsham, they are safe from cruelty of the government.

6. Suggestions

The comparison of totalitarianism in the two media: both novel and the adapted film of the same title should be examined to see if the adapted film is similar to the original text.

7. References

Babubhai,P.B.(2019). A Study on the Role of Clones in Never Let Me Go written by Kazuo Ishiguro. *Pramana Research Journal*, *9*(6), 1544-1548.

Benia, S. (2019). *Docile Bodies: Panopticism in Kazuo Ishiguro's Never Let Me Go*. Master Degree in English Literature and Civilisation, University of Mohamed Boudiaf- M'sila.

Grady, C. (2017). *The 2017 Nobel Prize in literature goes to Kazuo Ishiguro, author of Never Let Me Go.* [Online]. 30 September 2022, from: https://www.vox.com/culture/2017/10/5/16428754/2017-nobel-prize-literature-kazuo-ishiguro-never-let-me-go-remains-of-the-day

Ishiguro, K. (2010). *Never Let Me Go*. Croydon: Faber and Faber Limited.

Mondal, B, and Aravind, A. (2019). Human Cloning in Kazuo Ishiguro's Novel Never Let Me Go. *Journal of Xi'an University of Architecture & Technology*, *11*(12), 426-431.

JAPANESE COMMERCIAL CODE: THE COMPATIBILITY WITH 1980 VIENNA SALES CONVENTION AS COMPARED WITH THAI CIVIL AND COMMERCIAL CODE

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ABSTRACT

Given the fact that, currently in Thailand, there are no specific laws governing commercial sales and international sales which apparently causes legal obstacles. As Thailand and Japan share similar legal histories and backgrounds and both now follow the legal system of the Continental Europe, i.e. the Civil Law whereby many countries joining therein separate commercial sales from non-commercial sales, including Japan. In addition, Japan, but not Thailand, is a member state of the United Nations Convention on Contracts for the International Sale of goods (CISG), or the 1980 Vienna Sales Convention which was designed to apply only to commercial sales and is now worldwide accepted and gaining more and more popularity as the growing number of contracting states has been increasing and currently reaching 94 states.

This research is thus aimed to study the compatibility of Japanese Commercial Code regarding sales with the United Nations Convention on Contracts for the International Sale of Goods (CISG), or the 1980 Vienna Sales Convention as they were both designed to apply only to commercial sales and then compare with Thai Civil and Commercial Code regarding sales. The sales provisions provided in Thai Civil and Commercial Code are the only set of Thai sales law and apply to both commercial sales and non-commercial sales, including international sales, which are distinct in natures.

It is highly expected that the result of this research will be a piece of vital information which can be used to develop Thai sales law by considering (1) the separation of domestic commercial sales provisions from non-commercial sales by any mean, and (2) the accession to the United Nations Convention on Contracts for the International Sale of Goods (CISG), or the 1980 Vienna Sales Convention with the enactment of a new Thai sales law applying to international sales which needs specific provisions designed for international sales.

Two significant movements after this research has been launched in 2018 are to be updated. The first one is a major reform of the Japanese Civil Code which is called the "2017 Reform" and came into force on 1st April 2020. As the Japanese Civil Code's application is connected with the Japanese Commercial Code, its 2017

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[1] This Research is updated after has been first presented at Sripatum University National and International Conference (2018 SPUCCON) No. 13 on 20 December 2018.

Reform thus relates to this research, particularly where it attempts to (1) modernize Japanese contract law, (2) incorporate case law developments into the Civil Code and (3) promote the global convergence of contract law. The second one is that Thailand, according to the writer's latest research interview made with personnel of the responsible Ministry on 15th September 2022, is now reaching the final stage of the accession to the United Nations Convention on Contracts for the International Sale of Goods (CISG), or the 1980 Vienna Sales Convention. This includes the completion of its long drafting of the implementation law which shall be used as the new Thai sales law applying specifically to international sales. Both updates of which, shall be hereunder elaborated more towards the development of Thai sales law as is the aim of this research.

Keywords: Japanese Commercial Code, Commercial sales

1. Research Rational and Background

The history and background of Japan and Thailand's legal systems bear similarity since the development of their ancient laws to modernized laws under the influence of the West during its colonization at the beginning of the 19th Century. Back then, both countries decided to follow the continental Europe's legal system, particularly France and Germany, by enacting their own codes resulting which Japan and Thailand have long been classified as countries utilizing the Civil Law[2] legal system as distinct from the Common Law[3] legal system which is widely used in England and commonwealth countries.

At present, there is no Thai existing law specifically applied to commercial sales including international sales which bear similar natures. The nature of sale provisions under Thai Civil and Commercial Code is domestically and does not specifically conform to commercial sales including international sales. In term of international sales, similar nature exists all over the world and thus emerged a number of initiations to harmonize sales law to be as one or to share the same principles. The International Institute for the Unification of Private Law, or UNIDROIT, established by the Italian government and the United Nations Commission on International Trade Law, or UNCITRAL, established by the United Nations are two major organizations which involved in these initiations by launching the Uniform Law on the International Sale of Goods (ULIS), the Uniform Law on the Formation of Contracts for the International Sale of Goods (ULFIS) and the United Nations Convention on Contracts for the International Sale of Goods (CISG) or, the 1980 Vienna Sales Convention respectively.[4] The first two ULIS and ULFIS were the products of UNIDROIT in 1960 but unfortunately were not successful as the number of contracting states were few due to some specific reasons which shall not be discussed here. Followed by UNCITRAL, the United Nations Convention on Contracts for the International Sale of Goods (CISG) or, the

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[2] Or, known as 'Codification System', originated from Roman Laws and widely used in Continental Europe and countries all around the world including Asia.

[3] Or, known as 'Non-Codification System', originated from customary laws or Judge-made laws.

[4] Ruangvichathorn, J. (2003). "International Convention, is it about time?" In *Thammasat Law Journal*, pp.1-3.

1980 Vienna Sales Convention was adopted in 1980 at a Diplomatic Conference held in Vienna, Austria and effective in 1988 after the numbers of ratifying states reached ten states. Unlike the Uniform Law on the International Sale of Goods (ULIS) and the Uniform Law on the Formation of Contracts for the International Sale of Goods (ULFIS), the United Nations Convention on Contracts for the International Sale of Goods (CISG) or, the 1980 Vienna Sales Convention has been much more successful as the number of contracting states have now reaching 94 states including Japan and more recently is Vietnam and Laos[5] which is the second and third countries in the Association of Southeast Asian Countries (ASEAN) following Singapore.[6]

Japan is currently a contracting state of the United Nations Convention on Contracts for the International Sale of Goods (CISG), or the 1980 Vienna Sales Convention[7] but not Thailand. Given the fact that both the United Nations Convention on Contracts for the International Sale of Goods (CISG), or the 1980 Vienna Sales Convention and Japanese Commercial Code were specifically designed to apply only to commercial sales[8] which are distinct in nature from non-commercial sales the study why Japan decided to accede to the United Nations Convention on Contracts for the International Sale of Goods (CISG), or the 1980 Vienna Sales Convention by analyzing their compatibilities is the aim of this research. On the other hand, the study why Thailand has not yet acceded to the International Sale of Goods (CISG), or the 1980 Vienna Sales Convention despite the fact that Thai Civil and Commercial Code is not compatible with commercial sales including international sales because it was designed to apply to both commercial sales and non-commercial sales which are distinct in nature and currently causes legal obstacle in Thailand is also the aim of this research. Regarding Thai sales law, following a highly controversial Supreme Court Judgment No.3046[9] in 1994 (2537 B.E.[10]), this case law indicates that the only set of Thai law which is available for a court to apply to a sale contract, whether it be domestic or international including civil (non-commercial) or commercial, is the Law of Sales ("Book III, "Specific Contract: Sales") of TCC under which, according to its nature, is rather civil or non-commercial than commercial (and absolutely not international) because TCC was enacted long ago (the first one was in 1923 but, due to many criticisms, was repealed and replaced two years later by the present one which was in force in 1925) when commercial and international sales were obviously unknown to Thai society. This can be seen from the facts in

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[5]   Effective on 1 January 2017 and 1 October 2020 respectively.

[6]   Since 1995, Ruangvichathorn, J. "International Trade Law and Sales Convention" In Lecture Handouts, the Council of State, 2018.

[7]   Effective on 1 August 2009.

[8]   Ferrari, F. and Torsello, M. (2014). *"International Sales Law – CISG in a Nutshell"*. West Academic Publishing. p. 104. (stating that 'CISG excludes the sale of goods bought for personnel, family or household use from its sphere of application which 'leads *de facto* to a limitation of the CISG's sphere of application to commercial contracts'.)

[9]   In the same year, there was also another case bearing similar facts and points of dispute which was decided by the court with the same result, i.e. the Supreme Court Judgment No. 3651/2537

[10] B.E. stands for Buddhist Era (starting from the year Lord Buddha passed away) which is 543 years prior to A.D. (Anno Domini/starting from the year Jesus Christ was born) (Online). Available: https://www.shorteng.com /.

the above Supreme Court Judgment No. 3046 starting when an international sale contract between Thai seller and foreign buyer was concluded via telex and the Thai seller was later sued by such the foreign buyer in Thai court after refusing to deliver goods.

Thai court eventually decided in favor of the Thai Seller. This was because Section 456, Subsection 2 and 3 of TCC collectively provide that a contract of sale of movable property where the agreed price is 500 Thai Baht (THB) or upwards (this was amended in 1992 to be currently 20,000 THB) is not enforceable, unless, (1) there is some written evidence signed by the party liable, or (2) earnest is given, or (3) there is part performance. Accordingly, the Court ruled that any of these three requirements was not found even though the court did not deny that there was actually a concluded contract and a letter of credit was also come into play as the payment venue of this contract. These three requirements under Section 456 of TCC clearly reflect the nature of a sale that it is civil (or, non-commercial) not commercial and international which are conducted by merchants. Since then, such the Supreme Court Judgment No. 3046 has been subjected to vast criticism especially by law academics and, as a result, development of Thai sales law has been called for in various forms. In 2004 and 2005, for instance, the Government at the time set up a committee and a sub-committee respectively to principally work out whether or not Thailand should develop laws in this branch by separating laws governing non-commercial matters from commercial matters which include sales.

Accordingly, as Thailand needs other sets of law applying to domestic commercial sales and international sales separately from current Civil and Commercial Code, this research shall also be beneficial for Thailand if it will ever be used as part of the consideration to develop Thai sales law by (1) separating domestic commercial sales from non-commercial sales, and (2) acceding to the United Nations Convention on Contracts for the International Sale of Goods (CISG), or the 1980 Vienna Sales Convention with the enactment of a new Thai sales law applying specifically to international sales .

In addition, Thailand and Japan share similar legal histories and backgrounds bearing the fact that, at the time of drafting its own codes including the Civil and Commercial Code, Thailand partly utilized Japanese Civil Code as model[11]. Any comparative study of Japanese Commercial Code (particularly where there has been the 2017 Reform of the Japanese Civil Code under which its application is connected with the Japanese Commercial Code) and Thai Civil and Commercial Code derived herein shall also be valuable in term of legal history and legal principle particularly in international trade and investment to legal communities as a whole.

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[11] Ruangvichathorn, J. (2015). "The Japanese Civil Code: The forerunner of Thai Civil and Commercial Code". *Sripatum University Press,* pp.18-19.

2. Research Objectives

1. Combined with the 2017 Reform, to study the compatibility of Japanese Commercial Code regarding sales with the United Nations Convention on Contracts for the International Sale of goods (CISG), or the 1980 Vienna Sales Convention as compared with Thai Civil and Commercial Code in the same aspects.

2. Combined with the 2017 Reform, to study the incompatibility of Thai Civil and Commercial Code regarding sales with domestic commercial sales and international sales.

3. Combined with the 2017 Reform, to study the significance of Thailand in developing Thai sales law by (1) separating domestic commercial sales from non-commercial sales by any mean, and (2) acceding to the United Nations Convention on Contracts for the International Sale of Goods (CISG), or the 1980 Vienna Sales Convention with the enactment of a new Thai sales law applying specifically to international sales.

3. Research Questions

1. Combined with the 2017 Reform, to what extent Japanese Commercial Code regarding sales is compatible with the United Nations Convention on Contracts for the International Sale of goods (CISG), or the 1980 Vienna Sales Convention as compared with Thai Civil and Commercial Code in the same aspects.

2. Combined with the 2017 Reform, to what extent Thai Civil and Commercial Code regarding sales is not compatible with domestic commercial sales and international sales.

3. Combined with the 2017 Reform, to what extent Thailand will benefit from (1) the separation of domestic commercial sales from non-commercial sales by any mean, and (2) the acceding to the United Nations Convention on Contracts for the International Sale of Goods (CISG), or the 1980 Vienna Sales Convention with the enactment of a new Thai sales law applying to international sales.

4. Research Hypotheses

1. Combined with the 2017 Reform, Japanese Commercial Code regarding sales is compatible with the United Nations Convention on Contracts for the International Sale of goods (CISG), or the 1980 Vienna Sales Convention because they were similarly designed to apply only to commercial sales, not non-commercial sales.

2. Combined with the 2017 Reform, Thai Civil and Commercial Code regarding sales is not compatible with both domestic commercial sales and international sales which focus on commercial matters because it was designed to apply to both commercial sales and non-commercial sales which are distinct in nature and thus currently causes legal obstacle in Thailand.

3. Combined with the 2017 Reform, It shall be beneficial for Thailand to develop Thai sales law by (1) separating domestic commercial sales from non-commercial sales by any mean, and (2) acceding to the United Nations Convention on Contracts for the International Sale of Goods (CISG), or the 1980 Vienna Sales Convention with the enactment of a new Thai sales law applying specifically to international sales.

5. Research Scope

1. Combined with the 2017 Reform, studying on selected sale provisions of Japanese Commercial Code and analyze their compatibility with the United Nations Convention on Contracts for the International Sale of goods (CISG), or the 1980 Vienna Sales Convention.

2. Combined with the 2017 Reform, studying on the same selected sale provisions under Thai Civil and Commercial Code and analyze their incompatibility with domestic commercial sales and international sales.

3. Combined with the 2017 Reform, studying on the significance of Thailand to develop Thai sales law by (1) separating domestic commercial sales from non-commercial sales by any mean, and (2) acceding to the United Nations Convention on Contracts for the International Sale of Goods (CISG), or the 1980 Vienna Sales Convention with the enactment of a new Thai sales law applying specifically to international sales.

6. Research Significance

1. Combined with the 2017 Reform, learning the compatibility of Japanese Commercial Code regarding sales with the United Nations Convention on Contracts for the International Sale of goods (CISG), or the 1980 Vienna Sales Convention as compared with Thai Civil and Commercial Code in the same aspects.

2. Combined with the 2017 Reform, learning the incompatibility of Thai Civil and Commercial Code regarding sales with domestic commercial sales and international sales.

3. Combined with the 2017 Reform, proposing the significance of Thailand in developing Thai sales law by (1) separating domestic commercial sales from non-commercial sales by any mean, and (2) acceding to the United Nations Convention on Contracts for the International Sale of Goods (CISG), or the 1980 Vienna Sales Convention with the enactment of a new Thai sales law applying specifically to international sales.

7. Conclusion

In sum, with respect to Japanese Commercial Code, the United Nations Convention on Contracts for the International Sale of goods (CISG), or the 1980 Vienna Sales Convention and Thai Civil and Commercial Code, on the one hand, Japanese Commercial Code regarding sales is undoubtedly compatible with the United Nations Convention on Contracts for the International Sale of goods (CISG), or the 1980 Vienna Sales Convention both in substances and practices which are based on commercial sales, not non-commercial sales, resulting which the accession to the United Nations Convention on Contracts for the International Sale of goods (CISG), or the 1980 Vienna Sales Convention by Japan was not too remote. On the other hand, even though Thai Civil and Commercial Code, in the case of Thailand, is found to be incompatible with domestic commercial sales and international sales, the accession to the United Nations Convention on Contracts for the International Sale of goods (CISG), or the 1980 Vienna Sales Convention is also to be considered by Thai authorities. This is because there are not enough laws to apply to three types of sales currently practicing in Thailand, i.e. civil or non-commercial, commercial and international which are distinct in natures. In addition, in the course of this research, the writer has also found out that Japanese Civil Code, which has also come into play under Article 1(2) of

Japanese Commercial Code and has been in existence for more than 100 years (the first new text code was used in 1898) similarly to Thai Civil and Commercial Code (the first code was used in 1966) has now been revised particularly in the part of contract law, known as the 2017 Reform as aforesaid. In term of commercial sales, based on this reason alone, Thailand should thus considered revising Thai Civil and Commercial Code and also taking this opportunity to revise its sales law accordingly. In term of international sales, as Thailand is in the final stage of the accession to the United Nations Convention on Contracts for the International Sale of goods (CISG), or the 1980 Vienna Sales Convention, the draft implementation law which conforms to its provisions, as elaborated, shall serve as the development of Thai sales law in this aspect accordingly.

8. Discussion

Throughout the course of this research, with the two significant updates made, the writer has found out a great deal of valuable legal materials which eventually suggest that the existing Thai laws regarding sales in which we have been relying on them all along are not sufficient and compatible with the accommodation of all types of sales currently practiced in Thailand. This research, with great expectation, will be potentially used to consider the development of Thai sales in the future or, at least, trigger the same.

9. Recommendation

The recommendation of this research, with the two significant updates made, is the development of Thai sales law by considering (1) the separation of domestic commercial sales from non-commercial sales by any mean, and (2) the accession of the United Nations Convention on Contracts for the International Sale of goods (CISG), or the 1980 Vienna Sales Convention and Thai Civil and Commercial Code with the enactment of a new Thai sales law applying specifically to international sales.

10. Acknowledgements

11. Reference

Ferrari, F. and Torsello, M. 2014. *"International Sales Law – CISG in a Nutshell,* West Academic Publishing.

Hiroo, S. 2008. "Japan's Accession to the CISG: The Asia Factor" In 20 *Pace International Law Review, 105*, 114.

Kita, R. 1996. *"A Compendium of Japanese Commercial Law,"* KINDAIBUNGEISHA, Tokyo, Japan.

Ruangvichathorn, J. Contract Law in Thailand: A Proposal for Reform of Thai Sales Law as Compared with Japanese Contract Law and CISG, Bot Bundit, *Law Jounal of the Thai Bar, 78*(2), April-June 2022 ISSN 0857-2992, 73-93.

_____. 2003. "International Convention, is it about time?," In *Thammasat Law Journal.*

_____. 2015. *"The Japanese Civil Code: The forerunner of Thai Civil and Commercial Code"* Sripatum University Press.

_____. 2018. *"International Trade Law and Sales Convention,"* In Lecture Handouts, the Council of State.

Schwenzer, I. 2016. *"Commentary on United Nations Convention on Contracts for the International Sale of goods (1980).* 4th ed. London: Oxford University Press.

Sono, H., Nottage, L., Pardieck, A., Saigusa, K. (2019). *Contract Law in Japan.* Kluwer Law International B.V.

Room 3:

Business, Management, Logistics & Supply Chain

INNOVATION CULTURE: SONY CORPORATION'S KEIRETSU ORGANIZATIONAL CULTURE

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ABSTRACT

Keiretsu is a Japanese word for a system that maintains a long‐term relationship with suppliers or smaller enterprises in order to eliminate additional costs efficiently. The core of Keiretsu organizational culture is being cordial, using Hitozukuri (making people) and Monozukuri (delivering products/services). This research aims to explore Keiretsu organizational culture and the impact it has on the Sony Corporation's culture of innovation. The paper's archival search covers the business activities of Sony Corporation from 1946-2022. The results are presented in a table illustrating two periods: 1946‐2005 and 2006‐2022. Although seemingly innovative, Keiretsu has negatively affected the Sony Corporation's organizational culture by elongating the corporation's process of innovation. Furthermore, Sony Corporation also has produced too many products, which appears to be good, but eventually has led the corporation to be unproductive and out of focus. As a result, even though Sony Corporation exhibits Keiretsu organizational culture, but this culture has not led Sony Corporation to innovation culture.

Keywords: Innovation, Organizational Culture, Sony, Keiretsu

1. Importance and Research Background

Keiretsu is a Japanese word for a system that maintains long-term relationships with suppliers or smaller enterprises in order to eliminate additional costs efficiently (Rowley & Tashiro, 2005; Shimotani, 1995). According to Lincoln and Shimotani (2009), Keiretsu can be subcategorized either as horizontal Keiretsu or vertical Keiretsu. Horizontal Keiretsu concentrates on the financial industry (such as enterprises like Dai-Ichi Kangyo, Fuji, Mitsubishi, Mitsui, Sanwa, and Sumitomo), while vertical Keiretsu concentrates on the manufacturing industry (featuring enterprises such as Matsushita, Nippon, and Toyota. Keiretsu focuses on individuals as a whole (Johnson & Ouchi, 1974). The core of Keiretsu organizational culture is cordiality using *Hitozukuri* (making people) and *Monozukuri* (delivering products/services), as proposed by Diong and Choo (2008). A leading Japanese MNE, Matsushita Electric, for example, is generous enough that to pay dividends to smaller enterprises in its Keiretsu circle twice a year (Shimotani, 1995). Japanese MNEs do tend to hire an excessive number of employees to avoid a plausible workforce reduction during an economic downturn (Johnson

& Ouchi, 1974). Not surprisingly, this strategy results in an abundance of patents issued in the US that have a Japanese origin.

In reality, are there any pitfalls or drawbacks inherent in this kind of organizational culture? Shimotani (1995) criticizes the culture, saying that Keiretsu barricades foreign enterprises and keeps them out of Japan's marketplace. Hamel and Prahalad (1993) suggest that some Japanese MNEs decide to create their own facilities to avoid distributing profit to smaller enterprises (since these Japanese MNEs exploited smaller enterprises' resources). Furthermore, Japan's Sony Corporation, one of the world's leading MNEs, was established in 1946 (Sony Corporation, 2022a), and has performed well in the consumer-electronics industry together with the other leading electronic companies – Hitachi, Panasonic, Sharp, Sony Corporation, and Toshiba (Khanna et al. 2011). Nevertheless, surprisingly, Sony Corporation's major competitor is Matsushita, which is not among these top five consumer-electronic enterprises (Finkelstein, 2006).

The company's name, "Sony", refers to "Sound" – called *Sonus* in Latin (Ibid.). During the 1980s, Japanese MNEs were highly profitable because of their innovative products and the support they received for bringing these products to the market (Hamel & Prahalad, 1991). Although Sony Corporation has been bound to such an innovative environment for such as long time, it is questionable whether the corporation can sustain its competitive advantage in the long run. Despite its success, experts, such as Dvorak (2012) argues that the more recent downturn of Sony Corporation was caused by Sony's own organizational culture, which has negatively impacted its success. Could Keiretsu organizational culture bring about the demise of Sony Corporation by diminishing its innovation culture? The author attempts to address this question in depth.

2. Research Objectives

(1) This case study research aims to explore Keiretsu organizational culture in the Sony Corporation.

(2) The author would like to investigate the impact of Keiretsu on innovation culture.

3. Literature Reviews and Research Questions

3.1 Innovation Culture in Multinational Enterprises Driven by Organizational Culture

In the past, in order to advance innovation in Japan's organizational infrastructure, the country's public and private sectors sent students to study in Europe and abroad (Khanna et al., 2011). During that time, the Japanese government believed innovation culture could create state-of-the-art products/services and prevent other Asian countries from imitating Japan's products/services. The result of this strategy was that Japan acquired a British management style for its post-offices, a German management style for its cadets, and even a French management style for its legal system (Ibid.). In addition, multinational enterprises (MNEs) were prone to be more innovative than traditional enterprises due to their international exposure to competition (Jimenéz-Jimenéz et al., 2014). This essence of innovation has motivated MNEs to think and work differently from the usual traditional way (Diong & Choo, 2008). They also have more accessibility to know-how in the different international locations where they operate (Jimenéz-Jimenéz et al., 2014).

However, a side effect of innovation culture in MNEs is that it exposes their innovations to copycat competitors (Girotra & Netessine, 2011). To prevent copycat behavior by competitors, MNEs sometimes use patents to successfully protect their innovative products/services (Hutzschenreuter & Voll, 2008). In comparing to the number of patents from Asian MNEs with those in other parts of the world, it is remarkable that Asian MNEs can generate more patents than European MNEs. However, strong organizational culture MNEs with redundant pride in past successes may halt their innovation culture. This evidence is supported by Rowley and Tashiro (2005) who mention that past success can somehow eliminate future/ongoing innovation in an enterprises.

3.2 Research Questions (RQs)

RQ1: Sony Corporation exhibits Keiretsu organizational culture.

RQ2: Sony Corporation's Keiretsu organizational culture affects innovation culture.

4. Qualitative Research Methodology

For the archive screening process, Sony Ericsson and Sony Pictures were discarded since they are either joint ventures or were merged and acquired and thus could be influenced by other organizational cultures apart from Keiretsu. The archival search includes academic journals, articles from magazine, news channels, corporate websites, and etc. The main key aspects of the study are to find a Keiretsu theme and to investigate how this organizational culture affects innovation culture, especially in Sony Corporation. The archives cover the period from 1946-2022 – the lifespan to date of Sony Corporations. The results are presented in a table showing the timeline, rather than a quantified thematic matrix as presented by Simiyu (2017).

5. Research Findings

Based on the aforementioned case study research, the author dividess Sony Corporation's timeline into two periods: 1946-2005 (the establishment period) and 2006-2022 (the maturity period).

Table 1 Timelines of transitions in innovation culture of Sony Corporation from 1946-2005 (the establishment)

Years	Sony Corporation
1946-1994	Tokyo Telecommunications Engineering Corporation or Tokyo Tsushin Kogyo K.K. was founded in 1946 (Sony Corporation, 2015a). In 1957, Sony developed the cassette tape, mini radio, and the transistor (Finkelstein, 2006).
1995-2003	In 1995, Nobuyuki Idei became Sony Corporation's new CEO after Norio Ohga (Schlender, 2005).
2004-2005	A British citizen and an ex-historian from Oxford University, Howard Springer, was chosen as Sony Corporation's new CEO (Siklos, 2009).

Table 2 Timelines of transitions in innovation culture of Sony Corporation from 2006-2022 (the maturity)

Years	Sony Corporation
2006-7	Sony Corporation celebrated its 60th year of operation (Schlender, 2005) and launched an e-book reader (the Sony Reader) and golden PlayStation 3 (Siklos, 2009).
2008-2014	Sony Corporation earned $78 billion based on a few thousand products (Dvorak, 2012).
2015	Sony Corporation's Xperia™ Z2 tablet won the iF design award (Sony Corporation, 2022b). In addition, Sony introduced the Xperia M4 Aqua smartphone, which is water-resistant (Reisinger, 2015).
2015-2022	Sony Corporation provides its own brand-new service on streaming and subscription, against its rival, Perennial Console (Crider, 2022).

Indeed, Sony Corporation encourages its multiple units to compete with each other by making decisions on their own product designs (Rowley & Tashiro, 2005). In addition, Lincoln and Shimotani (2009) report that Sony Corporation's Board member and Nissan's former CEO, Brazilian-born Carlos Ghosn, challenged the sluggish Japanese Keiretsu by closing factories and laying off staffs. Ghosn's measures coincided with Kunio Nakamura's (CEO of Matsushita) decision to reduce staff by 19% and close 30 plants (Rowley & Tashiro, 2005). Due to these circumstances, the author concludes that Sony Corporation will be negatively affected by the Keiretsu organizational culture because it negatively elongates Sony Corporation's process of innovation culture. Creager (2021) supports this contention, stating that Sony Corporation used to collaborate with Nintendo but, in the end, the collaboration turned bitter. The highly innovative Sony Corporation also has produced too many products (Dvorak, 2012), which appears to be good, but eventually has led the Corporation to be unproductive and out of focus (consider Sony's Qualia, which left the market). Rowley and Tashiro (2005) also suggested that Sony Corporation now usually fails to catch on to new innovative products. As a result, even though the corporation exhibits Keiretsu organizational culture, but this culture does not lead an innovation culture for Sony Corporation.

6. References

Creager, R. (2021). Game-changing Feud: Nintendo-Sony Power Play, Announcements 30 years Ago Led to Emergence of Playstation. *Inventors Digest, 37*(7), 16-19.

Crider, M. (2022). Sony Reveals Its Game Pass Alternative… and Microsoft Has Nothing to Worry About. *PCWorld, 40*(5), 30-32.

Diong, A., & Choo, D. (2008). Transformative Innovation for Growth. *Industrial Management, 50*(3), 8-11.

Dvorak, J. C. (2012). *Watching Sony Slide.* PC Magazine, 1.

Finkelstein, S. (2006). Why Smart Executives Fail: Four Case Histories of How People Learn the Wrong Lessons from History. *Business History, 48*(2), 153-170.

Girotra, K., & Netessine, S. (2011). How to Build Risk into Your Business Model. *Harvard Business Review,* (May 2011), 100-105.

Hamel, G., & Prahalad, C. K. (1993). Strategy as Stretch and Leverage. *Harvard Business Review, 71*(2), 75-84.

Hutzschenreuter, T., & Voll, J. C. (2008). Performance Effects of "Added Cultural Distance" in the Path of International Expansion: The Case of German Multinational Enterprises. *Journal of International Business Studies, 39*(1), 53-70.

Jimenéz-Jimenéz, D., Martínez-Costa, M., & Sanz-Valle, R. (2014). Innovation, Organisational Learning Orientation, and Reverse Knowledge Transfer in Multinational Companies. *Electronic Journal of Knowledge Management, 12*(1), 47-55.

Johnson, R. T., & Ouchi, W. G. (1974). Made in America (under Japanese Management). *Harvard Business Review, 89*(7/8), 1-7.

Khanna, T., Song, J., & Lee, K. (2011). The Paradox of Samsung's Rise. *Harvard Business Review, 89*(7/8), 1-7.

Lincoln, J. R., & Shimotani, M. (2009). *Whither the Keiretsu, Japan's Business Networks? How Were They Structured? What Did They Do? Why Are They Gone?* [Online]. Retrieved September 1, 2022, from https://irle.berkeley.edu/whither-the-keiretsu-japans-business-networks-how-were-they-structured-what-did-they-do-why-are-they-gone/

Reisinger, D. (2015). *MWC 2015 Showcased Array of Smartphones for Diverse Markets, Budgets* [Online]. Retrieved September 1, 2022, from https://www.eweek.com/mobile/mwc-2015-showcased-array-of-smartphones-for-diverse-markets-budgets/

Rowley, I., & Tashiro, H. (2005). *Lessons from Matsushita's Playbook.* BusinessWeek, 3925, 32.

Schlender, B. (2005). Inside the Shakeup at Sony. *Fortune, 151*(7), 94-104.

Shimotani, M. (1995). The Formation of Distribution Keiretsu: The Case of Matsushita Electric. *Business History, 37*(2), 54-69.

Siklos, R. (2009). Sony Lost in Translation. *Fortune, 160*(1), 68-74.

Simiyu, S., Swilling, M., Cairncross, S., & Rheingans, R. (2017). Determinants of Quality of Shared Sanitation Facilities in Informal Settlements: Case Study of Kisumu, Kenya. *BMC Public Health, 17*, 1-13.

Sony Corporation (2022a). *Company Info: Corporate History* [Online]. Retrieved August 31, 2022, from https://www.sony.com/en/SonyInfo/CorporateInfo/History/

Sony Corporation (2022b). *Sony Design* [Online]. Retrieved August 31, 2022, from http://www.sony.net/SonyInfo/design/works/awards/if_design_2015.html

FACTORS AFFECTING THE INTENTION OF DIGITAL TRANSFORMATION OF THAI AGRICULTURAL ENTREPRENEURS

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ABSTRACT

The objective of the study is to examine the relationship among the perceived of digital technology, perceived of attributes of innovation, and digital readiness affect to and the intention of digital transformation in the Thai agricultural entrepreneurs. A total of 300 usable samplings of Thai agricultural entrepreneurs are obtained. Descriptive, frequency, percentage distributions, means are used to describe and report the information collected affecting to individual variables and demographic information. Furthermore, the data obtained is analyzed by Stepwise Multiple Regression. The findings reveal that the predictor variables of the perceived of digital technology, perceived of attributes of innovation, and digital readiness has positive relationship with the intention of digital transformation in the Thai agricultural entrepreneurs.

Keywords: Agricultural Entrepreneurs, Agro-Industry, Agribusiness, Digital Transformation

Introduction

As the world emerges from Covid-19, consumers' changing demands have created new trends in the agriculture sector. In Thailand, agriculture has been the foundation for the rapid development of many industries, in the form of the raw materials, intermediate goods, and domestic food. Moreover, Agriculture is one of the most important economic sectors in Thailand as it employs approximately 30% of the country's labor force (Digital Economy Promotion Agency, 2017). Thai Agriculture industry held six percent of GDP; however, the agriculture sector employs over one-third of the country's labor force (International Trade Administration, 2022). The trend of 2021 found that agricultural exports would increase compared to the previous year. Thailand is the world's largest exporter of tapioca products, rubber, frozen shrimp, canned tuna, and canned pineapple. According to the Office of Agricultural Economics (OAE) has reported that exports for agricultural products totaled 1.3 trillion baht or increased by 17 percent in 2021 (Sangpolsit, 2022). Prioritizing quality and safety are the key lead to increase for export. This growth was broad-based throughout the value chain of the agri-food sector. Significant growth in consumer spending has played a significant role in this expansion, driving demand in the hospitality industry and food retail. However, Thai agricultural sector confronts many challenges such as fluctuated prices of agricultural products, inappropriate use of farm inputs, lack of water, climate change, natural disasters, depleted natural resources and aging labors and manpower (Pongsrihadulchai, 2019).

In line with the changes, the government established the policies to make the development more sustainable and support farmers to develop themselves as smart farmers and to enhance the strength and potential of agricultural entrepreneurs for competition in the global market, which drive the national economy by creating more value for the Thai agricultural sector and driving to the digital economy. Thailand 4.0 is mainly focus at least three major changes, which are 1) change production of "commodities" into "innovative products; 2) transform industry-driven activities into those driven by technology, creativity and innovation; and 3) shift from the focus on making products, to providing services (Yoon, 2016). Therefore, Thailand 4.0 is based on value-based economy, integrated by digital technology and innovation. It became crucial for the new economy era.

However, one of priorities for developing Thai agricultural sector is to upgrade products to the global market. Thai agricultural entrepreneurs need to develop marketing knowledge, selling techniques, testing and validating global market, and creating awareness on product brands (Manit, 2022). However, one of the crucial of Thailand 4.0 model is to help Thai to adapt to global competitive pressures by increasing the technological base through the development and integration of enabling innovation, and digital technologies (Languepin, 2016). Moreover, the growths of the technology, especially the digital economy and the revolution of business processes have transformed a new interest in the digital business development and business strategy. Therefore, the objective of the study is to examine the factors, including perceived of technology and digital readiness significantly affect to digital transformation in the Thai agricultural entrepreneurs.

The Digital in Agricultural Industry

The agricultural sector has played an important role in developing the Thai economy. The evolutions of Thailand's agricultural sector can be described into four eras (Digital Economy Promotion Agency, 2017).

1) Traditional farming - In the first era (Agricultural 1.0), prior to 1986, this was the stage of traditional farming. Farmers cultivated their crops with inappropriate knowledge.

2) The second era (Agricultural 2.0) was between 1986-1999 which farmers gained agricultural knowledge and technique especially chemical products. However, Farming process was still cultivated with the same pattern. Farmers used this technique to increase their products, at the same time, the sector required more labors.

3) The third era (Agricultural 3.0) was between 2000 to 2016. This was the transformation period in term of agricultural products quality. In this era, consumers and producers began realizing the impact of their products because the technique employed was highly chemical. Consumers encountered fatal illness (e.g. cancer) while producer, especially farmers, lost their core operating asset due to chemical products. Therefore, in this era, the Thai government began to do research and release new rice varieties based on quality (Poapongsakorn, 2017). The shortage of labor also was initiated in this era due to the effect of labor movement from agricultural industry to other industries.

4) The latest era (Agricultural 4.0) began in 2016 under the Thailand 4.0 policy by the government. This era allowed farmer to cultivate by adopting new Agriculture Technology (AgTech) such as Drone for agriculture, Smart technology devices and IOT technology in agricultural sector. AgTech can mitigate some agricultural problems in the past. For example, AgTech can mitigate agricultural labor shortage by using the Agricultural Drone, and the smart farming system enables the farmers to schedule their crop plan and consequently manage their resources better than before.

For the 21st century, agricultural entrepreneurs need innovations include digital technologies, biotechnologies, new farming environments such as indoor farms, supply chain logistics and infrastructure and risk management all of which would affect long-term competitiveness and profitability. KResearch (2021) stated that agricultural industry in Thailand should focus on digital technology and innovation that are suited to the

improvement of farming in confined space, as such ventures would create high value-added products and aid in overcoming the challenges. To facilitate progress, the Thailand 4.0 initiative involves setting up 'innovation districts' to support the development of the country's technological capabilities. Accourding to Sithee (2022), the promotions should be covered the following areas:

Digital Transformation

Typically, digital economy specifically helps businesses mitigate the isolation inherent to most online data analysis activities. Furthermore, it is an online community-based e-commerce platform that brings together products from a vast array of stores into one digital platform. Moreover, the growing of the digital technology in the business field has heightened demand for new big data being used for business intelligence. The increasing recognition of the role of digital economy, which is enable the interactions among consumers, and suppliers as an important co-value creation has derived the implications of these interactions in numerous settings, including online activities. Digital economy is growing rapidly and frequently features comments about brands and products. Moreover, consumers increasingly rely on and are interested in collaborations (Cheong & Morrison, 2008). New business models have emerged demonstrating common features – mobility, use of data to generate value and network effects. Digital technologies increase competitive advantage for the economy; this is likely to be global in scale, given that geographical barriers are becoming increasingly irrelevant. Therefore, the businesses that are embracing the digital business trend to craft their transformation stages are required to focus and develop the key business transformations as a digital transformation strategy, which are mobility, value of data, social commerce effect, and new business model (Harvard Business Review Analytic Services, 2015).

Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM). The theory has widely applied and examined the determinants of computer usage behavior. Davis (1989) finds that intention to use a word processing system can precisely predict later use of the system. Meanwhile, perceived ease of use shows a significant effect on intention to use while attitude partially mediated the effects of beliefs on intention. Based on the theory, there are two important points of departure explained and predicted user acceptance of technology, including the beliefs in ease of use (EOU) and perceived usefulness (PU) (Davis, 1989). Ease of use is a degree to which the user expects a technology to be free of physical and mental effort (Davis, 1989). Perceived usefulness is a degree to which an individual believes that a particular system will increase the individual user's job performance (Fishbein and Ajzen, 1975).

Attributes of Innovation

According to Rogers (1995), the five attributes of innovation that affect the innovation adoption decision included relative advantage, compatibility, complexity, trialability, and observability. The theory revealed different factors known as attributes of innovation that were associated with adoption of new

innovations. Additionally, the rate of adoption depends on "the relative speed with which an innovation is adopted by members of a social system" (Rogers, 1995, p. 206). Therefore, the theory plays the important role to increase understanding of innovativeness and innovative decision-making in the adoption context, and how potential adopters perceive the innovation. An adopter forms an attitude toward the innovation, leading to a decision to accept or reject the innovation. Therefore, an innovation that is perceived as the higher relative advantage, stronger compatibility, less complexity, and more trialability would achieve a wider diffusion of innovation. These five attributes are used to explain the degree that innovations are perceived by adopters.

Research Methodology

The research design is drawn from quantitative research methodology. A total of 300 usable samplings of Thai agricultural entrepreneurs are obtained. To collect the data, two methods are used: (a) personal contact, and (b) self-administered survey from seminars during December 2021 – June 2022. Descriptive, frequency, percentage distributions, means are used to describe and report the information collected affecting to individual variables and demographic information. Furthermore, the data obtained is analyzed by Stepwise Multiple Regression.

Results

A total of 300 usable questionnaires are obtained. The results show the distribution of usable responses by gender; consist of 221 males (73.67%), and 79 females (26.33%). The respondents report that the business revenue in a year. 24.5% report that their revenue is less than 5 million baht; 33.3% report that their revenue is between 5-10 million baht; 22.29% report that their revenue is between 10.01-20 million baht; and 19.91% report that their revenue is between 20.01-30 million baht.

Table 1 showed the Thai agricultural entrepreneurs perceived usefulness of digital technology that it helps the business in better performance (mean = 3.86), and they agree that it is easy to plan and implement the digital transformation process (mean = 3.98).

Table 1 Means, Standard Deviations, and Median Response with Items for Perceived of Digital Technology

Perceived of Digital Technology	Mean	SD.
Perceived Usefulness	3.86	0.95
Perceived Ease of Use	3.98	0.93
Average	**3.92**	**0.95**

Furthermore, Table 2 showed the perceived of the attributes of innovation. Respondents agree that the digital technology has the relative advantage to their business (mean = 3.56), the digital technology is compatible to their business process (mean = 3.21), the digital technology is complex to adapt to their business process (mean = 3.25), the average mean of perceived trialability of the digital technology is 3.25, and the average mean of perceived observability of the digital technology is 3.85.

Table 2 Means, Standard Deviations, and Median Response with Items for Attributes of Innovation

Perceived of Attributes of Innovation (Digital Technology)	Mean	SD.
Relative Advantage	3.56	1.29
Compatibility	3.21	1.39
Complexity	3.25	1.38
Trialability	3.20	1.44
Observability	3.85	1.15
Average	**3.41**	**0.99**

Moreover, Table 3 showed the readiness to digital transformation of the Thai agricultural entrepreneurs. The samples presented that the digital readiness regarding hardware infrastructure (mean = 3.94), software infrastructure (mean = 4.01), and digital literacy (mean = 4.06).

Table 3 Means, Standard Deviations, and Median Response with Items for Digital Readiness

Digital Readiness	Mean	SD.
Hardware Infrastructure	3.94	1.00
Software Infrastructure	4.01	1.00
Digital Literacy	4.06	0.95
Average	**4.00**	**0.88**

Table 4 shows the respondents are asked their opinion regarding the intention of digital transformation. The respondents showed that their business policy and roadmap are ready for digital transformation (mean = 4.17), digital transformation aligns to their strategic plans (mean = 3.89), and their business culture is engaged to digital transformation (mean = 3.77).

Table 4 The Mean for the Intention of Digital Transformation

Intention of Digital Transformation	Mean	SD.
Business Policy and Roadmap	4.17	0.90
Strategic Plans Alignments	3.89	1.11
Business Culture	3.77	1.09
Average	**3.94**	**0.78**

Table 5 shows the significance of each coefficient for each independent variable. It reveals that the perceived of digital technology (β = 0.643, t = 15.541, P = 0.009), perceived of attributes of innovation (β = 0.173, t = 3.793, P = 0.000), digital readiness (β = 0.109, t = 2.631, P = 0.000), are achieved significance at the

0.05 level. Therefore, the regression equation for predicting the dependent variable from the independent variable is Intention of Digital Transformation = 1.427 + 0.643 (Perceived of digital technology) + 0.173 (Perceived of attributes of innovation) + 0.109 (Digital readiness)

Table 5 The Relationship among Factors

The Relationship between the Perceived of digital technology, Perceived of Attributes of Innovation, Digital Readiness, and the Intention of Digital Transformation	Regression Coefficient (b)	Standardized Coefficient (β)	t	P
Perceived of Digital Technology	0.736	0.643	15.541	0.009*
Perceived of Attributes of Innovation	0.214	0.173	3.793	0.000*
Digital Readiness	0.134	0.109	2.631	0.000*
Constant (a)	1.427		7.997	0.000*
R = 0.683, R2 = 0.467, SEE = 1.83, F = 13.443, P = 0.000*				

*P < 0.01

Conclusion and Discussion

Thai agricultural sector confronts many challenges such as fluctuated prices of agricultural products, inappropriate use of farm inputs, lack of water, climate change, natural disasters, depleted natural resources and aging labors and manpower (Pongsrihadulchai, 2019). Digital transformation can be seen as a solution for Thai agricultural entrepreneurs to take the advantage of digital technology to drive their business forward. This study investigated the intention of digital transformation and proposes the model that explains the determinant factors of digital transformation intention based on perceived of digital technology, attribute of innovation, and digital readiness. The results of this study indicated that the importance of perceived of digital technology, including perceived of usefulness, and perceived ease of use were found major determinants of the intention digital transformation that has been theoretically supported and empirically validated (Huyen, 2021). Moreover, regardless of the perceived of attributions innovation support for the digital transformation proposes, it is ultimately the responsibility of digital transformation implementation to ensure that the direction of digital technology matches the goals and strategies of the organization. This challenge is linked to the organization's goals and strategies, which are questions for management (Verganti, 2017). As the finding, there are the direct effects among digital readiness and digital transforamtion. Generally, the efficiency, whereby ventures can utilize digital business through highly scalable infrastructure. According to Boutetière, Montagner, and Reich (2018) found that develop talent and skills throughout the organization are a fundamental action for traditional

transformations which one of the most important factors for success in a digital change effort. Digital transformation is involved in the long-term success coming from the executives and employees understanding the opportunities of digital that provides and giving them the tools to successfully drive initiatives forward. Since the data found the relationship between a digital readiness and the strategic execution. to understand their ability to respond. Therefore, digital business transformation starts with an understanding of how the organization works now and identifying internal change as well as opportunities for a better innovation culture. Furthermore, the digital transformation strategies should be covered the following areas: 1) knowledge-based activities focusing on R&D and design to enhance the competitiveness, 2) infrastructure activities for the country's development, activities using technology to create value-added, 3) adding add value to domestic resources and strengthen the supply chain as the ecosystem platform although supporting industry that does not use high technology, but is still important to the value chain.

References

Boutetière, H., Montagner, A. & Reich, A. (2018). *Unlocking success in digital transformations.* Retrieved November 29, 2018 from https://www.mckinsey.com/business-functions/organization/our-insights/unlocking-success-in-digital-transformations

Buasang, P. (2018). *Digital Transformation: Transforming businesses with digital ideas.* SCB Economic Intelligence Center. Retrieved January 10, 2018 from https://www.scbeic.com/th/detail/product/4327

Cheong, H. J., and Morrison, M. A. (2008). "Consumers' Reliance on Product Information and Recommendations found in UGC." *Journal of Interactive Advertising, 8*, 2: 1-29.

Digital Economy Promotion Agency (depa). (2017). *Agriculture Landscape in Thailand.* Retrieved August 10, 2021 from https://www.depa.or.th/storage/app/media/file/investment-bulletin.pdf

Easley, D., and Kleinberg, J. (2010). *Networks, Clouds and Markets: Reasoning about a Highly Connected World*. United Kingdom: Cambridge University Press.

Harvard Business Review Analytic Services. (2015). *The Digital Transformation of the Business.* Harvard Business Publishing.

Huyen, P. (2021). Readiness for Digital Transformation of Higher Education in the Covid-19 context: The dataset of Vietnam's students. *Data in Brief, 39*(3).

International Trade Administration. (2022). *Agriculture.* Retrieved August 10, 2021 from https://www.trade.gov/country-commercial-guides/thailand-agriculture

KResearch (2021). *AgriTech Set to Transform Thai Agricultural Sector; Guidelines Should be Adopted for Use of Technology in Small-Scale Operations.* Retrieved September 29, 2016 from https://www.kasikornresearch.com/en/analysis/k-econ/business/Pages/AgriTech-z3223.aspx

Languepin, O. (2016). *"Thailand 4.0 What We Need to Know?"* Retrieved September 29, 2016 from http://www.thailand-business-news.com/economics/54286-thailand-4-0-need-know.html

Manit, S. (2022). *Enhancing Products to Global Market Project.* Retrieved August 10, 2021 from
https://repository.turac.tu.ac.th/handle/6626133120/1080

Poapongsakorn, N. (2017). *Transformation of The Thai Agriculture in The Last Three Decades.* Retrieved
January 10,2018 from https://www.slideshare.net/resakssasia/transformation-of-the-thai-agriculture-
in-the-last-three-decades

Pongsrihadulchai, A. (2019). *Thailand Agricultural Policies and Development Strategies.* Retrieve August 10,
2021, from https://ap.fftc.org.tw/article/1393

Ratchakitchanubaksa. (2018). *The 20 Years National Strategy.* Retrieved August 10, 2021 from
http://www.ratchakitcha.soc.go.th/data/phd/2561/a/082/t_0001.pdf

Rogers, E. M. (1995). *Diffusion of innovations* (4th ed). New York: Free Press.

Sangpolsit, N. (2022). *Government Reports 17% Increase in Agricultural Exports for 2021.* Retrieved August
10, 2021 from https://thainews.prd.go.th/en/news/detail/TCATG220218163209631

Yoon, S. (2016). *"Thailand 4.0: Will it Move the Country Out of its' Lost Decade?"* Retrieved May 4, 2017
from http://www.nationmultimedia.com/news/opinion/suthichaiyoon/30286689

Verganti, R. (2017). *Overcrowded: Designing meaningful products in a world awash with ideas.* The MIT
Press, Cambridge, MA.

THE IMPACT OF AFTER-SALES SERVICE QUALITY AND BRAND REPUTATION ON CUSTOMER TRUST AND REPURCHASE INTENTION: A CASE STUDY OF A AUTOMOBILE COMPANY IN NIGERIA

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ABSTRACT

The aim of this study is to examine the impact of after-sales service quality and brand reputation on customer trust and on repurchase intention of the selected automobile company in Nigeria. This study uses quantitative approach via self-administered questionnaire. The study collected the data from 274 customers who have experiences with after-sales services of the automobile company in Nigeria. The regression analysis showed that after-sales service quality and brand reputation have a positive relationship with customer trust. The study also found that customer trust, after-sales service quality and brand reputation have a positive relationship with customer repurchase intention. The findings concluded that automobile company with a strong and adequate after-sales service quality and brand reputation will be able to improve on the company's customers' trust and thereby on the long run will be to achieve a strong customer repurchase intention in-order to ensure their organizational objectives.

Keywords: After-Sales Service Quality, Brand Reputation, Customer Trust, Repurchase Intention, Automobile

1. Introduction

According to the National Automotive Council (NAC, 2018), Nigeria has the largest nominal GDP on the African continent, with a value of US $4.517 billion in 2017 among its population of approximately 170 million people. Toyota, Nissan, Honda, GM, VW, and other major vehicle manufacturers are now focusing on assembly and producing only about 30% of the over 2,000 parts in a car, with the rest outsourced to component suppliers (Ugwueze, Ezeibe & Onuoha, 2020).

After-sales support is a service that is provided to the customer after they have purchased a product. It is typically supplied by the seller, retailer, manufacturer, or, in some cases, a third-party customer service provider. Repair, maintenance, rescue, information consulting, insurance, spare parts, car modification, and car rental are all examples of automotive after-sales services. After-sales service quality is critical in cementing the relationship between the organization and its customers (Khushali, 2018).

Prior researches have explored the role of service quality in diverse context (examples are; Asnawi, Sukoco & Fanani (2019) (customers satisfaction); Li, Pomegbe, Dogbe & Novixoxo (2019) (Employees' customer orientation); Zameer, Wang, Yasmeen & Ahmed (2019) (brand equity), while limited number of

research have applied AutoSERVQUAL in the study for after-sales service quality in Nigeria. This study intends to measure automobile service quality for effective customer trust and repurchase intention derived from the SERVQUAL model with five dimensions from the previous works of Parasuraman, Zeithaml, and Berry (1988). This study therefore contributes to the body of existing literature in the field of automobile after-sales service, brand reputation, customer trust and repurchase intentions, and expand the frontier of research environment.

2. Literature Review

Service Quality Concept

In general, service quality refers to a customer comparing service expectations with a company's performance. A company with a high level of service quality is likely to meet the needs of its customers while also remaining economically competitive in its industry (Gefen, 2010). The duties and functions of the services sector in the automobile industry are diverse, according to Tour and Kumar (2003). These services include logistics and spare parts provision, documentation, startup services, improved products, insurance, warranty, call center services, training, and maintenance and repair. The key to a business's long-term competitive advantage is to provide high-quality customer service and achieve customer satisfaction, which will positively impact profitability (Keisidou et al., 2013). Customers are generally willing to pay a high price for guarantees and reliable after-sales service. The income generated from after-sales service and spare parts sales exceeds three times the initial automobile purchase price (Ahmad and Butt, 2012).

Parasuraman et al. (1985) related the standard service research approach to American and Nordic schools of thought. As described in Frimanet al. (2001), the SERVQUAL model is used to expose the American school's approaches to service quality learning. In the conceptualization of the simple service quality model, the authors identified 10 main components of service quality: access, connectivity, integrity, courtesy, reputation, tangibility, durability, sensitivity, and protection and consumer comprehension. Later, the authors divided SERVQUAL measurements into five, which are tangibility, reliability, responsiveness, assurance, and empathy whereby they added assurance and empathy measurements (Naik, Gantasala, & Prabhakar, 2010). Later, Gencer and Akkucuk (2017) developed AutoSERVQUAL from Turkish automobile aftersales customers to has five dimension the same as the original SERVQUAL scale. Example of the revisions are in Assurance and Empathy dimensions that employ two original SERVQUAL items with three recently added items.

Brand Reputation Concept

The reputation of superior quality and added value justifies a premium price, and brand reputation is a source of demand and long-term attractiveness. A reputable brand is a valuable asset that benefits from high levels of loyalty and future sales stability (Aperia, 2004). A reputation is a commodity that is produced and accumulated for specific reasons. The occurrence is not by chance. Customers rarely purchase goods without first reading the label. Brand loyalty cannot be created without a positive reputation (Seo & Park, 2017). According to Helm, Garnefeld, and Tolsdorf (2010), a company's brand can be used as a positioning tool, causing it to focus on promotion. In addition, a strong brand can act as a deterrent to new competitors and a deterrent to customer

withdrawal. Previous work has used signal theory to explain the effect of brand reputation. Spence (1974) defined signals as corruptible attributes or actions that relay information on the characteristics of economic agents (e.g., firms, consumers, work applicants). Signaling theory is mainly concerned with removing information asymmetry between the two sides (Spence, 2002).

Customer Trust Concept

The degree to which an individual is confident and eager to act based on the words, actions, and outcomes of others is customer trust (Ballester & Aleman, 2001). Customer trust ensures a customer's emotional attachment to a brand. Marketers are very interested in trust these days because higher trust ratings are commonly observed to be positively associated with loyalty (Reast, 2005). Customer trust is a long-term process in which a reliable brand considers customer expectations, follows through on promises, and values its customers, all of which contribute to customer trust and reliability(Ballester & Aleman, 2001). Consumers will be far more likely to buy and pay more if they trust the product, the maker of the product, the retailer of the product, and the process they go through to purchase the product than if they lack trust in any or all of those aspects (De Ruyter, Moorman & Lemmink, 2001).

Repurchase Intention Concept

Consumer behavior involves the thoughts and feelings people experience, as well as the actions they perform in consumption processes. Peter and Olson (2008) refer to Fishbein's Model for the Prediction of Intentions. Moreover, purchase intention "is the single best predictor of actual behavior" to understand consumers who want to repurchase an automobile (Peter & Olson, 2008). A behavior is an action performed on a target object at a specific time (Peter & Olson, 2008). Therefore, there is a time frame between consumers' repurchase intention and their actual behavior when they act on their repurchase intention (Ahmad & Juhdi, 2010). Customer's decision to repurchase a product or service is often based on a broad assessment of the service and supplier based on multiple service transaction experiences with that supplier (Kim & Kim, 2004).

Al-Shammari & SamerKanina (2014) examine After-sales service quality in the context of the automobile industry from the perspective of customer trust, with the questionnaire distributed to 120 customers. This study revealed a significant positive relationship between a company's After-sales service quality and its customers' trust. Therefore, this study proposed that.

Hypothesis 1: After-sales service quality has a positive relationship with customer trust

In a study of 300 respondents in the automobile industry in 2009, Smith and others (2010) found that an automobile company with a good brand reputation is unlikely to jeopardize this valuable asset by failing to keep promises and obligations. Therefore, this study proposes:

Hypothesis 2: Brand reputation has a positive relationship with customer trust.

The findings from Sunyansanoa (2013) show that when consumer trust and repurchase intentions for automobile products are mediated by consumer expectation and satisfaction, the relationship between consumer trust and repurchase intentions is related. This research thus suggests that:

Hypothesis 3: Customer trust has a positive relationship with customer repurchase intention.

Phuong & Trang (2018) use DeLone and McLean's information system success model to assess the impact of *After-sales service quality*, system quality, and information quality on customer repurchase intentions in Uber car services in Vietnam. For five months, 427 customers who used Grab and Uber services were surveyed. The study found that perceived *After-sales service quality* and customer satisfaction had a significant positive effect on repurchase intention. This research thus suggests that:

Hypothesis 4: After-sales service quality has a positive relationship on repurchase intention.

According to the study of Vigripat and Chan (2007) on their investigation on the relationship between brand reputation on repurchase intention with a sample size of 86 respondents that were chosen by a classified random sampling method. The result was found that the main factor influencing repurchase intention and recommendation is brand reputation. This research thus suggests that:

Hypothesis 5: Brand reputation has a positive relationship on repurchase intention
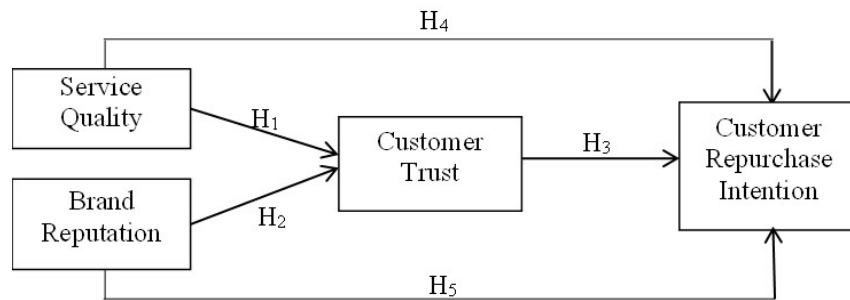
3.2 Research Framework

Figure 1: Research model

3. Research Methodology

3.1 Research Design

This study employee quantitative research to explore the relationship between after-sales service quality, brand reputation, customer trust, and customer repurchase intention. The questionnaires will be distribute to the customers of the selected automobile company.

3.2 Population and Sample

This study randomly distributed 1,000 questionnaires to the customers of the selected automobile company. The study collected the data from 274 respondents who are the customers in Nigeria. According to Cochran (1963) in determining the sample size of unknown population number, the sample size of 274 with 90% level of precision should be adequate for the analysis. The study includes the male respondents (57.8%) while 42.2%of the respondents are female. Majority of the respondents are between 26-40 years of age (62.5%). The majority of respondents are business owners (26.1%) and employed full time (24.2%). The study also ascertained that majority of the respondents are with a good sustainable monthly income earning of about ₦50,001 to ₦100,000. Most of respondents (64.9%) obtained bachelor degree and master degree.

3.3 Research Instrument

The distributed questionnaire is comprised of the demographic information of the respondent and the measurement items of the focused variables. All measurement items are in 5-point Likert scale (5 for strongly agree and 1 for strongly disagree. The measurement items of after-sales service quality were adapted from Gencer & Akkucuk (2017) with 28 measurement items in five dimensions which are reliability, assurance, tangible, empathy and responsiveness. Some examples are "XXX Automobile Motor dealer deliver maintenance/repair service of my car at the time promised," and "XXX dealer staffs are knowledgeable."

The measurement items of *brand reputation* were adapted from Chun (2005) with 14 measurement items in four dimensions which are emotional appeal, product and services, social and environmental responsibility, and financial performance. an example is "Customers of XXX Automobile have good feelings about their after-sale services." The measurement items of *repurchase intention* have six measuring items that were adopted from Kim et al. (2012) such as "I will choose this XXX Automobile brand in the future." The *customer trust* contains five measurement items that were adapted from Delgado-Ballester (2003) such as "I believe that the products rendered by XXX Automobile is worth the price paid."

3.4 Validity and Reliability Test

The study found that service quality, brand reputation, customer trust, repurchase intention have sufficient convergent validity. The loadings value of most items exceeding .50 confirming convergent validity (Fornell & Larcker, 1981) while only one items of customer trust are .3. Still, it should be included in the model as it has content validity according to the expert. In addition, the composite reliability of service quality (.956), brand reputation (.933), and repurchase intention (.902) were above .70, demonstrating internal consistency in terms of reliability. In addition, service quality (.959), brand reputation (.933), and repurchase intention (.901) have Cronbach's Alpha value above 0.8 which reflected that all variables have high internal consistency (Hair et al., 2010).

4. Findings

For hypothesis 1 and hypothesis 2, the multiple linear regression model reveal that after-sales service quality (β = .598) and brand reputation (β = .196) are statistically significantly impact on customer trust at statistically significant at 95% confidence level as p-value of the model is less than .05, $F(2, 272) = 199.415$, p-value = .000, Adj. R_2 =.592. In additional, for hypothesis 3, the simple linear regression model show that customer trust (β = .856) statistically significant impact on customer repurchase intention with 95 % significant level as p-value of the model is less than .05, $F(1,273) = 285.103$, p-value = .000, Adj. R_2 =.509. Finally, in additional for hypothesis 4 and hypothesis 5, the multiple linear regression model revealed that after-sales service quality (β = .118) and brand reputation (β = .934) statistically significant impact on customer repurchase intention at 95 % confidential level as p-value of the model is less than .05, $F(2, 272) = 1156.908$, *p-value* = .000, Adj. R_2 =.894. The summary of hypotheses testing shown in table below confirmed that all five hypotheses are supported.

Hypothese	Independent Variables	Dependent Variables	Adj. R^2	F-Value	Std. β	P-Value	Result
1	After-sales service quality	Customer trust	.592	199.415	.598*	.000	Supported
	Brand reputation				.196*	.000	
2	Customer trust	Repurchase intention	.509	285.103	.715*	.000	Supported
3	After-sales service quality	Repurchase intention	.894	1156.908	.101*	.000	Supported
	Brand reputation				.859*	.000	

5. Discussion and Conclusion

Hypothesis 1 of this study indicated that after-sales service quality is statistically significantly impact on customer trustat 95 % confidence level (β=.598, p=.000). This assertion is supported by Sitorus and Yustisia (2018) who found the mediated effect of customer satisfaction on the influence of after-sales service quality and customer trust.

Hypothesis 2 of this study indicated that brand reputation is statistically significantly impact on customer trust at 95 % confidence level (β=.196, p =.000). This assertion is supported by Keh and Xie (2009) who revealed that highly reputable automobile companies could gain customer trust. The multiple regression showed that after-sales service quality (β = .583) has stronger impact on customer trust than brand reputation (β = .177). This confirm that the brand reputation alone may not secure customer trust. The customer prone to trust the company with high service quality based on their own experience rather than brand reputation that derived from the available communication information. With the presence of intense rivals, nowadays, businesses are struggling to ensure the trust of their customers (Hegner-Kakar et al., 2018).

Hypothesis 3 of this study indicated that customer trust is statistically significantly impact on customer repurchase intention (β=.715, p=.000) at 95 % confidence level. This assertion is supported by the research of Upamannyu et al. (2015) show that when consumer expectation and satisfaction are mediated by consumer trust and repurchase intentions for automobile products.

Hypothesis 4 of this study indicated that after-sales service quality is statistically significantly impact on customer repurchase intention at 95 % confidence level (β=.101, p=.000). This assertion is supported from the study of Vigripat and Chan (2007) that conducted a study on the customer of car dealers in Bangkok, Thailand. The findings suggested that perceived value and perceived quality of service both have a positive impact on repurchase intention. Consistently, Malakar and Suwandee (2021) studied on after-sales service quality of 384 respondents who are the customer of a selected automobile company in India. The study found that assurance has the strongest impact on repurchase intension among five dimensions of service quality. In addition, hypothesis 5 of this study indicated that brand reputation is statistically significantly impact on customer repurchase intention at 95 % confidence level (β=.859, p =.000). This assertion is consistent to Balla and Ibrahim (2014), brand reputation challenges the businesses to achieve customer retention. The standardized coefficient also showed that brand reputation (β = .859) has stronger impact on customer repurchase intention than after-sales service quality (β = .101). Customers tend to search for information including brand reputation of alternatives before making a

purchase decision. Thus, the brand reputation strongly contributes to customer decision and intention to repurchase the product.

6. Managerial Implications

The results of this study demonstrated the impact of brand reputation on customer trust and repurchase intention, which is one of the most important goals for automobile top management to achieve. As a result, automobile top executives must understand how to provide customer-satisfied quality and how to make it an integral part of the service industry's business operations. Furthermore, this study's important performance analysis indicates that the automobile company should maintain their competitive advantage in effective after-sale service quality, in order to provide an effective contentment that will earn their customers' trust. The company should improve on the assurance dimension of the after-sale service quality by giving efficient training to their employees so as enable them have the quality to regularly instill confidence in customers, and to be consistently courteous with customers, so as to make them feel safe on any transactions they make with the automobile company.

This study also suggests that the company should maintain their competitive advantage in terms of effective brand reputation to improve their product and service brand reputation dimensions that have a high significant relationship with customer trust in order to provide effective customer satisfaction. This study also suggests that the company should embrace the brand trust by improving an effective customer-satisfied quality to improve their products and services. This study also suggests that the company should provide an effective customers' satisfaction to encourage the customers to ensure good repurchase intention attitudes. Finally, the company should also ensure that the products and services they rendered would enable a word-of-mouth advertisement from their customers to their family, friends and prospective customers towards an effective repurchase intention attitudes.

7. Limitations and Future Research

Due to the limitation of resource and time constraints, this study was limited only to Nigerians who have had experiences with the products and after-sales services of an Automobile company in Nigeria for gathering of data through the administration of the questionnaires.
Future researches based on this study could be in the following;

Future research should look into how companies can improve their brand reputation, customer trust, and engagement by leveraging customer expectation and perception of price, with brand image, customer engagement, customer expectation, customer trust, customer repurchase intention, and perceived price as variables.

Based on current literature and a large number of theories related to after-sale service quality measurement and dimensions in an international automobile context, future research should modify SERVQUAL Model among International Automobiles in Nigeria. This study should look into the various dimensions of after-

sale service quality in the Nigerian automobile industry, using a structured questionnaire to assess the perceived after-sale service quality of the international automobiles.

Finally, within the framework of economic signaling theory, future research should look into consumers' perceptions of warranties of services provided to them. As a result, this research should propose scenarios in which higher warranties lead to higher, lower, or the same quality perceptions, and it should demonstrate that these consumer quality perceptions are consistent with the various types of market equilibrium predicted by signaling theory. The propositions should also be tested in a study that varies warranty length, warranty scope, and warranty signaling conditions.

8. References

Ahmad, S., & Butt, M. M. (2012). Can after sale service generate brand equity? *Marketing Intelligence & Planning, 30*(3), 307–323. https://doi.org/10.1108/02634501211226285

Ahmad, S.n. B., & Juhdi, N. (2010). Organic food: A study on demographic characteristics and factors influencing purchase intention among consumers. *International Journal of Business and Management, 5*(2), 105-118.

Al-Shammari, M., & SamerKanina, A. (2014). Perceived Customer Service Quality, *Journal of Research in Management, Business and Social Sciences, 1*(1), 38-41.

Balla, B.E. & Ibrahim, S.B., (2014). Impact of Corporate Brand Reputation on Customer's Attitude towards Repurchase Intention. *International Journal of Science and Research (IJSR)*, ISSN (Online): 2319-7064, 3(11), www.ijsr.net.

Ballester, D.E. and Aleman, M.L. (2001), Brand trust in context of customer loyalty. *European Journal of Marketing, 35*(11/12), 1238-1258.

Chun, R. (2005). Corporate reputation: Meaning and measurement. *International Journal of Management Reviews, 7*(2), 91-109.

Cochran, W. G. 1963. *Sampling Techniques,* 2nd Ed., New York: John Wiley and Sons, Inc

Cohen, M.A, Agrawal, N. & Agrawal, V. (2006). Winning in the Aftermarket (HBR OnPoint Enhanced Edition), *Harward Business Review OnPoint Article*, May, 2006.

De Ruyter, K., Moorman, L. and Lemmink, J. (2001). Antecedents of commitment and trust in customer supplier relationships in high technology markets. *Industrial Marketing Management, 30*(3), 271-86.

Delgado-Ballester, E. (2003). Development and validation of a brand trust scale. *International journal of market research, 45*(1), 35-54.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research, 18*(1), 39-50.

Friman, M., Edvardsson, B., & Gärling, T. (2001). Frequency of negative critical incidents and satisfaction with public transport services. I. *Journal of retailing and consumer services, 8*(2), 95-104.

Gefen, J.A. (2010). *Defining consumer satisfaction. Academy of Marketing Science Review (online)*. Available at: http://www.ansreview.org/ansrevtheory/giese00-01.html.

Hair, J. F., Andersen, R. E. and Tatham, R. L.(2010). *Multivariate Data Analysis* (7 th ed.), Upper Saddle River, New Jersey: Pearson Prentice Hall.

Hegner-Kakar, A. K., Richter, N. F., & Ringle, C. M. (2018). The customer loyalty cascade and its impact on profitability in financial services. In *Partial least squares structural equation modeling* (pp. 53-75). Springer, Cham.

Helm, S., Garnefeld, I. and Tolsdorf, J. (2010). Perceived corporate reputation and consumer satisfaction-an experimental exploration of casual relationships. *Australasian Marketing Journal*, *17*(2), 69-74.

Keh, H. T., & Xie, Y. (2010). Corporate reputation and customer behavioral intentions: The roles of trust, identification and commitment. *Industrial Marketing Management*, *38*(7), 732-742.

Keisidou, E., Sarigiannidis, L., Maditinos, D. I., & Thalassinos, E. I. (2013). Customer satisfaction, loyalty and financial performance: A holistic approach of the Greek banking sector. *International Journal of Bank Marketing,* 31, 259–288. https://doi.org/10.1108/IJBM-11-2012-0114

Khushali, Shah. (2018). Global Automotive After-Sales Service Market By Service, By Parts, By Distribution Channel, By Vehicle, By Geographic Scope And Forecast, *Verified Market Research*, Report ID:11049, Published Date: Jul 2019, No. of Pages:115. https://www.verifiedmarketresearch.com/product/automotive-after-sales-service-market/.

Kim, C., Galliers, R. D., Shin, N., Ryoo, J. H., & Kim, J. (2012). Factors influencing internet shopping value and customer repurchase intention. *Electronic Commerce Research and Applications*, *11*(4), 374–387.

Kim, E. Y., & Kim, Y. K. (2004). Predicting online purchase intentions for clothing products. *European Journal of Marketing*, *38*(7), 883-897. Retrieved February 10, 2012 from ProQuest Central (237027738).

Malakar, S. & Suwandee, S. (May 2021) The effect of after sales service quality on customer satisfaction, and repurchases intention: a case study of automobile service agent in India, *Proceedings of DPU International Conference on Business Innovation and Social Sciences 2021* (DPU ICBIS 2021). 31-39

Naik, C. K., Gantasala, S. B., & Prabhakar, G. V. (2010). Service quality (SERVQUAL) and its effect on customer satisfaction in retailing. *European Journal of Social Sciences*, *16*(2), 231-243.

National Automotive Council (NAC: The Federal Republic of Nigeria), (2018). *Data Collection Survey on Automotive Sector in the Federal Republic of Nigeria.* https://openjicareport.jica.go.jp/pdf/12235321.pdf.

Parasuraman, A., Zeithaml, V.A. and Berry, L.L. (1985). A conceptual model of service quality and its implications for future research. *Journal of Marketing*, *49*(4), 41-50.

Parasuraman A, Zeithaml VA, Berry L. (1988). SERVQUAL: A Multiple Item Scale for Measuring Consumer Perceptions of Service Quality. *JR.* 1988. *64,* 12–40.

Peter, J. P., & Olson, J. C. (2008). *Consumer behavior and marketing strategy* (8th ed.). New York, NY: McGraw Hill.

Phuong, N.N.D & Trang, T.T.D. (2018). Repurchase Intention: The Effect of Service Quality, System Quality, Information Quality, and Customer Satisfaction as Mediating Role. *Marketing and Branding Research, 5*(2018) 78-91.

Reast, D.F. (2005). Does trust and brand extension acceptance: the relationship. *Journal of Product & Brand Management*, *14*(1), 4-13.

Seo, E. J., & Park, J. W. (2017). A study on the impact of airline corporate reputation on brand loyalty. *International Business Research*, *10*(1), 59-67.

Sitorus, Tulus & Yustisia, M.(2018). The influence of Service Quality and Customer Trust toward Customer Loyalty: The role of customer satisfaction. *International Journal for Quality Research*. *12*. 639-654. 10.18421/IJQR12.03-06.

Smith, K.T., Smith, M. and Wang. K. (2010). Does brand management of corporate reputation translate into higher market value? *Journal of Strategic Marketing*, *18*(3), 201–221.

Spence, M. (1974). Job market signaling. *QJE.* 1974.87: 355-374.

Spence, M. (2002). Signaling in retrospect and the informational structure of markets. *American Economic Review.* 2002, *92*: 434-459.

Tour, M. and Kumar, U., (2003). Design and development of product support and maintenance concepts for industrial system. *Journal of Quality Maintenance Engineering*, *9*(4), 378-386.

Ugwueze, M. I., Ezeibe, C. C., & Onuoha, J. I. (2020). The political economy of automobile development in Nigeria. *Review of African Political Economy*, *47*(163), 115-125.

Upamannyu, N. K., Gulati, C., Chack, A., & Kaur, G. (2015). The effect of customer trust on customer loyalty and repurchase intention: The moderating influence of perceived CSR. *International Journal of Research in IT, Management and Engineering*, *5*(4), 1-31.

Vigripat, T. & Chan, P. (2007). An Empirical Investigation of the Relationship Between Service Quality, Brand reputation, Trust, Customer Satisfaction, Repurchase Intention and Recommendation to Others. *International DSI / Asia and Pacific DSI 2007* Full Paper (July, 2007).

DEVELOPING COMPETENCY OF OPERATIONAL SECURITY OFFICERS IN BANGKOK

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ABSTRACT

The objectives of this research were 1）to study the level of developing competency of security officers in Bangkok and 2）to study the factors affecting the developing competency of security officers in Bangkok. by using questionnaires as a tool to collect data from 400 people security officers in Bangkok. The statistics used in the data analysis were mean, standard deviation and multiple regression analysis. The results of the research were as follows: 1) The overall developing competency of security officers was found to be of high importance. When considering each aspect, it was found that the self‑worth with the highest average, followed by personality, knowledge, and skills, respectively. 2) Leadership factors of organization administrators, work motivation, organization atmosphere and self‑development affect the developing competency of security officers in Bangkok.

Keywords: The Development Competence, Operational, Security Guards

1. Introduction

In Thailand, which is experiencing economic downturn caused by a variety of factors. Whether it is the economic recession of the United States that affects the global economy, including Thailand. The problem of oil prices that have fluctuated all the time, problems with the slowdown in exports. and political instability causing many businesses to face problems with lack of liquidity and must close their businesses or need to fully save the budget by the number of employees, salary reduction or special reductions such as allowances, overtime commissions, etc. This has caused many social problems especially the unemployment problem, Occupational instability problem, problem of insufficient income for subsistence. Causing news in the media during this period of robbery, hijacking, killing, admiring, and snatching frequently occur. Most of them are new thieves or needy thieves that arise due to economic pressure. In addition, the political conflict, and various forms of terrorism to cause unrest in southern Thailand. These problems make people and business owners fear that the safety of life and property is a serious problem that threatens the lives of people in society. But the security measures of

government or government agencies are not enough to fight insurgents and prevent unseen threats. According to data from the National Statistical Office in 2015, there were more than 70,000 additional crimes against property and persons, or threats of terrorism. causing various agencies or organizations to fear that they will become targets of attack This has led to more and more security services. The growth rate of the security service business in Thailand has increased by an average of 15% per year and the number of security personnel is 330,000 people. (Sangwien Thepha, 2018)

From the phenomenon that has occurred, people must find different ways to protect themselves. Hiring a security company is another good and appropriate approach. In addition to the private or the public, they play a role in preventing basic crimes by protecting themselves from becoming victims of crime. The provision of security personnel or equipment to protect assets. Private security firms play an important role these days to help reduce losses from basic crimes and preventing basic crimes for the community. By the fact that these companies provide services for contracting, procuring, or installing security systems in every aspect for customers as needed. Security companies are part of private security which will become even more important in the future. Nowadays, security companies are in demand among shopping centers, private hospitals, hotels, financial institutions, offices in high-rise buildings, condominiums, and housing estates. An important problem with private security systems is that the services provided by operators or private security officers in Thailand. It looks non-standard and quality because there are no concrete measures or norms to control problems that may arise, such as problems with the qualifications of the business operator, quality issues of security guards, problems with occupational control organizations, etc. These are considered problems that affect consumers to be fulfilled by contracts because if the operator or security officer performs the duty is not standard or insufficient quality may affect consumers to be damaged. In addition, if private security officers have inappropriate quality of life, it will directly affect the society, especially the problems caused by the security officers may be the offenders themselves. (Institute of professional qualifications (Public Organization), 2019)

Security officers can be considered as important mechanism in driving security business to have sufficient standards or quality. Therefore, security officers should be competent in their work that are the basic characteristics of a person which may be own skills or social roles or applied knowledge. Because competence can tell who is performing. outstanding or mediocre. Competency is the knowledge, skills, and attributes needed to successfully perform a particular job role. They stand out from others in behavior, such as being able to perform more tasks than their peers in a wider variety of situations and get better results. (Boyatzis, 2018) While developing the performance of employees in the organization. Organizational leaders have an important role in developing competency. Because leadership plays a role in building interpersonal relationships, roles related to information and decision-making roles. It also plays a role in the management of the organization, be a creative change and development leader role in mediation and management of operational-related conflicts. (Supha Awasakulsuth, 2013, p. 20) In other words, leadership is both executives and leaders who can work in their respective roles because having high leadership will be able to accomplish what they are responsible for and make the group achieve the goals. In addition, if they want their subordinates to be able to work more flexible and was

well assisted by his subordinates. Leaders need to study a person's motivation. What incentives are required? And leaders need to promote motivation to work and provide encouragement to those who perform their duties well and do the right thing. Motivation is therefore crucial to behavioral expression and meeting the needs of subordinates. Motivation is a wake-up call. Encouraging subordinates to have encouragement, determination, and to fully perform their duties to the best of their ability. Without motivation Subordinates will work in the organization unhappy. In business organizations, incentives are essential to both quantitative and qualitative productivity processes. Therefore, the motivation that arises with the subordinates will result in better job productivity and the task of the leader is find ways to create motivation in working for the followers to achieve the vision and aims of the organization. (Steer & Porter, 2013)

From the importance of the above problems. The researcher was aware of the problem of lack of competency in working. This causes the security officers to not meet the required standards. This will affect the overall picture of the security business. The researcher sees that such problems should start from fixing the security officers and the organization firstly. Before any other developments, security officers must first develop operational competencies. Therefore, the researcher is interested in studying "Developing competency of security officers in Bangkok" to use the information obtained from the study as a guideline in formulating policies to develop operational competency and factors that enhance operational competency to reach the maximum efficiency.

2. Objectives

(1) Study the level of developing competency of operational security officers in Bangkok.

(2) Study factors affect to developing competency of operational security officers in Bangkok.

3. Literature review

3.1 Theory and related research

Academics have defined competence that competence is the ability or competence of a person holding a position for the job that a job requires, and this competency refers not only to behavior. But also, their beliefs, attitudes, and profound habits. (Narongwit Saenthong, 2017, p. 45) Also the competency is the level of ability to apply the paradigm, attitude, behavior, knowledge and skills to achieve the highest quality, efficiency and effectiveness in the performance of duties of persons in the organization. (Wattana Pattanapong, 2016, p. 82) in accordance with Kajonsak Hannarong (2015) Competencies are defined as those which express a person's attributes and qualities, including knowledge, skills, and which characterize a person's qualitative and qualities. Including the knowledge, skills, and behaviors expressed which makes it possible to achieve results in quality practice and higher performance than general standards.

Competency refers to the group of knowledge, skills, and attributes of an individual that can be measured by the individual's expressed working behavior and noticeable. Therefore, competency consists of three components: 1) personal characteristic refers to traits, attitudes, and motive, which such traits will influence the

behavior of that person's expression. 2）behavior refers to the expression of a person who is both positive and negative, and 3) performance refers to the results of an action. (Krirkkiat Srisermphok, 2014, p. 102)

Consultant for a study project to determine the competency model for the Thai civil service of the Office of the Civil Service Commission (2016, p. 44) The description of the competency is a set of behaviors, abilities, and attributes that operators should have in the performance of their duties to be successful for use in human resource management, administration, and organization development for members of the organization to develop themselves. In order to effectively perform the present and future operations as required by the organization and has defined competency is the behavioral characteristics that enable individuals in the organization to perform the following characteristics: 1) Has a performance that stands out from the others. 2) Show more behavioral traits than other colleagues in a wider variety of situations; and 3) Achieve better results than others and has defined the definition of competence as behavioral attributes that result from knowledge, skills, abilities, and other attributes that enable individuals to perform better than their peers in the organization. Competency is a group of behaviors that the organization needs from employees or government officials. Because it believes that if employees or government officials have behaviors in working in the way that the organization has set will result in that employee or government official having good performance and result in the organization achieving the desired goals. (Office of the Government Commission, 2016, p. 48)

The definitions and meaning of competency have been studied in different studies, and none of them are right or wrong. But depending on the application, the meaning of competency in each subject studied, although not quite the same. But they have common characteristics. "Work behavior is related to the success of the job and related to knowledge, skills, abilities and other personal characteristics". Competency is a word that has been translated into Thai differently, such as the word competence, ability, competency, capability, potential, etc., But the word competency is a widely used term. Therefore, in this paper, the researcher uses the term "competency" to refer to the meaning of the word "competency".

Therefore, the term "Competency", the researcher can conclude that is a behavioral feature and all the abilities of the individual that are reflected or manifested in the performance. Behaviors in various roles and situations that produce the excellent results required by the organization to achieve the goals of its vision, mission, and plans. It is based on the knowledge, skills, abilities, and personal attributes necessary for performance such as mental models, habits, motivations and create development in the person.

3.2 Conceptual framework

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┌─────────────────────────────┐
│ Personal factors            │
│ 1. Gender                   │
│ 2. Age                      │          ┌──────────────────────────────────┐
│ 3. Education level          │          │ Developing Competency of Operational │
│ 4. Average monthly income   │ ──────▶  │    Security Officers in Bangkok     │
│ 5. Period of work           │          │ 1. Personality                     │
└─────────────────────────────┘          │ 2. Knowledge                       │
                                          │ 3. Skill                           │
┌─────────────────────────────┐          │ 4. Self-Esteem                     │
│ Organizational factors      │          │                                    │
│ 1. Leadership of the        │          │                                    │
│    organization's           │ ──────▶  │                                    │
│    executives               │          └──────────────────────────────────┘
│ 2. Motivation for work      │
│ 3. Organizational atmosphere│
│ 4. Self-development         │
└─────────────────────────────┘
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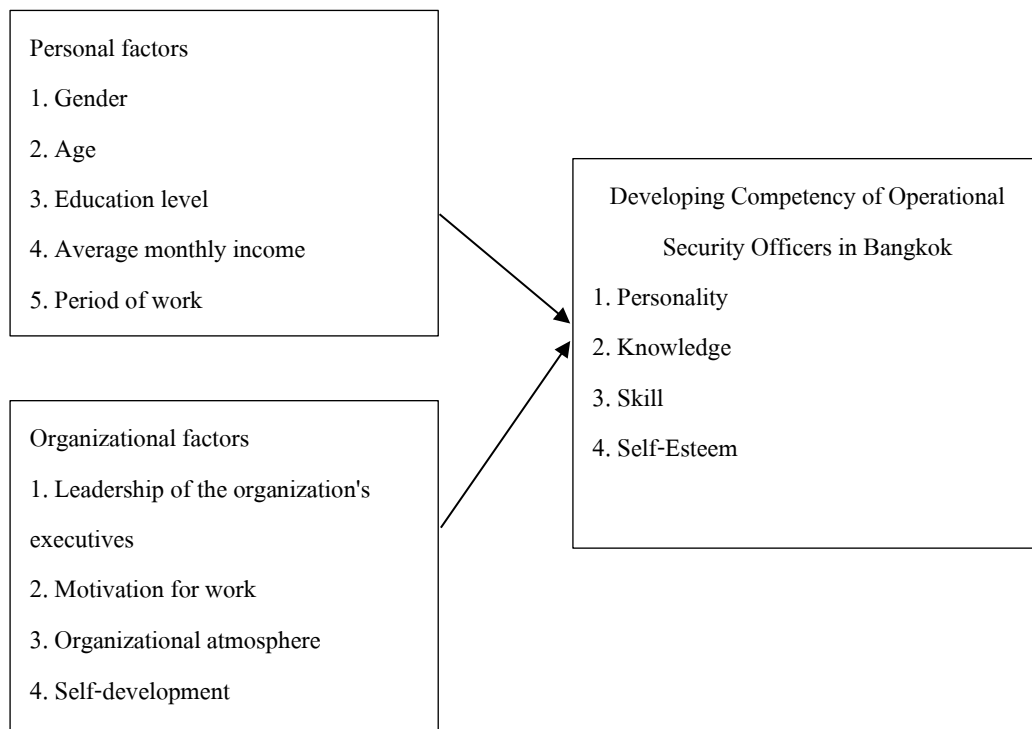
Diagram 1 Conceptual Framework

3.3 Research hypothesis

Leadership factors of organizational executives, motivation to work, atmosphere, and self-development affect the developing competency of operational security officers in Bangkok.

4. Research methodology

4.1 Research design

This study is a quantitative study, and the data is collected by questionnaire.

4.2 Population and samples

The population in this research was Security officers in the Bangkok area of 577,500 people. The sample group is 400 security officers in Bangkok from the formula for calculating the sample group of Taro Yamane (Yamane, 1970) at 95 percent confidence. They were using a stratified random sampling method, with samples randomly drawn from security personnel from small, medium, and large companies.

4.3 Research instruments

The tool for this research was a questionnaire consisting of 3 parts as follows. The questionnaire had a reliability value is 0.982.

Part 1 The questionnaire on personal factors of respondents were gender, age, educational level, average monthly income, and period of work. The questionnaire was a multiple choice.

Part 2 The Organizational Factors Questionnaire such as Leadership of Organization, Administrators motivation to work, organization atmosphere and self‑development. The questionnaire was based on a rating scale of 5 levels are very good, good, fair, poor, very poor. The scoring criteria are as follows: Very good = 5 points, Good = 4 points, Fair = 3 points, Poor = 2 points and Very poor = 1 point.

Part 3 Developing Competency of Operational Security Officers in Bangkok. The scoring criteria are as follows: Very good = 5 points, Good = 4 points, Fair = 3 points, Poor = 2 points and Very poor = 1 point.

4.4 Data collection

The researcher conducted the data collection according to the following steps:

1. The researcher requested a letter from the Graduate School, Suan Sunandha Rajabhat University to the management of the security company to request assistance in collecting information from security officers.

2. The researcher conducted the data collection by himself. The researcher received the questionnaire back after the respondents filled out the information.

3. The returned questionnaires were taken for integrity checks for data analysis.

4.5 Data analysis

1. The personal factors of the respondents classified by gender, age, educational level, average monthly income and period of work. Distributed in frequency and percentage.

2. Information about the developing competency of security officers in Bangkok analyzed by averaging and standard deviation. Decision criteria and consideration criteria. The researcher determined the interpretation of employee feedback scores. It is divided into 5 levels and uses a 5‑level estimation scale as follows:

Average score 4.21 – 5.00 Very good

Average score 3.41 – 4.20 Good

Average score 2.61 – 3.40 Fair

Average score 1.81 – 2.60 Poor

Average score 1.00 –1.80 Very Poor

3. A multiple regression analysis was performed using the enter method to determine the influence of organizational factors on the performance improvement of security officers by setting a statistical significance at the 0.05 level.

5. Data conclusion

1. Most of the respondents were male and representing at 86.42 percent. Aged between 31‑40 years and representing at 39.09%. Graduated from lower secondary school and representing at 54.73%. They had an average monthly income between 15,001 –20,000 baht or 34.98% and had a period of work between 6‑10 years, representing at 38.68%.

2. Organizational factors are of high importance ($\overline{X}$=3.97, S.D.=0.53). When each aspect was considered, it was discovered that motivation for work with the highest mean ($\overline{X}$=4.05, S.D.=0.58). Following

with self-development ($\overline{X}$=4.03, S.D.=0.55), leadership of the organization's executives ($\overline{X}$=4.00, S.D.=0.44) ,and organizational atmosphere ($\overline{X}$=3.80, S.D.=0.50), respectively. Refer details in Table 2.

Table 1 Mean and Standard Deviation of Organizational Factors

Field	Name List	$\overline{X}$	S.D.	Result
1.	Leadership of the organization's executives	4.00	0.44	Good
2.	Motivation for work	4.05	0.58	Good
3.	Organizational atmosphere	3.80	0.50	Good
4.	Self-development	4.03	0.55	Good
	Total	3.97	0.53	Good

3. The results showed that the overall level of developing competency of security officers was found to be of high importance ($\overline{X}$=3.60, S.D.=0.71). When each aspect was considered, it was discovered that self-esteem with the highest mean ($\overline{X}$=3.69, S.D.=0.71). Following with personality ($\overline{X}$=3.61, S.D.=0.81), knowledge ($\overline{X}$=3.57, S.D.=0.77) and skills ($\overline{X}$=3.55, S.D.=0.82), respectively. Refer details in Table 2.

Table 2 The Mean and Standard Deviation of Developing Competency of Operational Security Officers in Bangkok.

Field	Name List	$\overline{X}$	S.D.	Result
1.	Personality	3.61	0.81	Good
2.	Knowledge	3.57	0.77	Good
3.	Skill	3.55	0.82	Good
4.	Self-Esteem	3.69	0.71	Good
	Total	3.60	0.71	Good

3. The results of the study found that organizational factors, leadership of the organization's executives, motivation to work, organizational atmosphere and self-development affects the developing competency of security officers in Bangkok or can predict the developing competency of security officers in Bangkok by 76.93%

6. Summary and Discussion

In the study of Developing Competency of Operational Security Officers in Bangkok, the researcher brought important issues to discuss the results according to the following objectives:

1. The results showed that the overall level developing competency of security officers was found to be of high importance. When considering each aspect, it was found that self-worth with the highest average, followed by personality, knowledge, and skills, respectively. This may be due to reasons that organizational executives of security companies in Bangkok pay attention to the developing competency of security officers. Because of the

present is an era of business competition and needs to developing competency of security officers to be more quality which the study results are consistent with the research results of Thanyanan Thongpankunanon（2017）that have studied about the competency of employees Case study of POSCO (Thailand) Co., Ltd. Employees of POSCO (Thailand) Co., Ltd. have a high level of overall and individual performance of employees.

2. The results showed that organizational factors, leadership of the organization's executives, motivation to work, organizational atmosphere and self-development affects the developing competency of security officers in Bangkok. It can predict the developing competency of security officers in Bangkok by 76.93%. This may be due to reasons that coming from an organization executive, a security company focuses on enhancing organizational factors in having a good management vision, have high leadership, enhancing work motivation for employees and change the atmosphere of the organization and encourage security officers to develop themselves at a higher level. This has resulted in the developing competency of security officers in the Bangkok at a higher level. The results of the study were consistent with the research results of Tarinee Aphairot（2018）. A Study of Core Competency for Human Resource Development: A Case Study, Office of the President Mahidol University Salaya Campus. The results showed that factors of leadership, motivation, organizational atmosphere and in terms of self-development, affecting the development of core competencies for personnel development.

7. Suggestion

7.1 Suggestions for Applying The Research Results

（1）The organization's executives and supervisors shall encourage employees to receive training and improve their work knowledge.

（2）The organization's executives and supervisors must train their subordinates to show their abilities and use their skills to solve specific problems that arise within the organization in a timely manner.

（3）The organization's executives and supervisors need to create a feeling of confidence in their personnel more in order for employees to have more assurance and self-confidence.

（4）The organization's executives and supervisors must have regulations to guide the conduct of personnel equally.

7.2 Suggestion for Further Work

In the next study, factors that enhance the competency of security officers in other areas should be studied, such as organizational commitment, quality of life at work, etc., In order to be able to know the factors that enhance and develop competency in work.

8. References

Boyatzis, R.E. (2018). *The Competent Manager: A model of Effective Performance*. New York: John Wiley and Sons Inc.

Institute of Professional Qualifications (Public Organization). (2019). *Occupational Standard and Professional Qualifications*. Bangkok: Rajamangala University of Technology Thanyaburi.

Kajonsak Hannarong. (2015). *Assessment and follow-up of practical training*. Bangkok: SE-ED Book.

Krirkkiat Srisermphok. (2014). *Competency Development*. Bangkok: Gobalcon Cern Company Limited.

Mowday, R. T., Porter, L. W. & Steers, R. W. (2013). *Motivation and Work Behavior*. New York: McGraw-Hall Book Company.

Narongwit Saenthong. (2017). *Let's get to know COMPETENCY*. Bangkok: H R Center.

Office of the Civil Service Commission. (2016). *Thai Civil Service Competency Handbook.* Bangkok: Office of the Civil Service Commission.

Sangwien Theppha. (2018). *Standards for supervision and promotion of security businesses*. Bangkok: Royal Thai Police.

Supha Aawasakulsut. (2013). *Development of Leadership Characteristics of Nursing Supervisors community hospital*. Doctor of Philosophy Program in Human Resource Development Ramkhamhaeng University.

Tarinee Aphairot. (2018). *Study of core competencies for human resource development: Case Study Office of the President Mahidol University Salaya Campus*. Thesis - Master of Arts, Mahidol University.

Thanyanan Thongpankunanon. (2017). *Competency of employees, case study of POSCO (Thailand) Co., Ltd*. Master of Arts thesis, Krirk University.

Wattana Pattanapong. (2016). *Management for the future*. Bangkok: Dok Yha.

SUSTAINABLE SUCCESS OF INTERNATIONAL WILDLIFE IMPORTS AND EXPORTS

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ABSTRACT

The objectives of this research were study the degree and factors contributing of sustainable success of international wildlife imports and exports. The questionnaire was used as a tool to collect data from 340 investors or wildlife import-export operators which engaged in the Suvarnabhumi and the Don Mueang border. The statistics used in the data analysis were mean and standard deviation, and multiple regression analysis. The research findings were work system, government policy, Competent staff performance, and the capitalist or entrepreneur practice were affecting the sustainable success of international wildlife imports and exports by 72.41% and it was found that the award-winning influencing with the highest average, followed by supervision and achieving organizational goals respectively.

Keywords: Sustainable Success, International Imports and Exports, Wildlife

1. Introduction

Nowadays, the problem of commercial exploitation of wildlife is increasing, affecting wildlife and the ecosystem of many plants and animal life. Such threats have evolved into wildlife trade processes. The wildlife trade includes both live wildlife and carrion for use as food, used as an herb. It is an ornament according to beliefs and values and is raised for play by claiming to be recreational or enhance prestige, etc. International Wildlife Protection Organization released a research report and survey of the illegal wildlife trading market via social media, only collecting data in June 2016 found that 1,521 of 200 species of animals, of which 516 birds were offered for sale, followed by 139 lorises and 115 African spur tortoises were sold, while statistics of wildlife crimes in the Wild West of the Department of National Parks, Wildlife and Plant Conservation from 2010 to January 2018 found a total number of wildlife crimes 469 cases resulted in the deaths of more than 1,200 wild and restricted wildlife. Despite the laws governing and proclaiming the forest as a conservation area. Including declaring certain wild animals to be reserved or protected. However, the problem of hunting continues to emerge

from time to time, so the problem of wildlife threats has now evolved into a multitude of trades. Whether it is trade in live wildlife carrion trade wildlife trade in zoo operations. The wildlife trade process has been modified to avoid scrutiny from government officials. As well as regulations and legal regulations, it is a challenge for government processes to manage to stop and prevent wildlife trafficking from happening. This will preserve natural resources and the environment to maintain balance. (Moore et al., 2016)

In addition to the problem of illegal wildlife trade, there is still an important problem that continues to form a chain, namely epidemics, which originate from wild animals that cause serious infectious diseases to humans. The epidemic of many deadly infectious diseases, such as HIV or AIDS, avian influenza, severe acute respiratory syndrome (SARs), Ebola and Marburg hemorrhagic fever, is an animal-borne disease to humans (zoonosis). The spread of various serious infectious diseases from the past to the present, there is a strong correlation with human density, supporting the hypothesis that the phenomena of infectious diseases are the result of changes in human behavior, for example: expansion of agricultural land, routes of trade and travel, changes in land use, and the phenomenon of animal-to-human transmission in the past has a clear relationship between human density and the spread of the world's natural biodiversity (Wildlife biodiversity) and the likelihood of animal-to-human transmission. An epidemic has a high probability of inflicting human activity on the area and animal-to-human epidemics and lead to human-to-human outbreaks that continue and without the need for vectors or breeding grounds as in the beginning. (Mores et al., 2012)

The convention on international trade of endangered species of wild fauna and flora: CITES abbreviated as CITES is an international treaty that the goal is to conserve and protect endangered wildlife and wild plant resources were regulated by a permit system in which wild animals and plants that are regulated by the Convention are listed on List No. 1 or 2 or 3 and must have a permit to import, export and transit internationally. According to Article 8 of the CITES Convention. Requires Contracting Parties to establish mechanisms and procedures to control the import-export of wildlife and wild plants in accordance with this Convention. Thailand has established a mechanism for the implementation of the Convention which consists of management authority, scientific authority, and wildlife, aquatic or wild plant checkpoints at airports, seaports, and border crossings along the border with neighboring countries. There is the Wildlife Preservation and Protection Act B.E. 2535 which is currently the Wildlife Preservation and Protection Act B.E. 2562 and the Plant Varieties Act B.E. 2535. The management authority-CITES (MA) includes the Department of National Parks, Wildlife and Plant Conservation, the Department of Fisheries and the Department of Agriculture, is the issuer of the license to import, export or transit wildlife and wild plants under the Convention; It is under the guidance of the scientific authority-CITES (SA) and works in coordination and cooperation with the Department of Fisheries, Department of Agriculture, Police and customs authorities in regulating international trade in accordance with the Convention. The Department of National Parks, Wildlife and Plant Conservation is the focal point in implementing the CITES convention and is the coordination center with relevant agencies. To ensure consistent implementation of the CITES Convention at the national level. (Wildlife and Wild Flora Protection Convention, 2016)

The practice of permitting the import, export and transit of wildlife, carcasses, or carcass products. It is a mission to serve those who wish to apply for a permit to import, export and transit wildlife, wildlife carcasses or wildlife carcass products. The operation must be carried out in accordance with the relevant laws, ministerial regulations, rules, and regulations and in line with the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). In addition, other factors must also be taken into account such as zoology, epidemiology, economics, law and international relations, etc. Thailand has enacted the Wildlife Preservation and Protection Act B.E.2562. The Wildlife Preservation and Protection Act B.E. 2535. To have standards, practice guidelines must be laid. As well as to improve the old practice to be in line with the relevant laws and ordinances issued under the new Act, effective since 25 November B.E.2562. So that practitioners can perform properly, have confidence, as well as build strength and efficiency in their work, respond to the performance of duties in the current situation. (Wildlife and Wild Flora Protection Convention, 2016b)

As wildlife threats become more severe in the form of illegal wildlife trade movements, a variety of methods have been developed to circumvent the scrutiny of the authorities. This has a huge impact on wildlife resources, resulting in a decrease in the number of wildlife, which can lead to an imbalance in the ecosystem. Subsequent problems arise from the movement of unverified wild animals. Causing the epidemic of communicable diseases, both old and new diseases caused by infection from animals to humans which has an increasing effect on human health. This is evident in the case of a new viral disease, or COVID-19, that not only has a severe impact on the public health system of the world. Resulting in the number of patients and deaths in the millions. Also severely affect the economy and society until having to adjust the lifestyle known as new normal. All social sectors around the world must change their lifestyles to survive this crisis. For the matter of law Rules and Regulations, it has evolved to control the movement of wildlife between countries. The enactment of the Wildlife Preservation and Protection Act B.E. 2562 in line with the implementation of the CITES Convention, therefore, the performance of officials in determining the permission for the import, export and transit of wildlife, carcasses, or products. From the remains of wild animals as well as improving the work system, government policy, supervising staff operations, and check the performance of the capitalist or entrepreneur to achieve sustainable success of international wildlife imports and exports.

The researcher recognizes the importance of acting in situations where there is a gab of the problem of import, exporting wild animals through the cooperation of competent officials and capitalists/entrepreneurs. Therefore, it is interested to study "Sustainable success of international wildlife imports and exports" to apply the data from the study to solve the root causes of many problems. So that officers have guidelines to implement as standard legal. It can help create satisfaction for service recipients as well. It may also play a part in controlling and mitigating the impacts of international wildlife movements.

2. Research Objectives

(1) To study the degree of sustainable success of international wildlife imports and exports.

(2) To study the factors that affect the sustainable success of international wildlife imports and exports.

3. Literature Review

3.1 Theory and Related Research

Bustinza et al., (2013) state the success of the organization, in addition to financial success organizations can also be successful in other ways. By entrepreneurs should be checked that the business will be successful as it has been set for the purpose of running the business. Considering 1) return on investment 2) satisfaction of all parties and 3) attention to organization management.

The organizational factors concerning to understand the principle of management that causes sustainable development. A company will achieve sustainable development if it pays attention to the balance of organizational goals, award winning and supervision. Therefore, companies should prioritize financial award and economic goals, must interesting to social benefits and environment (Schaltegger et al., 2015; Baumgartner, R. J. and Rauter, R. 2017). One of the efforts that companies make to achieve sustainable performance have several significant effects, such as the construction companies (Afzal, F. and Lim, B. 2022) of work system, knowledge management but practically, the results provide insights to aid governments and regulators in continuously implementing knowledge management to achieve sustainable performance (Sapta et al., 2021) and determine that success of a company was because of its employees' performance (Siddiqui, M. N. 2014) and society with factor of labor was the most affected sustainable enterprises (Pongsri pecharak and Sirat Jangruxsakul. 2015). Its use the operationalized measurement items of each to self-assess and improve their organizational practices, which will help them develop strategies for improved sustainability performance.

In conclusion, success refers to the achievement of goals according to the objectives of the organization in an efficient and effective manner.

The concept of sustainable development has started to play a role in the global social development trend since 1972, since the United Nations has held the Human Environment Summit in Stockholm, Sweden. calls on the world to consider the efficient use of limited resources and in 1983, the United Nations established the World Commission on Environment and Development, commonly known as the "Brundtland Commission", calling on the world to make changes to environmentally safe livelihoods and in line with the limitations of nature and proposed that mankind can achieve "sustainable development".

Sustainable development has become even more important when the United Nations hosts the UN Conference on Environment and Development (UNCED) or Earth Summit in Rio de Janeiro, Brazil in 1992. As a result of this meeting, representatives of 178 countries, including Thailand, signed Agenda 21, which is considered a global master plan in which member states must be aware of environmental problems and seeing the importance of working together to protect the environment to create sustainable development. To occur in the world from the 21 Action Plan above, our country has also adopted sustainable development issues, especially

the 10th National Economic and Social Development Plan (2007-2011), which in addition to Focus on "people" as the center of development. Emphasis on sufficiency economy, strong communities and others and emphasizes on sustainable development.

Sustainable development means development that meets the needs of today's needs, want or necessity that will happen to future generations. A standard of living beyond the lowest necessity will be sustained only if consumption standards everywhere consider long-term sustainability, including covering resource heritage preservation measures that will fall on the latter by at least as much as the present generation has acquired and is a development that spreads the benefits of comprehensive economic progress. It is a development that protects the environment both locally and globally. Overall, for future generations and is a development that truly improves the quality of life. (Kua Wongboonsin, 2015)

It can be concluded that sustainable development is a development model that meets the needs of today's human beings without any compromise on the needs that meet the needs of future human beings.
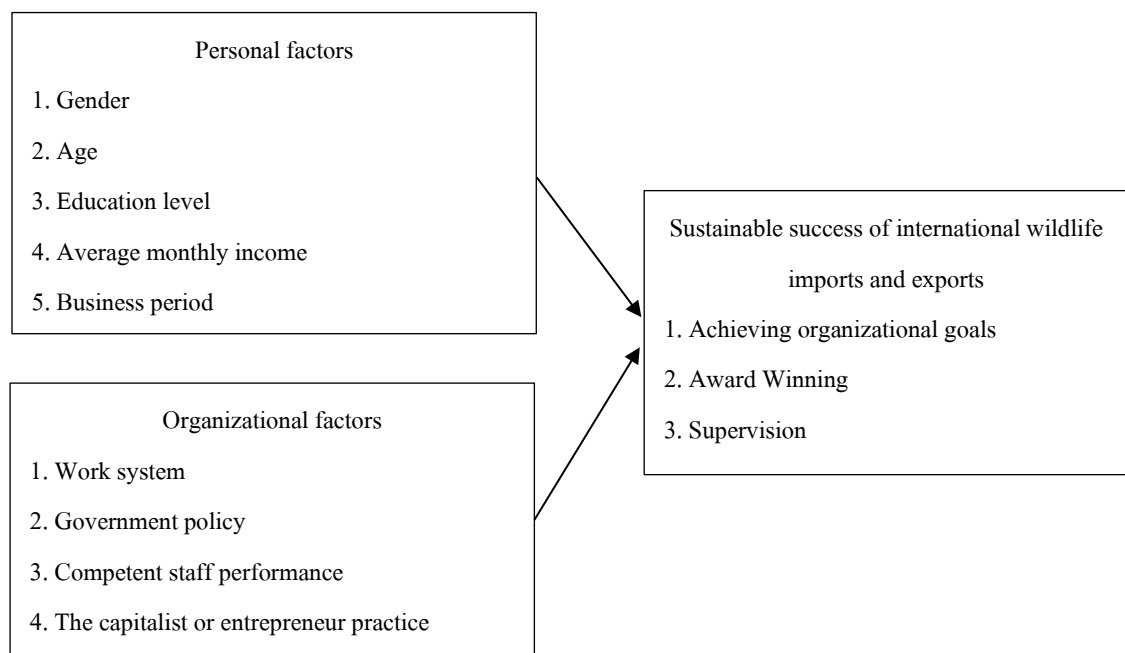
3.2 Conceptual Framework

Figure 1 Conceptual Framework

3.3 Research Hypothesis

Work system, Government policy, Competent staff performance, and the capitalist or entrepreneur practice affecting the sustainable success of international wildlife imports and exports.

4. Research Methodology

4.1 Research Design

This study employed quantitative-based research with used questionnaires to collect datas. The aim the study was to explore factors involved for the sustainable success of international wildlife imports and exports.

4.2 Participations

The research population was capitalists or entrepreneurs who importing and exporting wildlife at the Suvarnabhumi and the Don Mueang borders, totaling 936 people. The samples were selected by Stratified Random Sampling for 340 people, obtained from the sample group calculation formula of Taro Yamane (Yamane, T. 1970) at 95 %t confidence.

4.3 Research Instruments

The instrument for this research was a questionnaire consisting of 3 parts with description of the questions regarding sustainable success of international wildlife imports and exports including (1) achieving organizational goals (2) award winning and (3) supervision and the questions about suggestions concerning any issue in the measurement were provided as follows: Part 1 The personal factors of the respondents which questionnaire was a multiple choice. Part 2 The organizational factors and Part 3 sustainable success of international wildlife imports and exports were based on a rating scale of 5 levels with reliability at 0.93. The researcher determined the interpretation of employee feedback scores. It is divided 5 level estimation scale as follows:

Average score 4.21 – 5.00 = Very good

Average score 3.41 – 4.20 = Good

Average score 2.61 – 3.40 = Fair

Average score 1.81 – 2.60 = Poor

Average score 1.00 – 1.80 = Very Poor

4.4 Data Collection

The researcher conducted the data collection according to the following steps:

1. The researcher requested a letter from the Graduate School, Suan Sunandha Rajabhat University to the capitalist or entrepreneur to request assistance in collecting information.

2. The researcher conducted the data collection by myself and received the questionnaire back after the respondents filled out the information.

3. The returned questionnaires were taken for integrity checks for data analysis.

4.5 Data Analysis

1.The personal factors of the respondents classified by gender, age, educational level, average monthly income, period of business, frequency, and percentage.

2. The sustainable success of international wildlife imports and exports including (1) achieving organizational goals (2) award winning and (3) supervision and organizational factors including (1) work system

(2) government policy (3) competent staff performance and (4) the capitalist or entrepreneur practice analyzed by averaging and standard deviation, decision criteria and consideration criteria.

3.Enter multiple regression analysis to determine the influence of organizational factors on the sustainable success of international wildlife imports and exports. The statistical significance was set at the 0.05 level.

5. Research Finding

1. Most of the respondents with the average at 100 % of samples were female and representing 88.50 %, aged 31‐40 years and representing 43.50 %, education at a level lower than a bachelor's degree at 79.00 %, an average monthly income of 150,001 baht or more equivalent to 54.75 %, and a period of doing business for more than 3 years, representing 45.00 %.

2. The result showed that organizational factors were found to be very good level. ($\overline{X}$=4.49, S.D.=0.53) When considering each aspect, it was found that government policy effected with the highest mean ($\overline{X}$=4.51, S.D.=0.50), followed by work system ($\overline{X}$=4.50, S.D.=0.53), competent staff performance ($\overline{X}$=4.49, S.D.=0.50) and the capitalist or entrepreneur practice ($\overline{X}$=4.47, S.D.=0.58) respectively, with details in table 1.

Table 1 Mean and Standard Deviation of organizational factors

Field	Name List	$\overline{X}$	σ	Result
1.	Work system	4.50	0.53	Very Good
2.	Government policy	4.51	0.50	Very Good
3.	Competent staff performance	4.49	0.50	Very Good
4.	The capitalist or entrepreneur practice	4.47	0.58	Very Good
	Total	4.49	0.53	Very Good

3.The results showed that the sustainable success of international wildlife imports and exports were found to be at the very good level ($\overline{X}$=4.48, S.D.=0.57) When considering each aspect, it was found that the award winning effected with the highest mean ($\overline{X}$=4.54, S.D.=0.59), followed by supervision ($\overline{X}$=4.53, S.D.=0.60) and achieving organizational goals ($\overline{X}$=4.37, S.D.=0.63) respectively, with details in table 2.

Table 2 Mean and Standard Deviation of Sustainable Success of International Wildlife Imports and Exports

Field	Name List	$\overline{X}$	σ	Result
1.	Achieving organizational goals	4.37	0.63	Very Good
2.	Award Winning	4.54	0.59	Very Good
3.	Supervision	4.53	0.60	Very Good
	Total	4.48	0.57	Very Good

4. The results showed that organizational factors, work system, government policies, competent staff performance and the capitalist or entrepreneur practice affect the sustainable success of international wildlife imports and exports which can predict by 72.41%.

6. Conclusions & Discussions

The results of the study found that organizational factors, work system, government policies, competent staff performance, and the capitalist or entrepreneur practice affected the sustainable success of international wildlife imports and exports with very good level, it can predict by 72.41%. Because the competent staff working on the import and export work systematically, comply with government policies and strictly enforced by capitalists or entrepreneurs in accordance with the established laws, thereby ensuring sustainable success in international wildlife imports and exports. The finding is consistent with the study of Khan, Turner, and Maqsood (2018) that studied the factors influencing the success of government projects in Pakistan. The results showed that organizational factors, work systems, government policies and employee performance and service were affecting the success of government projects in Pakistan.

The results showed that the sustainable success of international wildlife imports and exports was found to be of high importance enclosing achieving organizational goals, award winning and supervision were influencing. Due to Thailand has given importance to the problem of animals smuggling and the law is enforced following the government's policy seriously. Consequently, organization were involved will be legal action. In accordance with Patranit Thongsamsee and Thirawat Chuntuk (2016) that studied was conducted on the causal relationship analysis of factors affecting the success of the innovative business plan grant program showed that internal control factors which included resource management, personal development, and control system affected success of the project.

7. Suggestions

(1) Entrepreneurs should set clear target indicators for wildlife import and export operations for more efficiency of the organization.

(2) Government agencies involved such as the Department of National Parks, Wildlife and Plant Conservation should be formulated policies to encourage entrepreneurs to comply with the law more strictly.

(3) Relevant agencies should promote the performance of competent officials on international wildlife imports or exports to provide incentives for their work. An honorary award was given to the competent officer for outstanding performance.

(4) The factors contributing to the sustainable success of international wildlife imports and exports should be explored, such as legal factors. export promotion factors etc. to the next.

(5) The multitudinous study who involved the international wildlife import and exports were conducted for factors hidden

8. Acknowledgement

9. References

Afzal, F., Lim, B. (2022). *Organizational Factors Influencing the Sustainability Performance of Construction Organizations*. Sustainability, *14*, 10449.

Baumgartner, R. J., and Rauter, R. (2017). Strategic Perspectives of Corporate Sustainability Management to Develop a Sustainable Organization. *Journal of Cleaner Production, 140*(1), 81–92.

Bustinza, O. F., Parry, G. C., Vendrell-Herrero, F. (2013). Supply and demand chain management: the effect of adding services to product offerings. *Supply Chain Management: An International Journal, 18*(6), 618-629.

Khan, K., Turner, J. R., and Maqsood, T. (2018). Factors that influence the success of public sector projects in Pakistan. *Journal of Innovation and Entrepreneurship, 10*(1), 1-21.

Kua Wongboonsin. (2015). *Population and Development*. Bangkok: Chulalongkorn University Press.

Moore, P. Prompinchompoo, C. and Beastall, C.A. (2016). *Cites Implementation in Thailand: Arnien of the legal regime governing the trade in great apes and gibbons and other CITES-listed species.* Malaysia: Traffic report, TRAFFIC Southeast Asia Regional Office.

Morse, S.S., Mazet, J.A.K., Woolhouse, M., Parrish, C.R., Carrall, D., Karesh, W.B., et al. (2012). *Prediction and prevention of the next pandemic zoonosis*. [online] Available on 10 August 2022, www.thelancet.com.

Patranit Thongsamsee and Thirawat Chuntuk. (2016). Analysis of Causal Relationship Among Factors Affecting Success of the Innovation Business Plan Grant Program: A Case Study of Central Area. *RUMTL Journal of Humanities and Social Sciences, 4*(1), 79 – 90.

Pongsri pecharak and Sirat Jangruxsakul. (2015). *Sustainable Management of Auto Part in Sedan Supply Chain*. Bangkok: Dhurakij Pundit University.

Sapta, I Ketut Setia, Sudja, I Nengah, Landra, I Nengah and Rustiarini, Ni Wayan. (2021). Sustainability Performance of Organization: Mediating Role of Knowledge Management. *Economies, 9*, 97.

Schaltegger, S., Hansen, E. G. and Lüdeke-Freund, F. (2015). *Business Models for Sustainability: Origins, Present Research, and Future Avenues. Organization & Environment, 29*(1), 3–10.

Siddiqui, M. N. (2014). Success of an Organization is a Result of Employees Performance. *Advances in Social Sciences Research Journal, 1*(4), 179-201.

Wildlife and Wild Flora Protection Division under the Convention. (2016). *Laws and Regulations Relating to the Practice of CITES Conventions*. Bangkok: Department of National Parks, Wildlife and Plant Conservation.

_____. (2016b). *Thailand and CITES (Thailand and CITES)*. Bangkok: Department of National Parks, Wildlife and Plant Conservation.

Yamane, T. (1970). *Statistic: an Introductory Analysis*. 2nd ed. New York: Harper & Row.

THE DEVELOPMENT OF THE CORPORATE IMAGE ON SOCIAL RESPONSIBILITY OF THE SPECIALIZED FINANCIAL INSTITUTIONS (SFIs) UNDER THE MINISTRY OF FINANCE

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ABSTRACT

The purposes of this study are 1) to study the level of social responsibility image development of specialized financial institutions (SFIs) under the Ministry of Finance, and 2) to study the factors influencing the development of social responsibility image of specialized financial institutions (SFIs) under the Ministry of Finance. By using questionnaires as a tool to collect data from 380 officers and executives who have been working in the specialized financial institutions (SFIs) under the Ministry of Finance under the "Thai Credit Guarantee Corporation Act B.E. 2534 (1991)". The statistics used in the data analysis were mean, standard deviation, and multiple regression. The research results are as follows 1) Developing the social responsibility image of specialized financial institutions under the Ministry of Finance overall was found to be of high importance. When considering each aspect, it was found that stakeholder participation was the highest average, followed by social, environmental, and economic indicators, respectively. 2) Organizational management, modern corporate management, communication, and the creation of shared value are all factors influencing the development of the corporate image and social responsibility of the Ministry of Finance's specialized financial institutions (SFIs).

Keywords: Development Corporate Image on Social Responsibility, Ministry of Finance

1. Introduction

Every organization's business operations are being challenged by rapid changes in the environment and unavoidable competition. Organizations must seek solutions or strategies that conform to and fit into the marketing situation in order to compete with old and new competitors who are stealing market share (Sangkharak, 2013). A positive corporate image influences product or service purchasing decisions and leads to satisfaction, impression, and trust in the organization. Consumers would be affected by the corporate image. Consumers would select products or services that reflect their self-value and personality, as well as those that enhance their self-

image. Customers would tell others about their positive experience and would be happy to support the organization's product or service in the future. This would be beneficial. (Uppanan et al 2018).

The business sector is under increasing pressure from society, including the government, non-governmental organizations, customers, and the general public. It has been pressed to assume greater societal and environmental responsibilities. This is the result of increased societal awareness and recognition of the consequences of the business segment's activities (Julintron, 2018). To improve corporate image, the concept of corporate social and environmental responsibility emerged. It has been used in the development strategy to contribute to the outstanding and distinct image and reputation of the product, as well as the recognition of the product or service's brand. All of this has resulted in revenue and market share, as well as consumer popularity and purchasing consideration. Positive factors for the organization would improve its image and reputation, which would affect its market share (Boonyasart and Chaisuwan, 2018). Businesses must consider profit, the environment, and society all at the same time. The organization must provide strategies in management that cover all of the above perspectives. The organization must contribute to resilience by preventing, enhancing, and avoiding any damage to the public's properties. The responsibility to society includes gaining an advantage in competition and contributing to the reputation of a good organization. (Nonthanathorn, 2015).

Corporate social responsibility (CSR) is becoming trendier and more accepted in the business industry due to the global negative changes that have occurred to human beings, such as global warming. The scarcity of natural resources, as well as consumers' desires to meet their needs, force business corporations to adapt in order to meet the needs of their customers, contribute to a good image and reputation among customers, and keep the economy, society, and environment in good balance. In Thailand currently, both big and small corporations have been more interested in CSR projects, but they lack the accurate concept and apparent activities conducted to contribute to the sustainable development of the corporate image. Thus, the CSR projects' conduction has been poorly formed (Chaisuwan, 2015). CSR has become one of the major policies in many corporations' administrations to make the public recognize the social responsibility of the organization. This would put a light on the organization or be a part of its reputation. The public has been aware of the negative impact, such as the global warming crisis, on the traditional industry. There has been litigation for laws or regulations to limit some activities that seem to be harmful to the environment. Consumers value businesses that have a good reputation and provide help or cooperation to improve society. In doing business with social responsibility, corporations need to focus on the social and environmental aspects, particularly on establishing good deeds for people, community, and society, and need to consider the role of the corporation to match society's requirements (Chatlerdyot, 2013).

To connect the concept of CSR and sustainable development, CSR is the continuous intention of the business corporation in connection with the commitment to ethical business conduct to enhance the advancement of economic development as well as the development of the personnel's and family's well-being, including the community and society (Branco & Rodrigues, 2016). CSR is the requirement to have a positive impact on society and reduce the negative impact (Ferrell & Hartline, 2018). CSR is related to the economic, legal, moral, and social

expectations that are given back (Carroll & Gillen, 2017). The components of CSR that corporations must do include "Economic Responsibility," which is the responsibility of the corporation to focus on producing goods or services that meet the needs of society, and the corporation would receive revenue in return to maintain the ability to do business and provide some profits to investors. "Law Responsibility" is the responsibility that the corporation has to do business under the provisions of laws and regulations in the location where the business is being conducted. The "Ethic Responsibility' is the ethical performance to consider the concept of ethics, and the "Philanthropy Responsibility" is to engage in activities that promote human well-being and good relations.

From the review of the related studies, it can be concluded that the specialized financial institutions (SFIs) under the Ministry of Finance usually have an image of unfairness, discrimination, and a delayed administration system. Thus, this kind of corporate image toward SFIs under the Ministry of Finance happened among those who came to take the services of the general public. The image reflects the thoughts and impressions of those who received the services and what people think of the specialized financial institutions (SFIs) under the Ministry of Finance. If there was good corporate image management, it would have a big influence on the specialized financial institutions (SFIs) under the Ministry of Finance as the corporate image is considered a hidden value, which has an impact on building trust and being faithful to those who come to receive the services and people. The image contributes to being recognized by the business operations, public relations work, and efficiency and proficiency of work. Then, the researchers are interested in the development of the corporate image and social responsibility of the specialized financial institutions (SFIs) under the Ministry of Finance.

2. Objectives

(1) To study the level of the development of the corporate image on social responsibility of the specialized financial institutions (SFIs) under the Ministry of Finance.

(2) To study the factors influencing the development of the corporate image and social responsibility of the specialized financial institutions (SFIs) under the Ministry of Finance.

3. Literature review

3.1 Theory and related research

Concepts and theories about social responsibility image.

A corporate social responsibility image means creating an image that reflects the management and operations of the organization, both in terms of management systems, personnel work, budget, and participation in activities with society. The components of the image of social responsibility are as follows. (Cowan & Guzman, 2020),

1. Stakeholder engagement means collaborating with and gaining support from all groups of people and relevant authorities. As for whether it is an employee community and society as a whole.

2. Social management means the creation of economic and social progress by the organization in return for voluntary social activities in order to help improve well-being.

3. Economic management means having productivity in the economy able to maintain a balance of development between the economy, society, and environment and allocating the right resources for sustainable, long-term business operations.

4. Environmental management refers to development that is integrated or integrated into the holistic nature of people and the environment for natural resource management to protect and manage natural resources and promote a green economy.

To achieve the goal, one must have the following factors in the development of a social responsibility image: (Huang-Horowitz & Freber, 2016) 1) Modern organizational management covers a wide range of activities. An organization is an important characteristic and feature of an organization. It is the process of taking action that allows each person to work together in different environments. To achieve the goals of the organization 2) Organization management refers to the improvement of existing products or production processes to prevent or reduce their impact on the environment, which enables the company to comply with the law, reduce social pressure, and show social responsibility and is characterized by continuous improvement in a gradual manner through cooperation. 3) Communication means establishing understanding and perceptions of a positive image between agencies and people through various public relations media tools in order for the public to access the facts and avoid misunderstandings that may arise from incomplete information to create a unified understanding and 4) Creating shared value means creating shared value within the organization. and together with society by setting policy practice guidelines, leads to work that promotes the economy and society for efficiency and effectiveness in work.

3.2 Conceptual framework

Personal information factor

1. Gender

2. Age

3. Education Level

4. Working Experience

Factors influent to the corporate image development

1. Corporate management

2. Modern corporate management

3. Communication

4. Creating shared value

The Development of the Corporate Image on Social Responsibility of the Specialized Financial Institutions under the Ministry of Finance

1. Collaboration of the interest persons
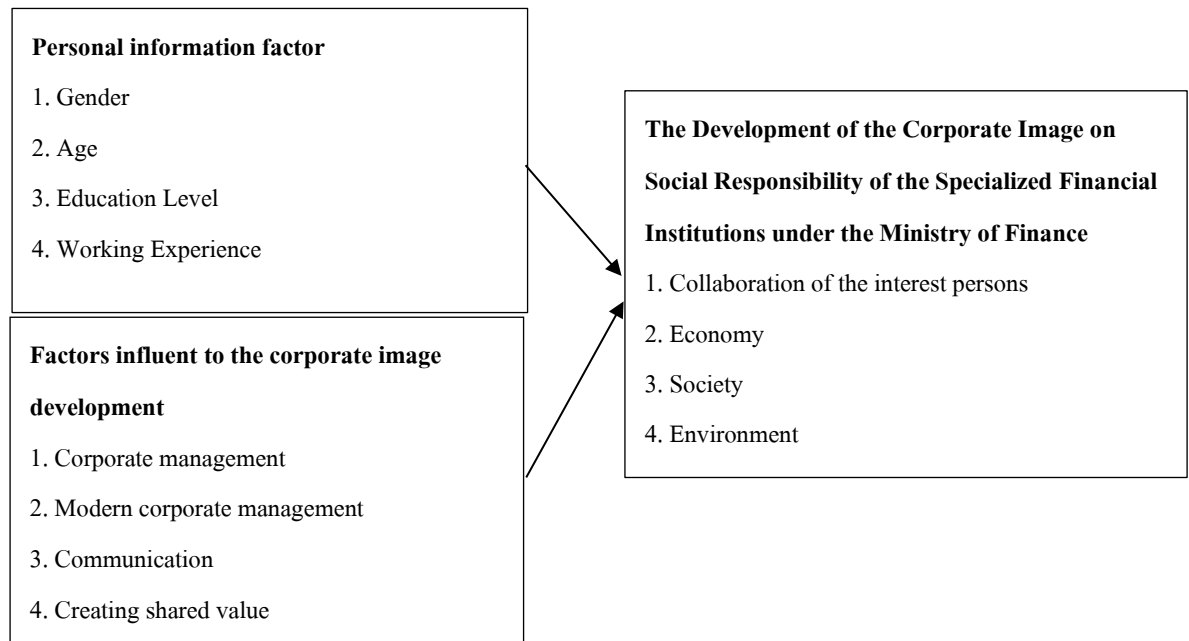
2. Economy

3. Society

4. Environment

Diagram 1 Conceptual Framework

3.3 Research hypothesis

The factors on corporate management, modern corporate management, communication and creating shared value would affect to the development of the corporate image on social responsibility of the Specialized Financial Institutions under the Ministry of Finance.

4. Research methodology

4.1 Research design

This research was quantitative research using questionnaires to collect data.

4.2 Population and samples

The population in this research was 1,750 officers and executives who have been working in the specialized financial institutions under the Ministry of Finance according to the "Thai Credit Guarantee Corporation Act B.E. 2534" and the sample groups were 380 officers and executives who have been working in the specialized financial institutions under the Ministry of Finance under the "Thai Credit Guarantee Corporation Act B.E. 2534" were obtained from the formula for calculating the sample of Taro Yamane (Yamane, 1970) with 95 percent confidence. They were using stratified random sampling and simplified sampling methods.

4.3 Research instruments

The tool for this research was a questionnaire consisting of 3 parts as follows:

Part 1 The questionnaire on personal factors of the respondents were gender, age, educational level and working experience. The questionnaire was a multiple choice.

Part 2 The questionnaire on the corporate image development factors are corporate management, modern corporate management, communication and creating shared value. The questionnaire was based on a rating scale of 5 levels, are very good, good, fair, poor, very poor. The scoring criteria are as follows: Very good = 5 points, Good = 4 points, Fair = 3 points, Poor = 2 points and Very poor = 1 point.

Part 3 Questionnaire of the development of the corporate image on social responsibility of the specialized Financial Institutions under the Ministry of Finance. The questionnaire was based on a rating scale of 5 levels, are very good, good, fair, poor, very poor. The scoring criteria are as follows: Very good = 5 points, Good = 4 points, Fair = 3 points, Poor = 2 points and very poor = 1 point.

4.4 Data collection

The researcher conducted the data collection according to the following steps:

1. The researcher requested a letter from the Graduate School, Suan Sunandha Rajabhat University to the Specialized Financial Institutions under the Ministry of Finance to request assistance in collecting data from the officers and executives.

2. The researcher conducted the data collection by himself. The researcher received the questionnaire back after the respondents filled out the information.

3. The returned questionnaires were taken for integrity checks for data analysis.

4.5 Data analysis

1. The personal factors of the respondents classified by gender, age, educational level and working experience into frequency value and percentage.

2. Information on the development of the corporate image on social responsibility of the specialized Financial Institutions under the Ministry of Finance and the corporate image development factors analyzed by averaging and standard deviation, decision criteria and consideration criteria. The researcher determined the interpretation of opinion scores. It is divided into 5 levels and uses a 5-level estimation scale as follows:

Average Score 4.21 – 5.00 Very Good

Average Score 3.41 – 4.20 Good

Average Score 2.61 – 3.40 Fair

Average Score 1.81 – 2.60 Poor

Average Score 1.00 –1.80 Very Poor

3. Enter multiple regression analysis to determine the influence of the corporate image development on the development of the corporate image on social responsibility of the specialized Financial Institutions under the Ministry of Finance. The statistical significance was set at the 0.05 level.

5. Data conclusion

1. Most of the respondents were female at 76.01%. They aged 31 - 40 years at 52.10 %. They are having a bachelor's degree at 79.10%. and They are having more than three years of work experience at 59.00 %.

2. The results of the study found that overall, it was found that the level of the development of the corporate image on social responsibility of the specialized Financial Institutions under the Ministry of Finance was at a high level ($\overline{X}$=3.99, S.D.=0.53) When considering each aspect, it was found that the collaboration of the interest persons had the highest average ($\overline{X}$=4.02, S.D.=0.43) followed by the society ($\overline{X}$=4.00, S.D.=0.48) the Environment ($\overline{X}$=3.98, S.D.=0.52)   and the economy ($\overline{X}$=3.95, S.D.=0.50), respectively, as detailed in Table 1.

Table 1 The Mean and Standard Deviation of the Development of the Corporate Image on Social Responsibility of the Specialized Financial Institutions under the Ministry of Finance

Field	Name List	μ	σ	Result
1.	Collaboration of the interest persons	4.02	0.43	GOOD
2.	Economy	3.95	0.50	GOOD
3.	Society	4.00	0.48	GOOD
4.	Environment	3.98	0.52	GOOD
	รวม	3.99	0.53	GOOD

3. Organizational management factors, modern corporate management, communication, and shared value creation They had a 69.81% influence on the development of the social responsibility image of specialized financial institutions under the Ministry of Finance.

6. Summary and Discussion

1. The development of the corporate image of social responsibility of the specialized financial institutions under the Ministry of Finance Overall, it was found to be of high importance. When considering each aspect, it was found that the collaboration of the interested persons had the highest average. Followed by Society, environment, and economy. This may be due to the board of the Specialized Financial Institutions under the Ministry of Finance focusing on social responsibility, and enhancing the officers' participation in CSR activities or projects that benefit the public and the corporate image. This study complies with the previously studied conducted by Teeraporn Tongkachok and Akom Chaikeaw (2013), which studied the factor's influent the social responsibility of the companies registered on the Stock Exchange of Thailand, the study indicates that the overall social responsibility of the companies registered to the Stock Exchange of Thailand is in the Very high level.

2. Organizational management factors, modern corporate management, communication, and shared value creation. They had a 69.81% influence on the development of the social responsibility image of specialized financial institutions under the Ministry of Finance. This could be because the board of directors of the Ministry of Finance's specialized financial institutions has been paying attention to corporate management, employing modern corporate management, communication, and the core-valued contribution to improving the corporate image through social responsibility. The result of this study is in accordance with the study conducted by Phonpavi Manasakorn et al. (2021), which studied the level of importance and the influence of corporate management, modern corporate management, communication, and core-valued contribution, and the proficiency of the social responsibility of the Electricity Generating Authority. The study finds that corporate management, modern corporate management, communication, and core-valued contributions influence the proficiency of the social responsibility of the Electricity Generating Authority.

7. Suggestion

7.1 Suggestions for applying the research results

(1) For executives of specialized financial institutions under The Ministry of Finance, policies on social responsibility activities and projects that benefit society as a whole should be formulated. Employees and civil society are encouraged to participate in more social responsibility activities.

(2) Executives of specialized financial institutions under The Ministry of Finance should pay more attention to social problems. Social responsibility activities or projects have been promoted that focus on solving social problems, such as vocational training programs for low-income people, education support projects, etc.

(3) Executives of specialized financial institutions under The Ministry of Finance should promote social responsibility projects or activities on the conservation of natural resources and the environment, such as projects on waste management, reforestation projects, etc.

(4) Executives of Specialized Financial Institutions Under the Ministry of Finance, there should be policies in business operations that focus on projects or activities related to social responsibility, concretely, clearly defined work plans or policies.

7.2 Suggestion for further work

The next study should be a combination of both qualitative studies. There was an in-depth interview with person who involve with the social responsibility to gain insights to strengthen and develop the corporate Image to be more successful.

8. References

Boonyasart, W. (2015). Marketing communications to generation C consumers in the digital age. *Journal of Communication and Management (NIDA E-Journal)*, *1*(1).14-30.

Branco, M.C. and Rodrigues, L.L. (2016). Corporate social responsibility and resource-Based perspectives. *Journal of Business Ethics*, *69*(111-132).

Carroll, S. J., & Gillen, D. J. (2017). Are the classical management functions useful in describing managerial work. *Academy of Management Review*, *12*(1), 38-51.

Chatlerdyot, R. (2022). *A study of supervisors' ethics towards subordinates: a case of secretarial employees in the Women Secretaries' Association of Thailand*. [Online] Accessed on 5 March 2022. http://www.bu.ac.th/knowledgecenter/epaper/ july_dec2004/rapepan.pdf.

Ferrell, O. C. & Hartline, M. D. (2018). *Marketing Strategy*. (4th ed). USA.: Thomson South-Western.

Huang-Horowitz, N. C., & Freberg, K. (2016). Bridging organizational identity and reputation messages online: a conceptual model. *Corporate Communications*, *21*(2), 195–212.

Julintron, A. (2018). *Factors Affecting Corporate Social Responsibility Behavior of Thailand Small and Medium Size Enterprise Entrepreneurs*. Doctoral Dissertation, Ph.D., Behavioral Science Research Institute, Srinakharinwirot University. Bangkok.

Manasakorn, P., Koolrojanapat, S. and Suteerachai, B. (2021). Effectiveness of Corporate Social Responsibility of the Electricity Generating Authority. *Journal of MCU Peace Studies, 9*(7), 3109-3126.

Nonthanathorn, P. (2015). *Corporate Social Responsibility Management: Creating Sustainable Competitive Advantage.* Think Beyond Books Ltd. Nontaburi.

Sangkharak K. (2013). The Relationship between the Perception of Image and Satisfaction on Service Quality of the Krung Thai Bank Public Company Limited and Government Savings Bank in Aumpher Mueng Roi-Et. *Journal of Business Administration The Association of Private Higher Education Institutions of Thailand*, *2*(1), 33-48.

Tongkachok, T. (2013). *The Factors Influencing Corporate Social Responsibility of Listed Companies in the Stock Exchange of Thailand*. Doctoral Dissertation, Ph.D., Prince of Songkla University. Surat Thani.

Tongkachok, T. and Chaikeaw, A. (2013). The Factors Influencing Corporate Social Responsibility of Listed Companies in the Stock Exchange of Thailand. *Journal of Management Science*s, *30*(1), 23-51.

Uppanan, O., Untachai, S. and Dullayaphut, P. (2018). The Casual Influences of Service Marketing Mix on Customer Perceived Value, Satisfaction and loyalty of Jewelry Shops. *NEU ACADEMIC AND RESEARCH JOURNAL*, *8*(2), 82-83.

FACTORS AFFECTING BUSINESS VALUE CREATION OF DRINKING WATER INDUSTRY ENTREPRENEURS

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ABSTRACT

This research aimed to 1) study the level of business value creation of entrepreneurs in the drinking water industry, and 2) study the factors of marketing strategies, internal knowledge management, customer relationship management, and business environment that affect the business value creation of entrepreneurs in the drinking water industry. The questionnaire was used as a tool to collect data from 400 drinking water consumers in Bangkok. The statistics used for data analysis were mean standard deviation and multiple regression analysis. The results of the research showed that 1) the overall business value creation of the drinking water industry entrepreneurs was found to be of high importance. When considering each aspect, it was found that operations had the highest average, followed by finance, resources, and stakeholder relations, respectively; and 2) marketing strategy factor, internal knowledge management, customer relationship, and management business environment have effects on the value creation of the drinking water business entrepreneur.

Keywords: Business Value Creation, Drinking Water Industry

1. Introduction

Water is an essential component of the human body, and it is also considered something that our bodies cannot live without as 60 percent of a person's body weight is made up of water. The body, therefore, needs the right amount of water every day to maintain its balance and to use it in the various processes of the body. We can get water from drinking water, drinks, and food to eat. Bottled water that is commercially available can be divided into 2 types: drinking water in clear plastic containers and opaque plastic. Consumers prefer to drink water in clear plastic containers because they are confident in cleanliness and safety. Consumers turn to drinking bottled water because it is sold in various places. It is convenient to buy and drink and is also good for the body. (Worakamin, 2014).

Water is essential and necessary for human life as the water consumed must go through various stages before it is consumed, such as filtration, sterilization, etc. Access to clean and safe water is a fundamental human right under the Civil Rights Act. Universal humanity The Sustainable Development Goals (SDGs), Article 6 on Water Management and Sanitation, set a goal for everyone to have access to safe and affordable drinking water by 2030. Thailand focuses on such issues by developing a water management system and producing clean water for consumption and giving people equal and sufficient access through joint operations of the public, private, and public sectors. (Department of Medical Sciences, Ministry of Public Health, 2019).   With the recent increase in population and economic growth, there are more urban communities. There is a dense residential setting. Economic expansion tends to increase the amount of wastewater. Although the wastewater discharge from the source of pollution is controlled, it still exceeds the carrying capacity of the water source, resulting in major rivers. There is a continuous deterioration in water quality under the 20-year water resource management master plan. (2018-2037) (Operation Report of the Water Quality Management Division, Pollution Control Department, 2020) along with the drought situation, the water discharge from major dams has decreased and some have high seawater in the Chao Phraya River, which is intermittent. People in Bangkok and surrounding provinces who use the water supply of the Metropolitan Waterworks for consumption are affected by the taste of brackish tap water from time to time in some areas. (Suriwan Ratchasom and Natharika Konkaew, 2020) Consequently, consumers are increasingly paying attention to the sources and processes of drinking water that are cleaner and safer, as well as the outsourcing business (OEM) of self-branded bottled water to restaurants, companies, or units that also create more jobs.

The drinking water business in Thailand is growing steadily every year. The total market value is tens of billions of baht, demonstrating the behavior of Thai people, increasingly preferring to buy water for consumption. The drinking water business is a business that requires a high initial investment, but the development of water purification machinery and technology that has been continuously developed until it can filter water according to standards helps reduce the cost of machinery and production per unit. More and more new entrepreneurs enter the market. Over 60% of the market is controlled by large producers who have the advantage of scale and are also producing other types of beverages such as soft drinks, spirits, beer, fruit juices, etc. (Kasikorn Research Center, 2021).

In 2020, the drinking water market in Thailand was valued at 56,303.7 million baht, an increase of 2.0% from the previous year. Drinking water is always in demand for consumers as the demand for bottled water increases in this global warming era. The population has increased; lifestyles and lifestyle behaviors have changed; and weather conditions and natural environments have changed. Moreover, this is the era where consumers are turning to pay more attention to food care. (Department of Medical Sciences, Ministry of Public Health, 2019) With the clean nutrient value obtained from food and beverages, the drinking water business is an interesting business. There are new entrepreneurs coming into this business. There are various brands of drinking water to provide an alternative to consumers with various individual needs and pollution from various sources. Including the situation of brackish water that has occurred along with the epidemic COVID-19 virus, more and

more encourage consumers to look for bottled water that helps to take care of their health, must be good for their health, and is easy and convenient to buy. (Smart Center for the Food Industry, Food Institute 2021).

Bottled water in general is valued at 44,805.2-million-baht, accounting for 80% of the market share, such as plain water, mineral water, etc. From the sales in 2020, the value was 56,303.7 million baht, which is an increase of about 2.33% from 2019. The first is Boon Rawd Brewery Company Limited under the brand Singha, with a 21.7% market share by brand and a 24.2% market share by the company because of its production closed system, adding online ordering channels, and increasing delivery. Second place is Sermsuk Public Company Limited under the brand "Crystal", with a market share of 14.7% of the brand and a market share of 14.7% of the company. (Department of Medical Sciences, Ministry of Public Health, 2019).

Although drinking water is the main beverage that general consumers choose to drink and is necessary for their livelihood, the market's revenue comes from restaurants and tourists as well, due to the ripple effect of the COVID-19 outbreak. There is new pressure on consumers' purchasing power to be cautious in their spending. In addition, the epidemic control measures that prohibit eating at restaurants in some areas will likely reduce the consumption of drinks outside the home. In addition, entrepreneurs slow down the launch of new products and have to adjust distribution channels, resulting in the overall non-alcoholic beverage market in 2020 can not returning to growth at the same level as in 2018-2019. The market value is likely to be at 1.97–1.99 billion baht, an improvement of 0.5–1.5% from the year 2020, in line with the Food Report 2021 prepared by the Zukunftsinstitut Research Institute with the German newspaper Lebensmittel Zeitung, foodservice, and gv-praxis. Many consumers are turning to alternative or non-alcoholic beverages. Some consumers prefer exotic beverages with a greater variety of flavors and do not need to focus solely on alcohol. Competition in the non-alcoholic beverages market in 2021 will be more intense and may see a few business strategies, whether launching new products to fill gaps in the traditional beverage market or responding to specific market segments, focusing on penetrating the new generation market to create a different image for the new generation to be more accessible. Entrepreneurs must face challenging factors that may affect business adaptation and fragile purchasing power conditions, such as the third excise tax on sugar-based beverages and the trend of using environmentally friendly packaging, etc. (Kasikorn Research Center, 2021)

The drinking water industry in Thailand is diverse in both production and consumption and is related to supporting industries such as raw materials (especially sugar) and packaging. As a result, Thailand can produce a variety of beverages to meet the demand for domestic consumption sufficiently. Only some high-end, expensive beverages, such as wine and whiskey, are imported. Thailand is also able to export about 10% of its total output. The competition in the drinking water industry is increasing, mainly driven by health-conscious consumers. The lifestyle group of the new generation that desires such convenience should develop a form of value creation to raise the price above the norm. Simple value creation starts with making the packaging attractive, eye-catching, and suitable for the price and public relations. It is another way that leads the product to add value. Therefore, the value-added price is based on the customer's belief that our products look good and are worth that price. The value of each item can be uncertain; it may be worth more or less depending on the circumstances, environment, and the nature or mindset of

the individual appraiser. Creating added-value bottled water provides a competitive advantage by creating better customer value. A better production process or service to be the leader in that product. Besides making a difference in the market, adding value will help to create value that has a higher consumer perception that leads to confidence in the decision to choose or buy products and services such as a bottle of water that may be of little value when placed and sold in convenience stores. Another bottle of water is sold in the same place. Even though it has the same properties as the first bottle of water, with a beautiful packaging design, it may be worth more than the first bottle of water. But when bringing the first bottle of water to sell in a remote area such as a desert, the first bottle of water may increase in value ten times higher than the second bottle of water, for example, factors affecting the business value creation of drinking water industry entrepreneurs.

2. Objectives

(1) To study the level of business value creation of entrepreneurs in the drinking water industry.

(2) To study the factors of marketing strategies, internal knowledge management, customer relationship management, business environment that affects the business value creation of entrepreneurs in the drinking water industry.

3. Literature review

3.1 Theory and related research

Concepts and theories on business value creation

Creating value is a way to create real value for an organization by developing the organization's ability to be unique and enhancing its already good strengths. This includes applying new knowledge and skills suitable to meet business needs and market suitability. Value creation will focus on sustainable development. It was not a momentary achievement. Process performance, therefore, does not focus on finances; indicators cannot be indicative of the long-term sustainability of the organization. Investing in sustainability is an investment in building skills, knowledge, and the ability to work, including research and development R&D, and knowledge innovations in various forms. Most of these are intangible assets but can create a market mechanism in an era of intense competition and high investment risk. Knowledge management and the organization's ability to learn are essential in preventing risks and preparing for business adaptations and future changes. Porter and Kramer (2019) suggest that the value of a business's investment in intangible assets can be a driving force for good market and financial performance and help businesses stay competitive over the long term. Creativity, basic knowledge, and skills, including resources that apply innovative concepts to bring outstanding competitive advantages with minimal risk. (Freudenreich, Lüdeke-Freund & Schaltegger, 2020; Kiel, Müller, Arnold & Voigt, 2019; Gianluca, Gloria, Gianluca, Giuseppina, 2020; Laukkanen& Tura, 2020).

The concept of value creation is a concept that has been of great interest to academics and businesses, especially businesses in the new era. Porter and Kramer (2019) have an opinion that, in the future, the organization will change the working model to be more efficient with the process of analyzing the value chain to improve the

various work processes in the organization that are related and affect the internal and external environment continuously. The process begins with defining the key attributes and intrinsic values of the organization. Then consider the activities How much does the work of both the main and supporting activities influence the organization's values? As a result of operating in this way, we can see what the organization really is today. Both advantages and disadvantages are to lay down guidelines for operational development until the organization's development. Of course, the value chain in each organization is different. According to the mission and the main work processes of the organization.

The Value Chain concept of Porter and Kramer (2019) focuses on economic and accounting indicators and activities and enhances measurable and assessable organizational values, such as cost management in the supply chain. Currently, it is found that this method is not suitable for evaluating value creation because the nature of value creation focuses on the sustainable growth of the organization, not short-term profit, and such valuation is only suitable for corporations with concrete trading assessments, but sales profits are not sufficiently indicative of the sustainability of the organization.

Finally, value creation consists of the operating system, operator, and operating environment. To create a system of value creation, it is necessary to create an interrelated system in which all elements reinforce each other, and the process of creating added value relies on the following factors: Porter and Kramer (2019)

1. Marketing strategy means that entrepreneurs use it as a large-scale marketing channel without borders that can reach the target consumer group quickly and directly without limitation of time and place, enabling entrepreneurs to have a wide buyer base and reduce costs.

2. Knowledge management within the organization means that entrepreneurs build tools from learning to promote their ability to develop and compete. Build the ability to create quality work together where the creative energy lies in the interaction of learning between humans and organizations.

3. Customer relationship management refers to the things that entrepreneurs have to pay a lot of attention to by building a customer database, using the right technology, managing customer relationships, and keeping customers effective.

4. The business environment refers to the environment that is conducive to business growth as a result of having capital in doing business, receiving support, developing joint ventures, encouraging staff to have appropriate knowledge, and modifying the way of doing business in response to consumer needs.

In conclusion, the value creation process is related to many factors. We cannot meet our customers' needs without ignoring pressure from suppliers. However, Value Creation's work style still emphasizes the importance of customers. Information from customers is a key mechanism in keeping other factors and processes circulating. Organizations must understand this mechanism and act as a hub for gathering knowledge and needs from customers and transferring them to suppliers. KIBS should be the center that understands the supplier's productivity in the industry, and the customer needs to find a balanced and profitable position for the organization.
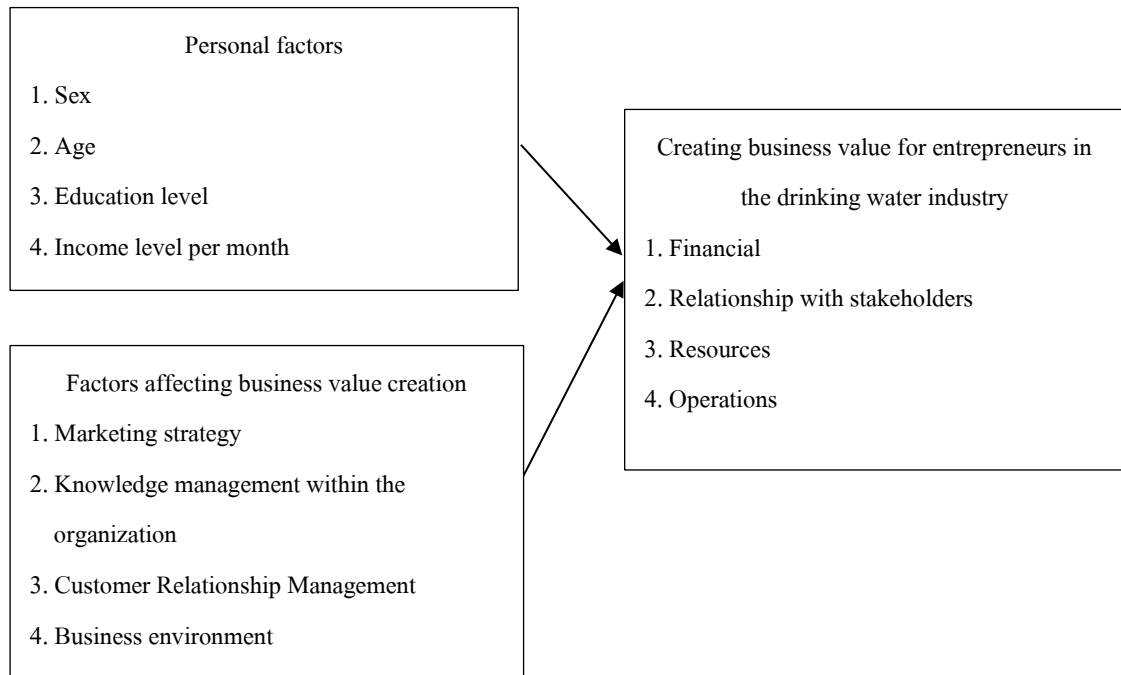
3.2 Conceptual framework

```
┌─────────────────────────────────┐
│         Personal factors         │
│  1. Sex                          │
│  2. Age                          │
│  3. Education level              │
│  4. Income level per month       │
└─────────────────────────────────┘          ┌──────────────────────────────────────┐
                                              │  Creating business value for          │
                                              │  entrepreneurs in                     │
                                              │  the drinking water industry          │
                                              │  1. Financial                         │
┌─────────────────────────────────┐          │  2. Relationship with stakeholders    │
│ Factors affecting business value │          │  3. Resources                         │
│ creation                         │          │  4. Operations                        │
│  1. Marketing strategy           │          └──────────────────────────────────────┘
│  2. Knowledge management within  │
│     the organization             │
│  3. Customer Relationship        │
│     Management                   │
│  4. Business environment         │
└─────────────────────────────────┘
```

Diagram 1 Conceptual Framework

3.3 Hypotheses

Marketing strategy factors, internal knowledge management, customer relationship management, and the business environment are factors that affect the business value creation of entrepreneurs in the drinking water industry.

4. Research methodology

4.1 Research design

This research was quantitative research using questionnaires to collect data.

4.2 Population and samples

The population in this research was 730,536 drinking water consumers in Bangkok (Department of Commerce, 2021), and the sample group was 400 consumers of drinking water in Bangkok. These numbers were obtained from the Taro Yamane sample formula (Yamane, 1970) with 95 percent confidence. Using stratified random sampling, calculate the proportion according to the 6 district offices selected in Bangkok, namely: Dusit District Office, Khan Na Yao District Office, Chatuchak District Office, Bangkok Noi District Office, Khlong Toei District Office, and Phasi Charoen District Office.

4.3 Research instruments

The tool for this research was a questionnaire consisting of 3 parts as follows:

Part 1 The questionnaire on personal factors of the respondents were gender, age, education level, and average monthly income. The questionnaire was a multiple choice.

Part 2 A questionnaire on factors affecting business value creation is marketing strategy, internal knowledge management, customer relationship management, and business environment. The questionnaire was based on a rating scale of 5 levels, i.e., very good, good, fair, poor, very poor.

Part 3 Business Value Creation Questionnaire of Drinking Water Industry Entrepreneurs. The questionnaire was based on a rating scale of 5 levels, i.e., very good, good, fair, poor, very poor.

4.4 Data collection

The researcher conducted the data collection according to the following steps:

1. The researcher requested a letter from the Graduate School. Suan Sunandha Rajabhat University and contacted to consumers of drinking water in Bangkok for assistance in collecting information.

2. The researcher conducted the data collection by himself. The researcher received the questionnaire back after the respondents filled out the information.

3. The returned questionnaires were taken for integrity checks for data analysis.

4.5 Data analysis

1. The personal factors of the respondents classified by gender, age, educational level, and average monthly income, frequency, and percentage.

2. Information about creating business value of drinking water industry entrepreneurs and factors affecting business value creation analyzed by averaging and standard deviation, decision criteria and consideration criteria. The researcher determined the interpretation of employee feedback scores. It is divided into 5 levels and uses a 5-level estimation scale as follows:

Average score 4.21 – 5.00 Very good

Average score 3.41 – 4.20 Good

Average score 2.61 – 3.40 Fair

Average score 1.81 – 2.60 Poor

Average score 1.00 – 1.80 Very poor

4. Multiple regression analysis using enter method to determine the influence of factors affecting business value creation and creation business value of drinking water industry entrepreneurs. The statistical significance was set at the 0.05 level.

5. Data conclusion

1. Most of the respondents were female, represent at 69.12%. The respondents were aged 31-40 years or 62.10%. 53.10% had a bachelor's degree. They have average monthly income between 15,001-20,000-baht, equivalent to 65.130 percent.

2. Creating business value of drinking water industry entrepreneurs was found overall to be of high importance. ($\overline{X}$=4.00, S.D.=0.48). When considering each aspect, it was found that the operations had the highest average. ($\overline{X}$=4.08, S.D.=0.50). Followed by financial ($\overline{X}$=4.05, S.D.=0.40) resources ($\overline{X}$=4.00, S.D.=0.45) and relationship with stakeholders ($\overline{X}$=3.98, S.D.=0.53) respectively, with details in Table 1.

Table 1 The Mean and Standard Deviation of creating business value for entrepreneurs in the drinking water industry

Field	Name List	$\overline{X}$	S.D.	Result
1.	Financial	4.05	0.40	Good
2.	Relationship with stakeholders	3.98	0.53	Good
3.	Resources	4.00	0.45	Good
4.	Operations	4.08	0.50	Good
	Total	4.03	0.48	Good

3. The study found that the marketing strategy factors, internal knowledge management, customer relationship management, business environment that affects the business value creation of the drinking water business entrepreneurs by 69.81 percent respectively, with details in Table 2.

Table 3 Multiple regression analysis of factors affecting business value creation of drinking water industry entrepreneurs.

Factor	Unstandardized (b)	SE	Standardized (β)	t	Sig.
Constant Value	1.121	0.105		10.503	0.002
Marketing strategy	0.041	0.021	0.318	7.813*	0.001
Knowledge management within the organization	0.095	0.042	0.145	2.412*	0.006
Customer Relationship Management	0.079	0.035	0.142	2.416*	0.004
Business environment	0.252	0.025	0.238	4.142*	0.000
R = 0.831	Adjusted R^2 = 0.689				
R^2 = 0.827	SE = 0.153				

* Statistical significance at the 0.05 level

6. Summary and Discussion

1. Creating business value for drinking water industry entrepreneurs was found to be of high importance. When considering each aspect, it was found that operations had the highest average, followed by finance, resources, and relationships with stakeholders, respectively. This may be due to industrial entrepreneurs focusing on developing drinking water products that pay attention to both operations and financial management. The allocation of resources used to produce quality drinking water and entrepreneurs' aim to build relationships with stakeholders, the results of which are consistent with the study of Porter and Kramer (2019), suggest that value creation affects the value of an enterprise's investment in intangible assets. It can be a driver of performance,

stakeholder resource management, and good financial performance, resulting in the business maintaining competitiveness in the long run.

2. Marketing strategy factors, internal knowledge management, customer relationship management, and the business environment affect the value creation of the entrepreneur's drinking water business. This may be because entrepreneurs in the drinking water industry aim to develop management strategies. There is knowledge management within the organization. In addition, customer relationship management has studied and analyzed the business environment very well, thus achieving the goal of creating business value for entrepreneurs in the drinking water industry. The results of the study are consistent with the research results of Freudenreich, Lüdeke-Freund & Schaltegger (2020), which mention business models being developed and managed to create business value. Most business model frameworks see value creation as a unidirectional flow between core business and customers. The value creation framework must consider stakeholders because they are both recipients and (joint) creators of value in the shared value creation process. Key findings include marketing strategy, knowledge management, having a relationship with customers, and analyzing the business environment. These will bring about business development and management to create business value.

7. Suggestions

7.1 Suggestions for applying the research results

(1) Entrepreneurs in the drinking water industry should conduct marketing activities with knowledge management for employees in the organization. To have more customer relationship management and business environment analysis to identify opportunities and obstacles in business continually.

(2) Entrepreneurs in the drinking water industry should have access to liquidity management and funding sources to create sufficient business value.

(3) Entrepreneurs in the drinking water industry should give priority to all stakeholders. Whether it is shareholders, employees, and customers, to create a network to promote and support each other.

(4) Entrepreneurs in the drinking water industry should allocate human resources to the continuous development of knowledge.

(5) Entrepreneurs in the drinking water industry should pay more attention to process changes. The work system is modern with the use of technology to support the work in every system.

7.2 Suggestions for future research

In the next study, a mixed-use study should be conducted with both quantitative and qualitative studies. Group discussions should be conducted, and in-depth interviews with people involved in the drinking water industry, both public and private, should be conducted. to gain insights to create a more value-added business to be more efficient.

8. References

Department of Medical Sciences Ministry of Public Health. (2019). *Report on the operation of the Water Quality Management Division*. Bangkok: Ministry of Natural Resources and Environment

Freudenreich, B., Ludeke-Freund, F. & Schaltegger, S. (2020). A Stakeholder Theory Perspective on Business Models: Value Creation for Sustainability. *Journal of Business Ethics*, *166*(3), 3–18.

Gianluca Elia, Gloria Polimeno, Gianluca Solazzo, Giuseppina Passiante. (2020). A multi-dimension framework for value creation through Big Data. *Industrial Marketing Management*, *90*, 617-632,

Kasikorn Research Center. (2564). *Non-alcoholic beverage market*. Bangkok: Kasikornbank

Kiel,D.,Müller, J.M., Arnold, C. and Voigt, Kai-Ingo. (2019). Sustainable Industrial Value Creation: Benefits and Challenges of Industry 4.0. *International Journal of Innovation Management*, *21*(8), 1–34.

Laukkanen, M. & Tura, N. (2020). The potential of sharing economy business models for sustainable value creation. *Journal of Cleaner Production*, *253*(12), 15- 36.

Porter M.E., Kramer M.R. (2019). *Creating Shared Value*. In: Lenssen G., Smith N. (eds) Managing Sustainable Business. Springer, Dordrecht.

Smart Center for the Food Industry. (2564). *Trends of Thai food industry*. Food Institute

Worakamin Somsak. (2014). *Ideal drinking water*. Bangkok: Sam Charoen Panich.

EVALUATING THE DIGITAL LITERACY LEARNING AND TEACHING MATERIALS IN CREATING DIGITAL MEDIA KNOWLEDGE WITH SAFETY AWARENESS OF THE THAI ELDERLY

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ABSTRACT

The authors had been advisors to Thailand's professional council association's project. The project began in September 2021. It aimed to produce learning and teaching materials in the form of ten video clips designed for the elderly without previous experience with digital technologies to equip them with knowledge, understanding, ability, and safety awareness to use the Internet and digital media through smartphones to benefit their quality of life. These ten clips were completed in April 2022. This research has three objectives: to study (i) the personal factors of the Thai elderly; (ii) knowledge, understanding, ability, and awareness of the safety of using the Internet and digital media for the elderly; and (iii) to compare the knowledge scores before and after watching the clips by the Thai elderly. The study was conducted with 1,010 elderly in Thailand via the focus group and ten school elders' site visits between June and September 2022. The results indicated that in terms of experience in digital media, of 1,010 elderly, 335 use digital media, representing 32.2%, followed by 269 (26.6%) who used digital media but are currently not using it. 227 (22.5%) use digital media regularly. The elderly knew at a moderate level before watching the clips about their knowledge, understanding, ability, and safety awareness. The mean score was 2.79, and the standard deviation was 1.02. Besides, the knowledge after seeing the clips with a full score of 40, the mean was 34.42, and the standard deviation was 4.16, which was higher than the knowledge before watching the clip. The mean score was 28.34, and the standard deviation was 7.74; considering the Sig was .000, the Sig was less than .05. The average score after watching the clips was higher than before. It was statistically significant at the .05 level, which satisfies the objectives set.

Keywords: Digital Literacy, Digital Media, Elderly, Learning and Teaching Materials, Thai Elderly, Thailand

1. Introduction

"Elderly" in the United Nations' definition means the population of males and females over 60 years or over. However, the terms differ in each country depending on the population's social, cultural, and quality of life (Scherbov & Sanderson, 2019). Similarly, for Thailand, the term "elderly" has been defined in the Act on the Elderly, AD 2003, as "people aged 60 years and over". Thus, a country is stepping into an aging society when 10% of its population is over 60, or more than 7% is 65 (Ministry of Social Development and Human Security, 2003). A "complete aging society" status is reached when the population over 60 years increases by 20% and the population over 65 increases by 14%. Thailand has had the "aging society" status since 2005, and it is expected that by 2028 the population of Thailand over the age of 60 will increase to 23%, meaning that in the next six years, Thailand will be a complete aging society.

Thailand's economy has been growing continuously over the last few years. As a result, there is a strong focus on the digital society with the push from Thailand 4.0 initiatives and policies supporting it. The rise of the digital economy and network infrastructure improvements have resulted in continuous increases in smartphone and social media adoption. Consequently, Thailand continues to witness a surge in smartphone penetration rates, with many mobile subscribers holding more than one subscription.

The Thai elderly benefit from using digital technologies for various purposes, and achieving digital literacy is essential for their participation as digital citizens. Digital technologies, including social media, offer enormous potential for the Thai elderly. Not only can the elderly stay socially connected with those they have not seen in decades, with friends and families living far away, or get to know new people with similar interests. Digital technologies also offer "aging in place" opportunities by supporting daily activities or alerting family members in an emergency (Zeissig, Lidynia, Vervier, Gadeib, & Ziefle, 2017).

However, there are also drawbacks and reasons why the Thai elderly do not use digital technology. The Thai elderly represents a special group concerning the usage of digital technologies. They are usually more cautious in adapting to new technologies, often less experienced, and less confident in dealing with online and privacy protection. Yet, technological developments, innovations, and services have mainly been designed for younger target groups. As a result, the Thai elderly are catching up with digital media usage but still lag (Jantavongso, 2022).

The authors view the elderly have the opportunity to become digital media users at a higher rate in the future for various reasons. As mentioned, most elderly cannot adjust to being sufficiently knowledgeable about digital technologies. Thus, it may put the elderly who want to use digital media at risk both as media receivers and digital media users. Especially the use of social media, which is the most popular for digital media users of all ages. For the elderly, using digital media or applications with complex and ever-changing usage patterns may cause them to lack knowledge, understanding, or awareness of the potential consequences of ignorant use.

In addition, information and media available online may allow users to use applications such as basic Internet usage such as searching for information, daily news reading, electronic mailing, and the use of social media applications such as Line application, Facebook usage, YouTube usage, and online banking transactions.

Although nowadays, it is not difficult to find teaching materials from blogs or websites on the Internet. But the reality is that most digital knowledge materials are not intended for the elderly. Those media, therefore, did not produce media considering the elderly's limitations. The experiences and behaviors of using digital media are different from those of the general young digital media users. It was found that the available media failed to meet the need of the elderly. The use of digital media will expand to the region, meaning the shortage of digital learning media for the elderly is particularly problematic.

The authors had been advisors to Thailand's professional council association's project. The names of the association and project are not disclosed in this paper for confidentiality agreements. The project began in September 2021 and is expected to complete by December 2022. The main project's objective is to produce teaching materials consisting of ten clips. The teaching methods were designed especially for the elderly without previous experience using digital communication technology to encourage the elderly to have knowledge and understanding with the ability to use the Internet and digital media through smartphones to benefit their quality of life.

Moreover, it is expected that the teaching materials will create an awareness of the safety of using digital media and user-generated content risks, both as a media recipient and in the ethics of using digital media. The ten clips were finished in April 2022, containing audio and visual images. Clip 1: Internet usage signing up and using email via smartphones; Clip 2: Using Google Play on smartphones; Clip 3: Using the Line application; Clip 4: Using the Facebook application; Clip 5: Using YouTube on smartphones; Clip 6: Using TikTok on smartphones; Clip 7: Online shopping through the app; Clip 8: Internet banking and QR code on smartphones; Clip 9: Setting up online safety; and Clip 10: Detecting fake websites and fake news.

2. Research Objectives

(1) To study the personal factors of the Thai elderly

(2) To study knowledge, understanding, ability, and awareness of the safety of using the Internet and digital media for the elderly in terms of improving the quality of life

(3) To compare the knowledge scores before and after watching the digital media learning and teaching material clips by the Thai elderly

3. Literature Review

The literature review was carried out through academic and professional journals recommended by Rangsit University. The review period ranges from the last ten years to the present, for example, Wiley Online Library, ThaiLIS, Science Direct, Scopus, ProQuest dissertation & theses, and IEEE Xplore.

The review indicates that a research gap does exist. For example, in Thailand, very few studies examine the definition and competencies of digital literacy for the elderly (Jantavongso, 2022). Yet, the Thai elderly had the lowest digital literacy rate of 63% amongst the population (Office of Thai Media Fund, 2021).

3.1 What exactly is digital literacy?

The term digital literacy differs and dates back to 1977. According to Jantavongso (2022), it is "the competence to understand, evaluate, use resources, and apply the digital resource to lifetime learning processes."

However, "digital literacy is more than technological know-how: it includes a wide variety of ethical, social, and reflective practices that are embedded in work, learning, leisure, and daily life" (Armenian PR Association, 2021). Therefore, using, understanding, and creating principles are competencies for digital literacy. While use covers skills and competencies, understanding is the skills that contextualize, comprehend, and critically evaluate digital media. Thus, create is the ability to create content and effectively communicate through digital media tools.

In addition, there are five essential keys to digital literacy (Promrub & Sanrattana, 2022). First, digital media are networked. Next, they are persistent, searchable, and shareable; they have unknown and unexpected audiences; experiences are real but do not always feel real. Therefore, under the platform's influence, individuals behave and respond when using digital media, which reflects the biases and assumptions of the creators.

3.2 Research Framework
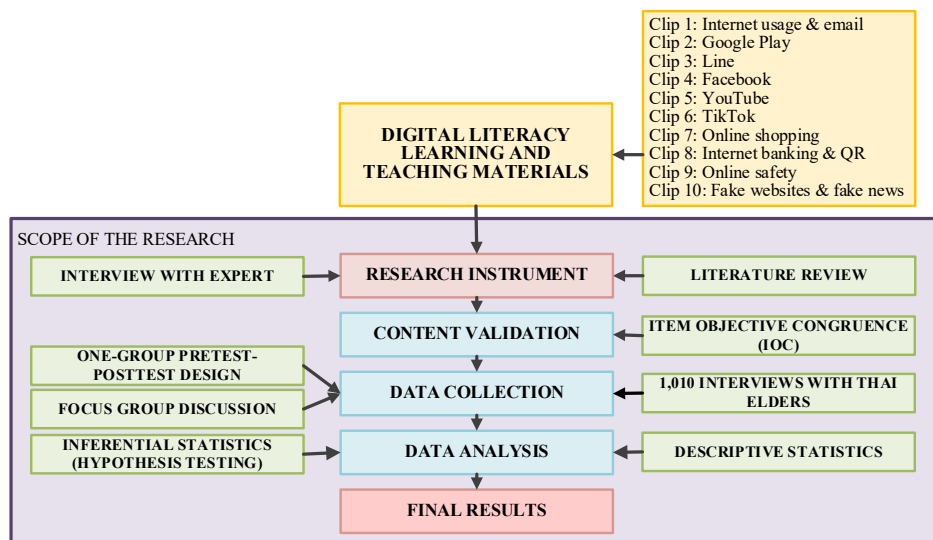
Figure 1 Research Framework

3.3 Research Hypotheses

The research hypothesis was used to evaluate the significance of the results. The hypothesis was aimed to address objective three: comparing the knowledge scores before and after watching digital media learning and teaching by the Thai elderly. The hypothesis asserted that the knowledge of the Thai elderly on digital media literacy is unaffected. Therefore, an independent sample t-test was performed.

Null Hypothesis: There is no significant difference in knowledge scores between the elderly before and after watching digital media. $H_0: \mu_{before} = \mu_{after}$

Criteria: Accept H_0 if $T \leq 1.962$ at Sig. = 0.05, df = 1,008 where: df = degree of freedom = 1,010 participants – 2 groups

4. Research Methodology

This section explains the choice of methodology and procedures used in this research.

4.1 Research Design

The research design used in this study is a mixed quantitative research method with qualitative research. A quantitative approach as a research methodology deals with questions or current status that researchers may answer by gathering and statistically analyzing numeric data. This can enable one to see results in terms of numbers and statistics (Mertler, 2021). This research applied the pretest-posttest design to know the result of the treatment (watching the video clips). The one-group pretest-posttest design involved three steps: (i) administering a pretest, (ii) allowing the elderly to watch the video clips (treatment), and (iii) administering a posttest. The pretest and posttest scores were compared. Alternatively, a qualitative approach examines the situation from a more open-ended perspective. In this study, a qualitative approach used focus groups and open-ended questions to gather information from the elderly.

4.2 Population and Sample

Samples of this research consisted of 1,010 elderly from ten school elders in Thailand. The names of the elderly were obtained through the Department of Older Persons and Provincial Social Development and Human Security Offices.

4.3 Research Instrument

The instrument consists of five sections according to the research objectives: section i, the demographic factors (five questions); section ii, knowledge, understanding, and ability to use the Internet and digital media for the elderly on the development of quality of life (seven questions); section iii, awareness of the safety of using digital media (four questions); section iv, knowledge before and after the elderly watching clips (40 questions); and section v, other suggestions (one open-ended question).

An instrument would have "content validity" if a consensus were given by experts (Jantavongso & Fusiripong, 2021). Thus, a judgment-based decision was used to assess the content validity. The instrument was evaluated by three experts using the Index of Item Objective Congruence (IOC) to rate individual items on the degree to which they "do" or "do not" measure specific objectives. Each expert evaluated each item by giving the item a rating of "1" for clearly measuring, "0" for a degree to which it measures the content area is unclear for each objective, or "-1" for clearly not measuring. Items rated above 0.5 were included.

Prior to the interviews, the questions were first developed in English and then translated into Thai to avoid misinterpretation. However, since English is not the official language in Thailand, some elderly may not fully understand the questions.

4.4 Data Collection

The team contacted the Department of Older Persons. First, the department made an initial phone call with the Provincial Social Development and Human Security (PSDHS) Offices in twenty provinces. Of these, ten provinces agreed to participate. Once the department provided the contact persons from each office, the telephone

team discussed the details leading to each school's contact person. Then, the authors' team visited the schools. The data were collected with papers or Google forms.

4.5 Data Analysis

Descriptive statistics and inferential statistics were used to analyze the data gathered from the interviews. Descriptive statistical techniques described the sample in terms of frequencies, means, medians, modes, and standard deviations. Hence, the inferential statistical technique (T statistic) was used to test the hypothesis.

5. Research Findings

The sequence of the results is according to the objectives.

5.1 Results of demographics

Data analysis on personal factors, including gender, age, education level, family characteristics, and experience in digital media, are presented as a table showing the numbers and percentages, resulting in the following analysis.

Table 1 Shows the number and percentage of personal factors.

Information about personal factors	Number (person)	%
Gender		
Male	486	48.1
Female	524	51.9
Total	1010	100
Age		
60 – 64 Years	478	47.3
65 – 69 Years	312	30.9
70 – 74 Years	139	13.8
75 – 79 Years	54	5.3
80+ Years	27	2.7
Education		
No Education	237	23.5
Primary school	313	31.0
Junior high school	118	11.7
Senior high school/ Vocational certificate	127	12.6
Diploma/ High vocational certificate/ technical certificate	49	4.9
Bachelor's degree	150	14.9
Postgraduate	16	1.6

Table 1 (continued)

Information about personal factors	Number (person)	%
Family characteristics		
Alone	196	19.4
Stay with family	605	59.9
Stay with relatives	184	18.2
Stay with others	23	2.3
Others	2	0.2
Experience in using digital media		
Never used	227	22.5
Used but not anymore	269	26.6
Still using	335	33.2
Using regularly	178	17.6
Others	1	0.1

From Table 1, it found that:

Gender: A total of 1,010 elderly; most were 524 females, accounting for 51.9%, and 486 males, accounting for 48.1%.

Age: Most elderly are 60-64 years old, 478, representing 47.3%, followed by 65-69 years of age, 312 (30.9%), 70-74 years old, and 139 (13.8%). Aged 75-79 years, 54 elderly, representing 5.3%, and aged 80 years and over, 27 elderly representing 2.7%, respectively.

Education level: Most elderly had primary education of 313 people, accounting for 31.0%, followed by not studying (237, accounting for 23.5%) and having a bachelor's degree (150 or 14.9%). Senior high school/ Vocational certificate, 127 elderly (12.6%), Junior high school, 118 elderly (11.7%), Diploma/ High vocational certificate/ technical certificate (49, representing 4.9%), and 16 elderly with postgraduate education, representing 1.6%, respectively.

Family characteristics: Most elderly live with the family (605 representing 59.9%), followed by living alone (196 or 19.4%), living with relatives (184 or 18.2%), living with others (23 or 2.3%), and living in other forms (2 or 0.2%), respectively.

Experience in using digital media: Most elderly use digital media (335 or 32.2%), followed by some who used digital media but are currently not using them (269 or 26.6%), never used them (227, representing 22.5%), use digital media regularly (178 or 17.6%), and have experience using digital media in other formats (1 or 0.1%), respectively.

5.2 Results of knowledge, understanding, and ability to use the Internet and digital media

The results on knowledge, understanding, and ability to use the Internet and digital media for the elderly to improve their quality of life were from the questionnaire that was a rating scale of 5 levels according to the Likert method, where 5 means the highest level of knowledge and 1 represents the lowest level of expertise.

From Table 2, it was found that the knowledge of the elderly had increased after watching the clips. The clips taught them about their knowledge, understanding, and ability to use the Internet and digital media to improve their quality of life. Overall, it's at a high level. The mean score was 3.55, and the standard deviation was 0.98. Line application had the highest average score of 3.64, and the standard deviation was 1.01, followed by being able to use/subscribe/find various channels through the YouTube application (the average score is 3.62, and the standard deviation is 1.05). The lowest was via the TikTok application, with the lowest mean score of 3.41 and a standard deviation of 1.14.

The elderly were knowledgeable, understood, and could use the Internet and digital media to improve their quality of life. The finding *before* and *after* watching the video clips are as follows.

Table 2 Mean and the standard deviation of knowledge, understanding, and ability before/after watching clips

Inquiry Items	Before			After		
	Mean	SD	Interpretation	Mean	SD	Interpretation
1. Send text messages/clips/photos via Line	2.99	1.13	Moderate	3.64	1.01	High
2. Use/subscribe/send messages via Facebook	2.85	1.10	Moderate	3.61	1.02	High
3. Use/subscribe/find channels via YouTube	2.83	1.12	Moderate	3.62	1.05	High
4. Use/subscribe via TikTok	2.64	1.12	Moderate	3.41	1.14	High
5. Conduct transactions via mobile banking	2.71	1.19	Moderate	3.50	1.13	Moderate
6. Search for products & order products online	2.70	1.16	Moderate	3.51	1.13	High
7. Use the Internet & applications	2.79	1.13	Moderate	3.58	1.07	High
Average	2.79	1.02	Moderate	3.55	0.98	High

5.3 Results of safety awareness in using digital media

The results on knowledge, understanding, and awareness of the safety of using digital media for the elderly were from the questionnaire with a rating scale of 5 levels according to the Likert method, where 5 means the highest level of knowledge and 1 represents the lowest level of expertise. Therefore, the elderly were knowledgeable, understood, and aware of the Internet and digital media. The findings are as follows.

Table 3 Mean and the standard deviation of safety awareness in using digital media before/after watching video clips

Inquiry Items	Before			After		
	Mean	SD	Interpretation	Mean	SD	Interpretation
1. Can name username and password	2.49	1.14	Low	3.48	1.12	Moderate
2. Know which news is fake or fake news	2.54	1.09	Moderate	3.59	1.14	High
3. Know that not posting other posts as their own, not lying, deceitful, infringing on rights, and causing damage to others because of legal offenses	2.67	1.22	Moderate	3.63	1.17	High
4. Can keep themself safe from using digital media	2.69	1.20	Moderate	3.65	1.15	High
Average	2.60	1.05	Moderate	3.59	1.08	High

Table 3 indicated that the elderly had overall knowledge after watching the clip at a high level. The mean score was 3.59, and the standard deviation was 1.08. Furthermore, the results showed that the elderly could protect themselves from the general use of digital media (the highest average score of 3.65, and the standard deviation was 1.15). Next is followed by not posting other people's posts as their own, not lying, deceitful, infringing, or damaging others because of a legal offense (a mean score of 3.63 and a standard deviation of 1.17). Lastly, the elderly could name and choose a secure password. It had the lowest mean score of 3.48, and the standard deviation was 1.12.

5.4 Comparison of the knowledge score before and after watching the clips

Table 4 reports the knowledge after watching the clips for the elderly of all ten clips. The ten clips had a full score of 40. The mean score was 34.42, and the standard deviation was 4.16, higher than before watching the clip. The mean score was 28.34, and the standard deviation was 7.74. The T-test value is 21.786 with Sig. = 0.000. From the T table (Turney, 2022), the critical value for $T(df = 1,008)$ at a 5% significant level is approximately 1.962 as the T-test value is more than the critical value and the Sig. value (0.000) is less than 0.05, the alternative hypothesis is accepted. The results confirm that differences exist between the knowledge before and after watching the clips.

Table 4 The average knowledge score before and after watching all clips for the elderly, a full score of 40

Results	Number	Mean	SD	t	Sig. (2-tailed)
Before watching the clip	1,010	28.34	7.74	21.786*	.000
After watching the clip	1,010	34.42	4.16		

6. Discussion and Conclusion

The authors undertook the project aimed to evaluate the learning and teaching materials in the form of ten video clips designed especially for the Thai elderly without previous experience in using digital technologies to equip them with knowledge, understanding, ability, and awareness to use the Internet and digital media through smartphones to benefit their quality of life.

This study applied educational materials that attract the elderly, facilitate digital media education, and make learning more effective and stable. Video instruction for the elderly is recommended. The study follows Pryor and McLaughlin (2018) that multimedia instructions, including text and pictures or videos rather than only text allow for the development of more supportive and useful instructions for the elderly. In addition, Pryor and McLaughlin (2018) indicated that video instructions combine aspects of multimedia instruction by presenting more visual information than static images or images and adding the possibility of auditory information.

Moreover, it was anticipated that the knowledge of the elderly would increase after watching the video clips. As expected, the average score after watching the clips was higher than before. Moreover, it was statistically significant at the .05 level, which satisfies the objectives set. The results align with the study by Najafi, Barghi, Kooshyar, Karimi-Mounaghi, and Rodi (2017). Najafi et al. (2017) used a quasi-experimental study (with pretest

and posttest) among 66 elderly residents in Iran. Their results also indicated that training the elderly through video improved their confidence over the traditional method.

Lastly, the authors agreed with Najafi et al. (2017) that further research on the effectiveness of different digital media teaching methods should be considered.

7. Suggestion

From collecting the opinions of the elderly, important issues can be used to improve the preparation of video clips for the elderly for the project as follows: (i) Videos are suitable for anyone unaware of digital media. The video contents are easy to understand, but the clips are too long. (ii) Should provide a simple manual as a short method to accommodate the video clips. The manual should explain how to use each application in a simple and uncomplicated for reviewing the usage because it's been too long for the elderly to not member.

8. Acknowledgement

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9. References

Armenian PR Association. (2021). *Digital literacy fundamentals*. Retrieved 20 September, 2022, Retrieved
    from https://bit.ly/3UpCn4s

Jantavongso, S. (2022). Toward global digital literate citizens: A case of Thailand's aging generation. *The
    Electronic Journal of Information Systems in Developing Countries, 88*(2), e12207. doi:
    https://doi.org/10.1002/isd2.12207

Jantavongso, S., & Fusiripong, P. (2021). Ethics, big social data, data sharing, and attitude among the millennial
    generation: A case of Thailand. *The Electronic Journal of Information Systems in Developing
    Countries*(e12179), 1-16. doi: 10.1002/isd2.12179

Mertler, C. A. (2021). *Introduction to educational research*. Singapore: SAGE Publications, Inc

Ministry of Social Development and Human Security. (2003). *The Act on the Elderly BE 2546 (2003 AD)*.
    Retrieved 20 September, 2022, Retrieved from https://bit.ly/3RVM8FW

Najafi, Z., Barghi, M., Kooshyar, H., Karimi-Mounaghi, H., & Rodi, M. Z. (2017). A comparison of the effect
    of education through video versus demonstration on fear of falling in nursing home residents of
    Mashhad, Iran. *Iran J Nurs Midwifery Res, 22*(3), 195-200. doi: 10.4103/1735-9066.208160

Office of Thai Media Fund. (2021). *A survey on the situation of Thai people's media, information, and digital
    literacy for the year 2020-2021*. Retrieved 20 September, 2022, Retrieved from https://bit.ly/3Uq4twa

Promrub, S., & Sanrattana, W. (2022). Online program to empower teacher learning to develop students' digital
    literacy skills. *Education Quarterly Reviews, 5*(2), 469-483. doi: 10.31014/aior.1993.05.02.506

Pryor, M., & McLaughlin, A. C. (2018). Developing video or multimedia instructions for older adults. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting, 62*(1), 1739-1743. doi: 10.1177/1541931218621394

Scherbov, S., & Sanderson, W. (2019). *Measuring population ageing: Bridging research and policy.* Retrieved 20 September, 2022, Retrieved from https://bit.ly/3UAkWhN

Turney, S. (2022). *Student's t table.* Retrieved 12 October, 2022, Retrieved from https://bit.ly/3yBbQaZ

Zeissig, E.-M., Lidynia, C., Vervier, L., Gadeib, A., & Ziefle, M. (2017). *Online privacy perceptions of older adults*. Paper presented at the Human Aspects of IT for the Aged Population. Applications, Services and Contexts, Cham.

THE RELATIONSHIPS BETWEEN EMPLOYEE EMPOWERMENT, EMPLOYEE MOTIVATION, EMPLOYEE COMMITMENT, AND EMPLOYEE PERFORMANCE: A CASE STUDY OF A LOGISTICS COMPANY IN CAMEROON

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ABSTRACT

The aim of this study is to examine the relationship among employee empowerment, employee motivation, employee commitment, and employee performance. This study uses quantitative approach via self-administered questionnaire. The study collected the data from 286 employees who had been working with the selected logistics company in Cameroon for at least three years to ensure that they have possess sufficient experience with the company. The regression analysis showed that employee empowerment, employee commitment and employee motivation have a significant positive impact on employee performance. The study also found that employee empowerment has a significant positive impact on employee motivation, and employee motivation also impacted positively on employee commitment. This study found that employee empowerment has the most impact on employee performance followed by employee motivation, and employee commitment. The findings concluded that a strong and adequate employee commitment and empowerment programs will improve the employee motivation and thereby improve on the employee performance in the long run in order to achieve their organizational objectives.

Keywords: Employee Commitment, Employee Empowerment, Employee Motivation, Employee Performance, Logistics Industry

1. Introduction

In logistics company, human capital refers to the human element, and it is a mixture of knowledge, capacities, and data that it can provide for the company (Zámečník, 2016).. Logistics companies regularly focus on human capital as a wellspring of additional opportunities and advancement (Carson et al., 2004). Human capital additionally carries an enthusiastic connection to a logistics company. The elements that motivate a supervisor do not motivate his/her employees. It is essential to see every employee independently (Robbins and Judge, 2008). Every one of that must be considered in the correct motivation of employees. Motivation supports the achievement of workers in their fields and their adaptation to ordinary tasks (Urbancová & Urbanec, 2012). Control and assistance for individual achievements constitute a significant prerequisite for monitoring and empowerment the overall achievement of the business structure (Kucharcikova et al., 2016). Notwithstanding the fact that motivation is very important to determine employee's ability so do other factors such as the resources given to an employee to do his or her job. Therefore, successful work performance can arise from a variety of motives. Motivation to enhance performance varies from person to person and from company to company (Thornton & Rupp, 2006).

Employee motivation signify the difficult services and needs which provide the drive for an employee to complete a specific job (Shulze & Steyn, 2003). In the organization, motivation impact the employee performance especially those employees who have less skills they are motivated more and contribute 100 percent with the work (Azar & Shafighi, 2013). The main objective of the logistics company is to classify the needs and wants and replying it to the most elementary method of all organization to get the commitment of the workers (Surbhi, S. 2012).

Mouallem and Analoui (2014) proposed that to fully build the human resource capacity of the public sector, empowerment through training of employee providing inputs and control employee access to information flow are the key requirements to improve performance. Employee empowerment can influence the organizational commitment and reduce employee 's replacement. Commitment is a force that binds an individual to a course of action that is of relevance to a particular target. (Meyer & Herscovitch, 2001).

Employees are committed to "associating individuals of organization characters in their work; and to commitment, workers are truly, deeply, and mentally speaking, in the work of performances" (Huang et al., 2016). As indicated by Zia-ud-Din et al., (2017) management or leadership of logistics companies assume a significant role in the commitment at the degree of the employee working in the various logistics companies. Commitment is such a physical tendency that incorporates singular activity, is consolidated to improve its presentation. Huang et al. (2016) explained that commitment is the objective behind an employee whose work is related to his work. This is a persuasive attitude that is used in employment when it receives authoritative assistance and social assistance. According to Robinson et al. (2004), the probability of a worker's commitment is an optimistic certainty. Macey and Schneider (2008) described the employee commitment as a multifaceted structure, with features of character and other social creations. Bakker et al. (2012) therefore assessed that the degree of commitment depends on the expectations and character of an individual. Consequently, by job mentalities that

boost the measured worker performance of the enterprise, symbolic participation can be conceptualized. Thus, the attracted laborers perform well and make a beneficial relationship with their friends and chiefs (Mackay et al., 2017).

Limited number research has explored the relationship employee empowerment, employee motivation, employee commitment, and employee performance in logistic company in Cameroon. Hence, the purposes of this study are to investigate the impact of employee empowerment on employee motivation as well as the effect of employee motivation on employee commitment. This study also explores the impact of employee empowerment, employee motivation, and employee commitment on employee performance in a logistics company in Cameroon. This study therefore contributes to employee empowerment concept as well as employee motivation and employee concept in the field of logistics company.

2. Literature Review

2.1 Employee Motivation Concept

Motivation is one of the enormous components that influence human leadership and performance. The degree of motivation applied by a person or group in their work undertaking will affect all authoritative performances pieces. As workers are the key tools the business works out for logistics companies, the issues of the creativity of members will ultimately select the flourishing logistics companies (Burke, 2007). Bourgault et al. (2008), stated that logistics companies should gain a proper appreciation of the dissimilarities of the employees in the needs and trends of the motivational factors to help their exposure towards a large objective organization.

2.2 Employee Empowerment Concept

Fernandez and Moldogaziev (2013) asserted that workers with an empowered perspective encounters sentiments of authority over the activity to be performed, consciousness of the setting in which the work is performed, responsibility for individual work yield, shared duty regarding unit and organizational performance, and value in the prize's dependent on individual and aggregate performance. It is expressed that employee empowerment is alluded to the designation of power by the directors to every employee, for the most part, as for work practices and strategies (McClean & Collins, 2011). However, moving power to the employees ought to be finished with due perseverance. Worker empowerment occurs through sharing information, self-administration in making decisions, and improving scholarly breaking point (Albdour & Altarawneh, 2014). The dimensional scales of employees' empowerment for this study were two as adopted from Ahmad (2018): 1.) Delegation of Authority is to entrusted delegated authority to the employees with the ability to perform; 2.) Participation is to give the opportunities for learning, training and acquiring new skills, to enable them provide new ideas to work development.

2.3 Employee Commitment Concepts

In a broad sense, employees' commitment alludes to a person's loyalty or attach to their utilizing organization (Van Dick, 2013). Neeta (2011) asserted that the duty of the worker, extend, or proceed with a genuine edge for the organization by submitting human resource in its work. Committed members are consistently

committed to reducing their job intensity, which contributes to a large production. The three dimensions of employees' commitment are as indicated: 1.) Affective commitment conveys the eager collaboration of the workers (Sai & Raju, 2020); 2.) Normative commitment represents their tremendous dedication to the group (Meyer et al., 2013); 3.) Continuance commitment comes from an incentive to avoid going towards costs that would be correlated with a possible market comparison (Raub & Robert, 2013). The greater the obligation of the members, the more important they see the cost of such a reform.

2.4 Employee Performance Concept

Ako (2019) refers to productivity of the employees demonstrated how individuals are pleased with their work would have more precise job performance and thus more critical job release than people who are not satisfied with their work. The presence of remarkably cheerful and optimistic workers is higher, with the result that the organization has given an advantage to its ghostly objections and relies on this higher degree of pro-speculation. Employee performance incorporates the monetary or non-budgetary assessment of a laborer, which has a linear relationship with organizational performance and its success (Anitha, 2014).

2.5 Hypotheses development

A study from Hanaysha & Hussain, (2018) aims to examine the effect of employee empowerment, employee training and teamwork on employee motivation at Malaysia. The outcomes showed that employee training which is a form of empowerment and employee teamwork have significant positive effects on employee motivation. Therefore, this study proposed that:

Hypothesis 1: Employee empowerment significantly impact on employee motivation

The motivated employees do not work only for a compensation, or only for promotion, but work for the organization's objectives. At the point when employees care-when they are committed, they utilize optional effort (Kevin Kruse, 2012). Therefore, this study proposes:

Hypothesis 2: Employee motivation significantly impact on employee commitment.

Zia ud and Khan (2010) explored the relationship between commitment and employees' performance in the oil and gas sector in Pakistan. The findings indicated a good connection between the employee commitment and the performance of employees. The results showed that the three dimensions of the commitment have such a strong and important correlation with the employees' performance. This research thus suggests that:

Hypothesis 3: Employee commitment significantly impact on employee performance.

Motivation and performance of an employee are indistinguishably connected as each worker must have some degree of motivation just to go to work regardless (Malik et al., 2011). This research thus suggests that:

Hypothesis 4: Employee motivation significantly impact on employee performance.

Pilar, Angel Martinez, and Mauela (2005) dismembered the findings of employees working on the relationship between employee empowerment and performance of employees and the organizational perspectives. The findings reflect the beneficial outcome of empowerment and performance of workers as well as the organizational mindsets. This research thus suggests that:

Hypothesis 5: Employee empowerment significantly impact on employee performance.
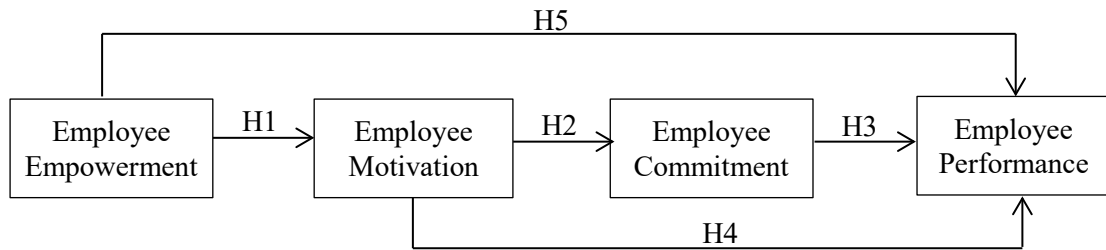

Figure 1: Research model

3. Research Methodology

3.1 Research Design

This study employs quantitative research to explore the relationship between employee empowerment, employee motivation, employee commitment, and employee performance of the employee of the selected logistics company in Cameroon.

3.2 Population and Sample

This study distributed 1,000 questionnaires to the employees of the selected logistics company in Cameroon. The study collected data from 286 respondents using a non-probability sampling technique in which respondents that are suitable and compatible with the study subject are selected in some non-random manner from the population. According to Yamane (1967) in determining the sample size of known population number, the sample size of 286 with 95% level of precision should be adequate for the analysis. The study showed that 64.3% of respondents are male while 35.7% of the respondents are female. Majority of the respondents are youths between 18-40 years of age (85.7%). Majority of respondents (69.5%) obtained bachelor degree and master degree.

3.2.1 Measurement Items

The measurement items for this study are measured in 5-point Likert scale (Strongly Agree to Strongly Disagree). Measurement Items of *employee commitment* was measured by the six items used by Rhoades et al. (2001). The scale of *employee empowerment* for this study was adopted from Ahmad Nasser Abuzaid, (2018). The scale was converged on two dimensions (i.e., delegation of authority, participation) measured by the ten items. Five items for delegation of authority dimension and five items for Participation dimension. *Employee motivation* converged on three dimensions measured by the nine items scale adopted from Jaiswal et al. (2017). The three dimensions are organizational inspiration dimension, working environment dimension, and values dimension. The scale of *employee performance* was adopted from Williams and Anderson (1991).

3.2.2 Validity and Reliability Test

The study found that employee commitment, employee empowerment, employee motivation, and employee performance have sufficient convergent validity and reliability. The average variances extracted (AVEs) for employee commitment (0.626), employee empowerment (0.570), employee motivation (0.505), and

employee performance (0.569) were above 0.5, while the loadings of all measurement items for each construct were above 0.5. These confirm convergent validity (Fornell & Larcker, 1981). In addition, the composite reliability and Cronbach's alpha of variables exceeded 0.8, showing internal consistency for reliability (Commitment=.913 Empowerment=.923, Performance=.867 and Motivation=.892).

3. Findings

The simple and multiple linear regression model was employed in testing the hypotheses. Hypothesis 1 was tested in model 1 shown in table 1 and confirmed that employee empowerment is statistically significantly impact on employee motivation at 95% confidence level (F $(1,285)$ = 942.983, p-value=.000, β=.855). Hypothesis 2 was tested in model 2 and also confirmed that employee motivation is statistically significantly impact on employee commitment at 95% confidence level (F $(1,285)$ = 866.027, p-value=.000, β=.976). The study used multiple linear regression in model 3 shown in table 1 to test hypothesis 3, hypothesis 4 and hypothesis. The result suggested that that employee motivation (β = .451), employee commitment (β=.117), and employee empowerment (β=.463) statistically significantly impact on employee performance at 95% confidential level (F $(3,283)$ = 544.142, p-value = .000). Thus, all five hypotheses are supported.

Table 1 Hypotheses summary

Model	Independent Variables	Dependent Variable	P-Value	Adj. R^2	Std. β	Result
1	Employee Empowerment	Employee Motivation	.000*	.767	.876	Supported
2	Employee Motivation	Employee Commitment	.000*	.752	.867	Supported
3	Employee Commitment	Employee Performance	.000*	.851	.120	Supported
	Employee Motivation				.432	
	Employee Empowerment				.410	

4. Discussions and Conclusion

The hypothesis 1 of this study indicated employee empowerment is statistically significantly impact on employee motivation. This assertion is supported by Tutar et al. (2011) who stated when an employee is supported by the administrative system, it is a form of employee empowerment in which the employee realizes his or her own potential, and this situation has a positive impact on his or her achievement. The hypothesis 2 of this study indicated that employee motivation is statistically significantly impact on employee commitment. This assertion is supported by Minhas, (2017) who stated that the commitment of employees cannot be bought since it is a direct result of the employee being significantly motivated by their organization. Therefore, when employees are motivated by their organization, they become more committed to activities that boost their position in the organization.

The hypothesis 3 of this study indicated employee commitment is statistically significantly impact on employee performance. This assertion is supported from the study of Aydogdu and Asikgil, (2011) which verified

that when there exists an employee commitment where there is a strong belief in the goals and values of the organization, the willingness to work on behalf of the organization and the desire to maintain membership in the organization will be sustained. The hypothesis 4 of this study indicated that employee motivation is statistically significantly impact on employee performance. This claim is supported by a study conducted by Alawiyah, Backhtia, and Daud (2017), which found that employee motivation has a significant influence on the performance of logistics employees at pharmaceutical wholesalers using the value-t statistic variable of work motivation. The hypothesis 5 of this study indicated that employee empowerment is statistically significantly impact on employee performance. According to the study of Danit and Menon (2012) who have noted that 'employee empowerment' has been most preferred option to enhances employee performances in many organizations during the time of business decline.

Based on multiple regression for H3, H4, H5, the employee commitment ($\beta = 0.117$) has the lowest impact on job performance, while the employee empowerment ($\beta = 0.463$) has the highest impact on job performance. Therefore, the company should focus on improving the employee empowerment by ensuring that the employees have opportunity to make decisions independently as well as having adequate authority delegated by management to do their job. The employee should be encouraged to perform the entrusted tasks from the management.

4.1 Managerial Implications

The results of this study demonstrated the impact of employee motivation on employee performance, and likewise employee commitment and employee empowerment impacts on the employee performance, which is one of the most important goals for any logistics company top management to achieve. As a result, logistics top executives must enhance the performances of the employees because improved performances enable the successful achievement of the business objectives. This study also suggests that the company should maintain their competitive advantage in terms of effective ways through which the management provide the employees with effective motivational drive packages as well as employee empowerment to enhance the employee commitment and also improve their performance to meet up with the company's objectives to enhance employees to feel proud, attach, and strong sense of belonging to the company and deem to work with the company until retirement. The managers should also improve on the employee motivation by aiming at establishing effective and sophisticated channels of communication with their employees. The company should provide opportunities for learning, training and acquiring new skills as well as encourage employee to practice team spirit, share new ideas to work development, and exchange experiences.

5. References

Ahmad Nasser Abuzaid. (2018). Employees' Empowerment and its Role in Achieving Strategic Success: A Practical Study on Jordanian Insurance Companies. *Jordan Journal of Business Administration, 14*(4), 641-659

Ako, E. (2019). Analyzing the Effects of Lead Time Management on Workers Productivity at the Ministry of Transport in Cameroon. *Available at SSRN 3456327*.

Alawiyah, T., Backhtia, Y., & Daud, I. (2017, December). Factors That Affect the Performance of Logistics Employees at Pharmaceutical Wholesalers X In Banjarmasin. In *2nd Sari Mulia International Conference on Health and Sciences 2017 (SMICHS 2017)–One Health to Address the Problem of Tropical Infectious Diseases in Indonesia* (644-651). Atlantis Press.

Albdour, A. A., & Altarawneh, I. I. (2014). Employee engagement and organizational commitment: Evidence from Jordan. *International journal of business*, *19*(2), 192.

Anitha, J. (2014), Determinants of employee engagement and their impact on employee performance. *International Journal of Productivity and Performance Management*, *63*(3), 308-323.

Aydogdu, S., & Asikgil, B. (2011). An empirical study of the relationship among job satisfaction, organizational commitment and turnover intention. *International review of management and marketing*, *1*(3), 43.

Azar, M & Shafighi, A. (2013). The Effect of Work Motivation on Employees' Job Performance. *International Journal of Academic Research in Business and Social Sciences*, *3*(9), ISSN: 2222-6990.

Bakker, A.B., Tims, M. and Derks, D. (2012). Proactive personality and job performance: the role of job crafting and work engagement. *Human Relations*, *65*(10), 1359-1378.

Bourgault M, Drouin N, & Hamel É. (2008). Decision Making within Distributed Project Teams: An exploration of formalization and autonomy as determinants of success. *Proj. Manage. J.*, *39*, S97-S110.

Burke R. (2007). *Project Management Leadership.* CapeTown: Burke.

Carson, E., Ranzijn, R., Winefield, A. & Marsden, H. (2004). Intellectual Capital: Mapping Employee and Work Group Attributes. *Journal of Intellectual Capital*, *5*(3), 443-463.

Danit, A. and Menon, K. (2012). New dimensions of decisional HR practices. *International Journal of Business and Strategy*, *9*(2), 76.

Fernandez, S., & Moldogaziev, T. (2013). Employee empowerment, employee attitudes, and performance: Testing a causal model. *Public Administration Review*, *73*(3), 490-506.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, *18*(1), 39-50.

Jaiswal, G., Pathak, R., & Kumari, S. (2017). Impact of employee engagement on job satisfaction and motivation. *Global advancements in HRM innovation and practices*, 68-78.

Huang, C.-C., You, C.-S. & Tsai, M.-T. (2016). A multidimensional analysis of ethical climate, job satisfaction, and organizational citizenship behaviors. *Nursing Ethics*, *19*, 513-529.

Hanaysha, J. R., & Hussain, S. (2018). An Examination of the Factors Affecting Employee Motivation in the Higher Education Sector. *Asia-Pacific Journal of Management Research and Innovation*, *14*(1–2), 22–31.

Kruse, K. (2012). *Employee Engagement 2.0*. Kruse Group.

Kucharcikova, A., Konusikova, L., & Tokarcikova, E. (2016). Approaches to the quantification of the human capital efficiency in enterprises. *Communications-Scientific letters of the University of Zilina*, *18*(1A), 49-54.

Malik, S.A., Iqbal, M.Z., Khan, M.M. & Nasim, K. (2011). Measuring job satisfaction, motivation and health issues of secondary school teachers in Pakistan *African Journal of Business Management*, *5*(5(33)): 12850-12863.

Macey, W.H. and Schneider, B. (2008), The meaning of employee engagement, *Industrial and Organizational Psychology*, *1*(1), 3-30.

Mackay, M.M., Allenb, J.A. and Landisc, R.S. (2017). Investigating the incremental validity of employee engagement in the prediction of employee effectiveness: a meta-analytic path analysis. *Human Resource Management Review*, *27*(1), 108-120.

Meyer, J. P., Kam, M., Goldberg, T. E., & Bremner, C. (2013). Employee commitment and motivation: A conceptual analysis and integrative model. *Journal of Applied Psychology, 89*, 991-1007.

Meyer, J. P., & Herscovitch, L. (2001). Commitment in the workplace: Toward a general model. *Human Resource Management Review, 11,* 299 –326.

Minhas, L. (2017). Relation of Managerial Creativity and Emotional Intelligence to Employee Motivation Commitment and Performance. *Journal of Psychosocial Research*, *12*(2) 255, ISSN: 0973-5410

Mouallem, L., & Analoui, F. (2014). *Developing Effective Communication for project managers in developing countries.* San Francisco: Sage Publications Inc.

Neeta, B. (2011), To study the Engagement practices and its effect on employee performance with special reference to ICICI and HDFC Bank in Lucknow. *International Journal of Scientific & Engineering Research*, *2*(8), 2229-5518.

Pilar, D., Angel, M., Manuela, P., & Maria, J. (2005). Team Empowerment: An Empirical Study in Spanish University R & D Teams. *International Journal of Human Resources Development and Management*, *5*(1), 69-84

Raub, S., & Robert, C. (2013). Empowerment, organizational commitment, and voice behavior in the hospitality industry: Evidence from a multinational sample. *Cornell Hospitality Quarterly*, *54*(2), 136-148.

Rhoades, L., Eisenberger, R. and Armeli, S. (2001). Affective commitment to the organization: the contribution of perceived organizational support. *Journal of Applied Psychology*, *86*, 825-36.

Robbins, S.P. & Judge, T.A. (2008). *Organizational behavior.* Global and Southern African Perspectives, 234 p. (South Africa: Cape Town, 2008)

Sai, P. H. S., & Raju, P. (2020). Impact of Employee Motivation on Organizational Development with Reference to Oil and Natural Gas Corporation, Rajahmundry. *Studies in Indian Place Names*, *40*(60), 5390-5397

Surbhi, S. (2012). The impact of motivation on the employee performance and job satisfaction in it park (software house) sector of Peshawar, Pakistan. *International Journal of Academic Research in Business and Social Sciences*, *6*(9), 297-310.

Thornton, George C. Rupp, Deborah E (2006). *Assessment centers in human resource management: strategies for prediction.* Routledge, Inc.

Tutar, H., Altınöz, M., & Çakıroǧlu, D. (2011). Is ethical leadership and strategic leadership a dilemma? A descriptive survey. *Procedia-Social and Behavioral Sciences*, *24*, 1378-1388.

Urbancová, J. J., & Urbanec, D. J. (2012). The moderating role of goal commitment on the goal difficulty – performance relationship: A metanalytic review and critical reanalysis. *Journal of Applied Psychology, 83,* 308 –315.

Van Dick, R. (2013). *Identifikation and Commitment.* In W. Sarges (Hrsg.). Managementdiagnostik (S. 349-354). Göttingen: Hogrefe.

Williams, L.J. and Anderson, S.E. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviors. *Journal of Management*, *17*(3), 601-617.

Yamane, Taro. (1967). *Statistics, An Introductory Analysis,* 2nd Ed., New York: Harper and Row.

ZámeČník, R. (2016). *Marketing and Management of Innovations 4*, 325-341.

Zia ud, D., Khan, M.R. (2010). The Impact of Organizational Commitment on Employees Job Performance: A Study of Oil and Gas Sector of Pakistan. Rochester: Social Science Research Network.

Zia-ud-Din, M., Shabbir, M.A., Bin, S., Bilal, M. & Raza, M. (2017). Impact of Strategic Leadership on Employee Performance. *International Journal of Academic Research in Business and Social Sciences,* DOC: 10.6007/IJARBSS/v7-i6/2938

FACTORS AFFECTING CUSTOMER SATISFACTION OF LAST-MILE DELIVERY IN THAILAND

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ABSTRACT

The purpose of this study was to explore factors affecting customer satisfaction of last-mile delivery in Thailand. Closed-ended survey questionnaires were reviewed the validity of content and tested for reliability. Collected data from 400 people and the inferential statistics used to test the hypothesis was multiple regression analysis. The results of the study found that factors of service quality, service capability and customer perception affect customer satisfaction towards choosing a last-mile delivery in Thailand. However, the results showed that there are some sub-factors do not affect the satisfaction of the customers in choosing the last-mile delivery in Thailand. Organizations might apply these factors for their last-mile delivery policy in the future.

Keywords: Last-mile Delivery, Service Quality, Service Capacity, Customer Perception, Customer Satisfaction

1. Introduction

During the past decade, the internet has created a customer behavior to buy product online. Today, the world is connected by the Internet, allowing people all over the world to communicate with no limits (Xing, Grant, McKinnon, & Fernie, 2011). This is a key contributor to the rapid growth of the economy as it becomes easier to connect. There is a cultural exchange of each country due to the unlimited import and export of goods, and there are many types of transportation for users to choose from, such as road transportation, water transportation or air transportation, which each transport has different advantages and disadvantages. Depending on the type of products and services of each service user, therefore, the sale of goods or services does not have to be in the country. Therefore, the best way to meet the demand is logistics and supply chain. It serves to deliver goods and services from the beginning of raw material acquisition to delivery of finished goods and services to end users with the highest quality and lowest cost. Rai, Verlinde, and Macharis (2018) found that consumers' preference goes out to free, next day delivery to an address of choice, on regular office hours during the week, they are willing to collect their orders themselves of wait longer for their order to arrive when delivery and return are free.

Regarding to the impact of the COVID-19 crisis, it can be seen that domestic transportation by parcel services is very popular because of e-commerce has been rapidly growing, disrupting the way people shop (Ignat & Chankov, 2020). This has dramatically increased the direct-to-consumer deliveries within urban areas, thus creating big challenges for city logistics. According to an e-commerce business, a last-mile delivery is needed to meet the customers' requirement to receive products as fast as possible. From the aforementioned, the use of last-mile delivery plays an important role in the daily life of many people, including buying, selling, tourism, production, and international relations. Furthermore, due to its importance in affecting the overall logistics costs and, as a consequence, the economic sustainability of a B2C e-commerce initiative, last-mile delivery process deserves particular attention in order to be optimised (Mangiaracina, Perego, Seghezzi, & Tumino, 2019). Last-mile delivery is the least efficient and most expensive part of the delivery process, due to the challenging target service levels, the small dimension of orders and the high level of disposal of destinations (Macioszek, 2017).

Therefore, the researcher sincerely hopes that the results of this study will be a guideline for organizations or those interested in developing last-mile delivery in Thailand. There are different express companies in Thailand such as Thai Post, Kerry Express, Best Express, Ninja Van, J&T express, Flash Express, SCG express, DHL express, Lalamove and etc. Thus, customers have different option for selecting last-mile delivery service in Thailand. Then, the propose of this paper is to investigate the factors that affecting the selection of last-mile delivery in Thailand to better understand the advantages that can suggest to delivery company who are a player in this field for improving that service and expanding their business to compete with their competitors.

2. Literature Review

As mentioned before, the online shopping or eCommerce have grown sustainability in the last decade and this section will discuss the impact of this growth. Moreover, in global, B2C eCommerce us a rapid growing and the online market in 2018 has been worth more than €2,500 bn worldwide (Mangiaracina et al., 2019). Parcel delivery is Door-to-Door transport, meaning transport from merchant to customer via land transport. Parcel delivery is a very popular form of transport today, mainly through logistics agents. Used to deliver goods across provinces or across regions. and transportation of short-distance parcels such as small documents through delivery services This type of transport provides convenience for both the recipient and the sender. It is the most economical and popular transportation. In addition, two last-mile transport options are commonly offered to consumers when they order products online: 1) delivery at home (or any other address of choice) and 2) collection at a local pick-up point or locker (Rai et al., 2018). Furthermore, retailers often offer next day delivery as part of their standard service, however, fast delivery reduces the opportunity to consolidate orders and organize efficient delivery routes which leading to an increase in vehicles and fuel usage. The number of vans in UK and Belgium have grown which means the increasing of fuel use and release more emissions per metric ton when compare with large delivery (Rai et al., 2018). In addition, research on last-mile delivery investigates the final part of the supply chain from the last distribution centre, consolidation point or local warehouse and focuses on the way in which products reach their final destination in the consumer market .

Regarding to the study from Tengwongwastana (2015), found that the service quality in terms of reliability, responsiveness, assurance, and price consciousness affected the decision to use private companies' domestic parcel shipping service of customers in Bangkok at the significant level of .05. These factors explained 74.0% of the influence toward the decision to use private companies' domestic parcel shipping service of customers in Bangkok. However, the results showed that the service quality in terms of tangible, empathy, brand Image, and word of mouth did not affect the decision to use private companies' domestic parcel shipping service of customers in Bangkok.

Furthermore, Nguyen and Wang (2020) found online retailers' CSR is positively associated with consumer purchase intention. Brand identification and word of mouth (WOM) have a mediating effect on the relationship between retailers' CSR and consumer purchase intention. Brand identification is defined as a consumer's psychological state of perceiving, feeling and valuing his or her belongingness with a brand, while, word of mouth is defined as the exchange of marketing information between consumers that leads to changes in consumer attitudes and behavior towards products and services. Moreover, Li, Fan, Cao, and Lv (2020) proposed a model selection method for last-mile delivery considering delivery service cost advantage which consist of the basic delivery service cost, the first-time, second-time delivery service cost, the basic cost of reverse delivery and so on and delivery service capability advantage which comprise with the basic delivery service capacity, the number of working hours of a worker each day, the number of operators who deals with reverse delivery and etc.

According to the study from Chaisinson (2021) about the development of behavioral decision model for choosing the parcel transportation service provider in Bangkok, it can be found that service factor, damage insurance factors, payment methods, and the promotion strategy are the factors that related to the decision to choose the service of parcel carrier in Bangkok. The independent variable with the best predictive power was promotion factor, with the regression coefficient of forecasting equal to 0.488. The four factors could explain the variance of the decision to use the parcel carrier in Bangkok with 75.90%. Therefore, the researcher used this study to create important strategies for last-mile delivery in Bangkok. The operators could consider using all four development strategies to improve the quality of service to meet the needs of users and attract users to use the service. The successful implementation of the strategy varied depending on the ability to adapt, organization readiness, management, and situation of each company.

Regarding to Vakulenko, Shams, Hellström, and Hjort (2019), they found that the last-mile delivery experience mediates the relationship between the customer's perception of the online shopping experience and customer satisfaction. Thus, organizations should understand customer requirement for providing a suitable last-mile delivery option to customers to increase customer satisfaction in the future.

Various studies have investigated what consumers find important in last-mile delivery such as free and fast delivery, environmental concerns, social responsibility, financial concerns and etc. Considering online customers, they are very demanding in terms of the service level. Therefore in this study, the researcher selects service quality (as reliability, responsiveness and employee awareness), service capability (as shipping time, payment methods and tracking system), and customer perception (as price consciousness, brand image and word

of mouth) as factors that affecting the selection of last-mile delivery option and impacting to customer satisfaction for improving better service in the future. Thus, a conceptual framework of this as Figure 1 below;
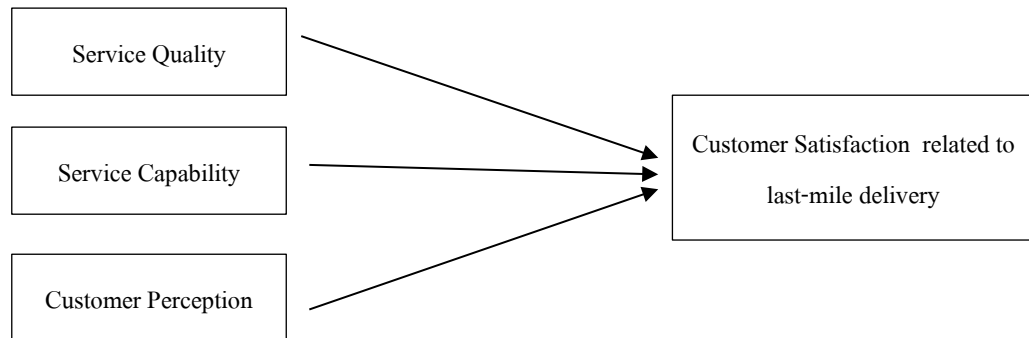

Figure 1: A conceptual Framework

Furthermore, research hypotheses of this study are presented as below:

H_1: Services quality has a positive impact to customer satisfaction related to last-mile delivery,

H_2: Service capability has a positive impact to customer satisfaction related to last-mile delivery, and

H_3: Customer perception has positive impact to customer satisfaction related to last-mile delivery.

3. Research Methodology

This research was quantitative research using a survey research and data collection using closed-ended questionnaires via google, as electronic questionnaire, form between August to September 2021 due to COVID-19 pandemic. The respondents fill out the questionnaire by themselves. Population and sample group for this study was Thai consumers who have used or are deciding to use last-mile delivery services in Thailand. Sample group is using simple random sampling determine the sample size using the formula of Cochran (1977), where the population ratio is 0.5, the confidence is 95 %, and the discrepancy is 5%. The number of sample group is 385, however, for this study the researcher collected 400 sample size for reducing error as much as possible. Once the respondents reached 400, the researcher closed google form to reject other answers. The questionnaire was distributed via email and post in social media to collect data. Then, the researcher test first 30-respondents with Cronbach's alpha to measure reliability of this survey, and got the result with 0.712, thus, this survey can use for this study. Moreover, the questionnaire is divided into two sections with a total of 37 items. A 5-point Likert scale from Strongly Disagree (1) to Strongly Agree (5) is used to measure the effect of the service quality, service capability and customer perception on customer satisfaction.

4. Research Findings

The sample group in this study consisted of 400 respondents. The researcher use SPSS program to calculate the results. Regarding to usable data, the findings show that about half and a half between male (48%) and female (52%). Most of the respondents have age between 20 to 25 years old (82.5%), then 26 to 30 years old

(4.8%), 36 to 40 years old (3.5%) and lower than 20 years old (3.3%), respectively. More than a half are students and undergraduate students (49.5%) and follow with owner or freelance (35.8%) and company employee (10.8%). Therefore, the results from this study come from generation Z who are using eCommerce platform as daily life. A reliability test of the measured variables showed good and excellent levels of internal consistency; Cronbach's alpha for service quality, service capability, customer perception, customer satisfaction and overall was 0.817, 0.719, 0.704, 0.755 and 0.851, respectively. According to multiple linear regression for service quality on customer service, there are some sub-factors that were removed due to there are not significance as presented in Table 1.

Table 1: Multiple Linear Regression for Service Quality on Customer Satisfaction

Sub-Factors	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.240	.150		14.919	.000*
Sub-factors - Reliability					
1 – The service center of the last-mile delivery company is clean and modern	.093	.027	.197	3.478	.001*
2 – The last-mile delivery company has a standard and reliable service system	.187	.035	.260	5.340	.000*
Sub-factors – Responsiveness					
1 – Staffs supervise all customers equally	-.153	.031	-.352	-5.009	.000*
2 – The last-mile delivery company can solve the problem quickly	-.056	.031	-.133	-1.814	.071
3 – Staffs respond to your questions politely	-.039	.032	-.082	-1.208	.228
4 – The parcel was sent with damage free	-.075	.039	-.128	-1.932	.054
5 – There is advance notice if there is transportation on that day	.099	.022	.230	4.476	.000*
Sub-factors – Employee awareness					
1 – Staffs aware your problem and quick response	.232	.033	.428	7.044	.000*
2 – Staffs explain any information to understand easily	.205	.035	.394	5.809	.000*

a. Dependent Variable: Customer Satisfaction

$r = 0.625$, $r^2 = 0.390$, r^2 adj = 0.376, ANOVA sig = 0.000, Significant level * = $p < 0.05$

Next, for service capability, it can be seen that the researcher needs to remove 1 sub-factors from the result of multiple linear regression as shown in Table 2 below.

Table 2: Multiple Linear Regression for Service Capability on Customer Satisfaction

Sub-Factors	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.117	.146		7.674	.000*
Sub-factors – Shipping time					
1 – The delivery time is on the standard time	.175	.021	.395	8.297	.000*
2 – The parcel was delivered on time	-.103	.016	-.293	-6.491	.000*
Sub-factors – Payment Methods					
1 – The last-mile delivery company provides several payment methods	.087	.023	.174	3.821	.000*
2 – The last-mile delivery company has a reliable system to calculate the service fee correctly	.130	.029	.201	4.539	.000*
Sub-factors – Tracking System					
1 – The status of the parcel is correct and exactly as stated in the system	.228	.023	.363	9.883	.000*
2 – The last-mile delivery company has different channels for tracking parcels	.195	.028	.262	7.045	.000*
3 – The status of the parcel is specified in detail	.017	.028	.031	.606	.545

a. Dependent Variable: Customer Satisfaction

$r = 0.788$, $r^2 = 0.622$, r^2 adj = 0.615, ANOVA sig = 0.000, Significant level * = $p < 0.05$

Next, for customer perception, as similar as before, the researcher removed 2 sub-factors as shown in Table 3.

Table 3: Multiple Linear Regression for Customer Perception on Customer Satisfaction

Sub-Factors	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.410	.164		8.573	.000*
Sub-factors – Price Consciousness					
1 – You check the price before deciding to use the last-mile company	-.047	.019	-.107	-2.469	.014*
2 – Cheap service fees that affect the decision to choose a last-mile delivery company	.141	.022	.405	6.264	.000*
Sub-factors – Brand Image					
1 – The last-mile delivery company is popular	-.003	.031	-.006	-.089	.929
2 – The last-mile delivery company is reliable	.186	.036	.261	5.179	.000*
3 – The last-mile delivery company has a good reputation	.254	.026	.382	9.852	.000*
Sub-factors – Word of Mouth					
1 – You collect information from others before deciding to use a last-mile delivery company	.097	.023	.213	4.182	.000*
2 – You ask someone before deciding to choose a last-mile delivery company	.022	.021	.066	1.067	.286

a. Dependent Variable: Customer Satisfaction

$r = 0.701$, $r^2 = 0.491$, r^2 adj = 0.482, ANOVA sig = 0.000, Significant level * = $p < 0.05$

Lastly, the researcher removed all non-significance sub-factors from the model and compiled the remaining sub-factors into service quality, service capability and customer perception and calculate with customer satisfaction. The result for this study as followed in Table 4. It can be seen that service quality, service capability and customer perception have a positive relationship with customer satisfaction in last-mile delivery that means all research hypotheses were accepted. The research can summarize the formular to estimate customer satisfaction from these three factors as "Customer Satisfaction = 0.323 + 0.311*Service Quality + 0.304*Service Capability + 0.333*Customer Perception". Moreover, based on correlation coefficient (r-value) equal to 0.789, it means all these three factors are contribute customer satisfaction about 78.9%, and 21.1% are from other factors.

Table 4: Multiple Linear Regression for Service Quality, Service Capability and Customer Perception on Customer Satisfaction

Sub-Factors	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	.323	.154		2.094	.037*
Service Quality	.311	.023	.413	13.302	.000*
Service Capability	.304	.033	.357	9.184	.000*
Customer Perception	.333	.036	.357	9.243	.000*

a. Dependent Variable: Customer Satisfaction

$r = 0.789$, $r^2 = 0.623$, r^2 adj $= 0.620$, ANOVA sig $= 0.000$, Significant level $* = p < 0.05$

According to the result, there are something similar to previous study. This study got the same result with Tengwongwastana (2015), that service quality in terms of reliability, responsiveness, assurance, and price consciousness affected the decision to use private companies' domestic parcel shipping service of customers in Bangkok. Then, this study confirm service quality (as reliability, responsiveness) and customer perception (as price consciousness) are related to customer satisfaction. Furthermore, this study as similar to Chaisinson (2021) that quality of service and payment methods have a relationship to the decision for using parcel delivery in Bangkok. Moreover, this result supports the study of Nguyen and Wang (2020) that brand image (or brand identification) and word of mouth are a relationship with consumer intention (or customer satisfaction in this study).

However, this study got the different results in term of brand image and word of mouth because Tengwongwastana (2015) as she found that these two factors are not affect the decision to use private companies' domestic parcel shipping service of customers in Bangkok. Moreover, there are some different with Chaisinson (2021) that shipping time and tracking system are not a relationship to the decision for using parcel delivery in Bangkok. Therefore, organizations might focus on different factors by sorting the most important factor for their business and sequencing their policy based on customer requirement if possible.

5. Conclusion

Regarding to the findings of this study, it can be seen that all factors in the conceptual model have a positive relationship with customer satisfaction in term of last-mile delivery in Thailand. Most of sub-factors have the results with strongly agree in all factors. However, there are some sub-factors were removed from this study. Then, the remaining factors will support organizations to consider their policy to do last-mile delivery option in Thailand. Organizations should have a reliability for their service and customer service and the staffs at the shop need to be friendly and polite when they are working because the respondents focus on this atmosphere. Moreover, couriers who are delivering parcel to their customers should call to customers before they arrived to make sure that someone will receive the parcel. Furthermore, customer service should provide their support as much as possible to the customers to guarantee good customer satisfaction as well. On the other hand, delivery lead time should be on time as promise to your customers as possible. However, if they are somethings wrong, couriers should call or alert to your customers in advance for late-delivery or miss-shipment. For payment methods and tracking system, organizations should develop their system for supporting customers to pay in different options and tracking parcel at real time because these two factors are also important factors in customers' view. Lastly, customer perception, it can be confirmed that price for last-mile delivery is sensitive factor for customers because customers will compare the price before they select a last-mile delivery company. Then, organizations need to provide an information about promotion, customer loyalty program or attract new users by improving more brand image and organization reputation in term of good service in last-mile delivery.

6. Suggestion

For future study, the researchers might focus on organizations' view instead of customers' view to gain more information or more points to develop last-mile delivery literature. Furthermore, those who are interested and want to learn more, there should be a study on consumer behavior in Thailand at each age, occupation, and income because additional study data can be used to make a better decision to a company. Finally, other factors should be studied in addition to service quality, service capability and customer perception, which were studied in this research, for example, promotion for users, customer loyalty program, special package or special price for SMEs and online sellers, and etc. Therefore, it is necessary to study information that affects consumers or better understand consumers.

7. References

Chaisinson, S. (2021). The development of behavioral decision model for choosing the parcel transportation service provider in Bangkok. *Journal of Association of Researchers, 26*(1(2564)), 145-160.

Cochran, W. G. (1977). *Sampling techniques*: John Wiley & Sons.

Ignat, B., & Chankov, S. (2020). Do e-commerce customers change their preferred last-mile delivery based on its sustainability impact? *The International Journal of Logistics Management*.

Li, F., Fan, Z.-P., Cao, B.-B., & Lv, H.-M. (2020). The logistics service mode selection for last mile delivery considering delivery service cost and capability. *Sustainability, 12*(19), 8080.

Macioszek, E. (2017, 2017). *First and last mile delivery–problems and issues*.

Mangiaracina, R., Perego, A., Seghezzi, A., & Tumino, A. (2019). Innovative solutions to increase last-mile delivery efficiency in B2C e-commerce: a literature review. *International Journal of Physical Distribution & Logistics Management*.

Nguyen, N., & Wang, J. (2020). Consumers' perceptions and responses towards online retailers' CSR. *International Journal of Retail & Distribution Management*.

Rai, H. B., Verlinde, S., & Macharis, C. (2018). The "next day, free delivery" myth unravelled: Possibilities for sustainable last mile transport in an omnichannel environment. *International Journal of Retail & Distribution Management*.

Tengwongwastana, W. (2015). *Service Quality, Price Consciousness, Brand Image, and Word of Mouth Affecting the Decision to Use Private Companies' Domestic Parcel Shipping Service of Customers in Bangkok*. (Master of Business Administration). Bangkok University, Bangkok University.

Vakulenko, Y., Shams, P., Hellström, D., & Hjort, K. (2019). Online retail experience and customer satisfaction: the mediating role of last mile delivery. *The International Review of Retail, Distribution and Consumer Research, 29*(3), 306-320.

Xing, Y., Grant, D. B., McKinnon, A. C., & Fernie, J. (2011). The interface between retailers and logistics service providers in the online market. *European Journal of Marketing, 45*(3), 334-357. doi:10.1108/03090561111107221

THE RELATIONSHIPS BETWEEN TRANSFORMATIONAL LEADERSHIP, JOB MOTIVATION, AND EMPLOYEE COMMITMENT: A CASE STUDY OF A LOGISTICS COMPANY IN THAILAND

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ABSTRACT

Logistics is one of the thriving businesses in Thailand in the past year. Hence, transformational leadership contribute to achieving employee commitment in logistic company. The purpose of this study is to explore the relationships between transformational leadership, job motivation, and employee commitment of a logistics company in Thailand. This study collected the data from 227 employees of the selected logistics company. The result from linear regression analysis revealed that transformational leadership has positive impact on job motivation while job motivation has stronger impact on employee commitment than transformational leadership. The company should ensure that the job is meaningful and exciting to enhance employee motivation, thus, increase employee commitment.

Keywords: Leadership, Transformational Leadership, Job Motivation, Employee commitment,
Logistics Industry

1. Introduction

The logistics industry in Thailand is essential to individuals and businesses to satisfy their considerable demand for goods, supplies, and other products and services（Intelligence, 2019）. International trade is very

crucial for economy in Thailand; hence, it requires strong logistic company to facilitate their businesses. The logistics industry provides sea transportation, air transport, warehouse services, and truck transport. Logistics in Thailand has been improved since 2018 (Intelligence, 2019). This study focuses on the selected logistic company in Thailand as the company is one of the logistics companies that offers all of the services mentioned to satisfy its customer's needs. The company has a flexible supply chain solutions tailored made to meet their individual business needs. In order to provide such services, the logistic company must ensure that their employees are committed to their job to perform at their best capability.

Leadership is one of the keys to the successful operation of logistics companies and can motivate the employees in the organization to perform at a high level for the company to reach its goals each year. In order to get the employees to motivate and commit to working for the organization, it will need a serious leader to guide them. The leader has to find a way to motivate the employees in order to gain their trust (Habib and others, 2014). Job motivation is one of the important factors in an organization. The employees that are motivated can perform the job much better than employees that do not have motivation. A company with high job motivation can achieve its goals and mission faster (Dieleman and others, 2003) which lead to employee commitment. Secure employee commitment derives a very valuable asset for the logistics company. It is important to have committed employees working for an organization (Jaw & Liu 2004).

Prior researches have intensively focused on transformation leadership compared to other types of leadership as it contributes to achieving employee commitment. However, limited number of researches have explored the application of transformation leadership in the logistic company in Thailand. Therefore, this study propose research objectives as follows:

2. Research Objective

(1) To explore the effect of transformational leadership on job motivation.

(2) To study the impact of transformational leadership on employee commitment.

(3) To identify the influence of job motivation on employee commitment

3. Literature Review

3.1 Theory, Concept and Related Research

Leadership Theories

Leadership is a characteristic ability of extraordinary individuals. This conception of leadership, known as the great man theory, evolved into the study of leadership traits, only to be supplanted later by the theories under discussion here (Glynn & DeJordy, 2010). Bass (2008) focused on three types of leadership which are Situational leadership, Transformational leadership, and Transactional leadership.

Situational leadership theory proposes that effective leadership requires a rational understanding of the situation and appropriate response, rather than a charismatic leader with a large group of dedicated followers (Graeff, 1997; Grint, 2011).

Transformational leadership has been "the single most studied and debated idea with the field of leadership" (Diaz-Saenz, 2011, p. 299). Burns (1978) operationalized the theory of transformational leadership as one of the two leadership styles represented as a dichotomy: transformational and transactional leadership. But the transformational leadership got a positive report from the other leadership.

Transactional leadership focuses on the exchanges that occur between leaders and followers (Bass 1985; 1990; 2000; 2008; Burns, 1978). These exchanges allow leaders to accomplish their performance objectives, complete required tasks, maintain the current organizational situation, motivate followers through contractual agreement, direct behavior of followers toward the achievement of established goals, emphasize extrinsic rewards, avoid unnecessary risks, and focus on improving organizational efficiency.

Job motivation concept

Maslow's Hierarchy of Need Theory could explain the effect of job motivation. Maslow believed that there are at least five sets of goals, which can be referred to as basic needs are physiological, safety, love, esteem, and self-actualization. Maslow (1943) stated that people, including employees of the organizations, are motivated by the desire to achieve or maintain the various conditions upon which these basic satisfactions rest and by certain intellectual desires.

Employee commitment concept

For a business or any organization to grow and be successful, the employees must be dedicated to and be committed to having the same goals as the organization. This is called "Commitment". If the employee is aligned with the organization in this manner, both will move forward and achieve prosperity (Dixit & Bhati, 2012).

Gopal and Chowdhury (2014) indicated that the correlation between transformational leadership styles and job motivation is positive with value of 0.602. This report has shown that leadership has positive impact on motivation. This confirmed the importance of having the leader who can positively impact the employees. Therefore, this study proposed

Hypothesis 1: The transformational leadership has positive impact on job motivation.

In education sector, the change in teachers' level of motivation contributes positively to teachers' occupational commitment (Canrinus, 2012). The motivation includes 'working with children' or 'have had inspiring teachers. An increase in teachers' level of motivation will lead to more occupational commitment and that a decrease in teachers' level of motivation will lead to less occupational commitment. Therefore, this study proposed

Hypothesis 2: Job motivation has positive impact on employee commitment.

Ismail and others (2011) further asserted that empowerment is the mediator in the relationship between transformational leadership and organizational commitment when they conduct a study on 118 employees who have worked in a US subsidiary firm in East Malaysia. Therefore, this study proposed

Hypothesis 3: The transformation leadership has positive impact on employee commitment.

2.2 Research Framework

This study explores the influence of transformational leadership towards job motivation and employee commitment. It also studies the relationship between job motivation and employee commitment.
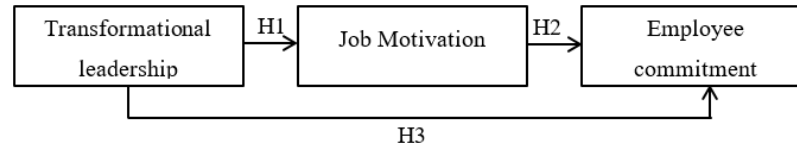
4. Research Methodology

4.1 Research Design

This study employed quantitative methods for data collection and data analysis.The data was collected from the employees of the selected logistics company in Thailand. This study uses regression analysis to explore the relationships between transformation leadership, job motivation, and employee commitment.

4.2 Population and Sample

The population of the current study are 500 employees of the selected logistics company at the headquarter in Bangkok, Thailand. The sample size of this study is based on Yamane (1967) at a confident level of 95% that require a minimum of 223 respondents. This research includes two hundred and twenty-seven (227) respondents. Among those, 55.5% of respondents (126 respondents) are male while 44.5% (101) are female. Majority of respondents (48%, 109 respondents) are between 25 and 30 years old. Most of their education qualification are bachelor's degree (60%, 135 respondents). Most of their job position (67%,152 respondents) are officer (25.6%, 58 respondents). Most of them (44.1%, 100 respondents) have been working for the selected company for 3 - 5 years.

Table 1 Respondent Characteristics

		Freq.	%			Freq.	%
Gender	Male	126	55.5	Job Position	Director	3	1.3
	Female	101	44.5		Manager	14	6.2
Age	25-30 years old	109	48		Officer	152	67
	31-35 years old	68	30		Senior/Supervisor	58	25.6
	36-40 years old	13	5.7	Working	11 -15 years	8	3.5
	41-45 years old	2	0.9	Experience	3-5 years	100	44.1
	< 25 years old	35	15.4		6-10 years	57	25.1
Education	Bachelor degree	135	59.5		< 3 years	58	25.6
	Doctoral Degree	2	0.9		> 15 years	4	1.8
	High School	62	27.3				
	Master degree	28	12.3				

4.3 Data Collection

Five hundred questionnaires were distributed to employee of the selected logistic company in Thailand in February 2022. The questions include demographic information such as gender, age, education qualification, job position level, working experience. The questions also include the focused variables in this study which are transformational leadership, job motivation, and employee commitment. The measurement items were measured on 5-point Likert scale (1 for Strongly Disagree and 5 for strongly Agree).

Measurement items

For *transformation leadership*, seven measurement items were developed by Carless and others (2000). Example of items are "My supervisor communicates a clear and positive vision of the future" and "My supervisor treats staff as individuals, supports and encourages their development" For *job motivation*, six measurement items were developed by Kuvaas and others (2017). Example of items are "The tasks that I do at work are themselves representing a driving power in my job." and "The tasks that I do at work are enjoyable". For *employee commitment*, six measurement items were adopted by Allen and Meyer (1990). Example of items are "I would be very happy to spend the rest of my career with this organization," and "I enjoy discussing my organization with people outside it."

Validity and Reliability Test

This study conducted confirmatory factor analysis using AMOS and found that the loadings of all measurement items for each construct and average variance extracted (AVE) are above 0.5 as shown in table 2 confirming validity (Fornell & Larcker, 1981). The model is fit with CMIN/DF of 3.563 which is less than 5.00 suggested acceptable fit (Wheaton and others,1977), while NFI (.944) and CFI (.959) are more than .90 confirming the fit. Cronbach's alpha and composite reliability (CR) are above .8 confirming reliability.

Table 2 Validity and Reliability

	Loadings	Cronbach' Alpha	CR	AVE	No. of Items
Job Motivation	.932 -.965	.983	.983	.906	6
Transformational leadership	.943-.965	.986	.986	.911	7
Employee Commitment	.952-.973	.987	.987	.925	6

4.4 Data Analysis

This study uses SPSS for regression analysis to explore the relationships between transformation leadership, job motivation, and employee commitment.

5. Research Findings

5.1 The effect of transformational leadership on job motivation

A linear regression of this study indicated that transformational leadership (β= .832) could statistically significantly predict job motivation at 95% confidence level as p-value of the model is less than .05, $F_{(1,225)}$

=1385.310, p=.000. Thus, hypothesis 1 is supported. Adjusted R-Square of the model is .860. Hence, transformational leadership accounted for 86% of the explained variability in job motivation.

5.2 The effect of job motivation on employee commitment

A linear regression of this study indicated that job motivation (β= .946) statistically significantly effect on employee commitment at 95% confidence level as p-value of the model is less than .05, F (1,225) =1882.940, p=.000. Thus, hypothesis 2 is supported. Adjusted R-Square of the model is .893. Hence, job motivation accounted for 89.30% of the explained variability in employee commitment

5.3 The effect of job motivation on employee commitment

A linear regression of this study indicated that transformational leadership (β= .834) could statistically significantly influence on employee commitment at 95% confidence level as p-value of the model is less than .05, F (1,225) =1404.18, p=.000. Thus, hypothesis 3 is supported. Adjusted R-Square of the model is .862. Hence, Transformational Leadership accounted for 86.2% of the explained variability in employee commitment. As shown in table 3, all three hypotheses are supported.

Table 3 Hypothese testing summary

Model	Independent Variables	Dependent Variable	P-Value	Adj. R^2	Std. β	Result
1	Transformational leadership	Job motivation	.000*	.860	.928	Supported
2	Job motivation	Employee Commitment	.000*	.893	.945	Supported
3	Transformational leadership	Employee Commitment	.000*	.862	.928	Supported

6. Conclusions and Discussions

This study confirmed the impact of transformational leadership on job motivation (β = .928). Transformational leadership enables leader to explain the meanings of challenges that have to face and motivate them. They motivate the followers for achieving optimum results. Leader tells followers about future affairs and also aware about the future goals and vision of organization that is actually commitment to goals (Ahmad and others 2014).

On the other hand, this study confirmed that job motivation has strong and positive impact on employee commitment (β = .945). For the sake of making employees satisfied and committed to their jobs, there is necessity for strong and effective motivation at different levels (Shaheen & Farooqi, 2014). Motivation is the set of processes which includes the push and pull forces and these forces gives the power to any action to accomplish certain goal. It is the collection of different factors which develops positive feelings and gives a positive attitude among the employees and these factors was related to task (Hussain and others, 2013).

Furthermore, this study also confirmed the impact of transformational leadership on the employee commitment (β = .928). Transformational leadership in its all behaviors is positively and significantly related to continuance commitment, normative commitment and affective commitment (Riaz and others, 2011).

7. Managerial Implications

The transformation leadership, job motivation and employee commitment are the key for the organization to reach their goal and mission. Transformation leadership lead to enhance of job motivation. Once employees are motivated to work, they will commit to their organization or job and attempt to satisfy the customer. In addition, the result from regression analysis revealed that job motivation (β = .945) has stronger direct impact on employee commitment (β = .928) than transformational leadership. The company should ensure that the job is meaningful and exciting to the employee to enhance employee motivation, thus, increase employee commitment. Furthermore, the supervisor must be highly competent and capable of instilling pride and respect in others as well as inspires the staff

8. References

Ahmad, F., Abbas, T., Latif, S., & Rasheed, A. (2014). Impact of transformational leadership on employee motivation in telecommunication sector. *Journal of Management Policies and Practices*, *2*(2), 11-25.

Allen, N. J., & Meyer, J. P. (1990). The measurement and antecedents of affective, continuance and normative commitment to the organization. *Journal of Occupational Psychology*, *63*(1), 1-18.

Bass, B. M. (1985). *Leadership and performance beyond expectations.* New York: Free Press

Bass, B. M. (2008). *The Bass handbook of leadership: Theory, research, & managerial applications* (4th ed.). New York, NY: Free Press.

Burns, J. M. (1978). *Leadership.* New York: Harper & Row.

Canrinus, E. T., Helms-Lorenz, M., Beijaard, D., Buitink, J., & Hofman, A. (2012). Self-efficacy, job satisfaction, motivation and commitment: Exploring the relationships between indicators of teachers' professional identity. *European Journal of Psychology of Education*, *27*(1), 115-132.

Díaz-Sáenz, H. R. (2011). Transformational leadership. *The SAGE handbook of leadership*, *5*(1), 299-310.

Dieleman, M., Cuong, P. V., & Martineau, T. (2003). Identifying factors for job motivation of rural health workers in North Viet Nam. *Human Resources for Health*, *1*(1), 1-10.

Dixit, V., & Bhati, M. (2012). A study about employee commitment and its impact on sustained productivity in Indian auto-component industry. *European Journal of Business and Social Sciences*, *1*(6), 34-51.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39-50.

Glynn, M. A., & DeJordy, R. (2010). Leadership through an organizational behavior lens: A look at the last half-century of research. In N. Nohria, & R. Khurana (Eds.), *Handbook of leadership and practice* (pp. 119-158). Boston, MA: Harvard Business Press.

Gopal, R., & Chowdhury, R. G. (2014). Leadership styles and employee motivation: An empirical investigation in a leading oil company in India. *International Journal of Research in Business Management*, *2*(5), 1-10.

Graeff, C. L. (1997). Evolution of situational leadership theory: A critical review. *The Leadership Quarterly*, *8*(2), 153-170.

Grint, K., & Holt, C. (2011). Leading questions: If 'Total Place','Big Society'and local leadership are the answers: What's the question?. *Leadership*, *7*(1), 85-98.

Habib, S., Aslam, S., Hussain, A., Yasmeen, S., & Ibrahim, M. (2014). The impact of organizational culture on job satisfaction, employee commitment and turn over intention. *Advances in Economics and Business*, *2*(6), 215-222.

Hussain, S., Rizwan, M., Nawaz, M. S., & Hameed, W. (2013). Impact of effective training program, job satisfaction and reward management system on the employee motivation with mediating role of employee commitment. *Journal of Public Administration and Governance*, *3*(3), 278-293.

Intelligence, M. (2019). *Thailand Freight & Logistics Market: Growth, Trends, and Forecast (2019-2024).* Retrieved January 10, 2022, from https://www.mordorintelligence.com/industry-reports/thailand-freight-and-logistics-market.

Ismail, A., Mohamed, H. A. B., Sulaiman, A. Z., Mohamad, M. H., & Yusuf, M. H. (2011). An empirical study of the relationship between transformational leadership, empowerment and organizational commitment. *Business and Economics Research Journal*, *2*(1), 89.

Jaw, B., and Liu, W. (2004). Promoting Organisational Learning and Self Renewal in Taiwanese Companies: The Role of HRM. *Human Resource Management*, *42*(3), 223 -241.

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review, 50*(4), 370–396.

Riaz, T., Akram, M. U., & Ijaz, H. (2011). Impact of transformational leadership style on affective employees' commitment: An empirical study of banking sector in Islamabad (Pakistan). *The Journal of Commerce*, *3*(1), 43.

Shaheen, A., & Farooqi, Y. A. (2014). Relationship among employee motivation, employee commitment, job involvement, employee engagement: A case study of University of Gujrat, Pakistan. *International Journal of Multidisciplinary Sciences and Engineering*, *5*(9), 12-18.

SELF-POTENTIAL DEVELOPMENT AND EFFICIENCY OF ACCOUNTANTS IN DIGITAL ECONOMIC ERA OF METAL PRODUCTS AND MACHINERY MANUFACTURING COMPANIES

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ABSTRACT

This research aimed to study the relationship between self- potential development and efficiency of accountants in digital economy era. The sample was 236 accountants from 143 metal products and machinery manufacturing companies in Amata City Industrial Estate in Chonburi province. The sample was calculated for an unknown sample of the population by using W.G.Cochram's formula with a reliability of 95% and an error of 5%. Questionnaire was applied to collect the data. The statistics used for analyzing the data were mean, standard deviation and multiple regression analysis. The result found the relationship between self- potential developments had a positive relationship with efficiency of accountants in digital economy era. In addition, four components of self- potential development that had positive relationship with the performance of accountants in the digital economy era with statistical significance were learning, information technology, communication and leadership. From the research result, business and organization should develop and encourage accountants to develop themselves continuously to be able to work in the digital era to present quality accounting information that can be used to make decisions for executives appropriately and timely. Furthermore, it can increase business efficiency.

Keywords: Self- Potential Development, Efficiency, Digital Economy Era

1. Introduction

Today, technology plays a huge role in society. It also influences business operations. Many businesses have introduced new technologies to help them increase efficiency in work processes and technology has changed

and developed rapidly (Rogers, 2003). Digital systems are increasingly adopted. However, for every business today, digital systems must be introduced for efficient operations. Operational efficiency is the key to show the level of success in managing activities within a business or organization to be competitive. One of factors leading to be success is quality accounting information that can be used to make decisions for executives appropriately and timely. The efficiency of business operations depends on the people in the organization which are running the business (Numprasert, 2015). The current economy has changed into the digital economy era, so the advancement of technology has resulted in a change in organizational structure and management. Therefore, accountants have expanded their roles from previous responsibilities to the roles that add more value to the organization. Accountants must have knowledge and understanding of the digital economy, organizational processes in the field of professionalism, law, information technology systems, digital technology and organizational readiness. This will require accountants to have more roles and qualifications in terms of participating in corporate strategic planning, applying various technologies to accounting, as well as analyzing and presenting information that contributes to executive decision (Klaysuban, 2018) Accountants who produce financial reports need to be developed and have expertise in finance, accounting, financial information system, technology and has knowledge and understanding of a wide range of industries. Accountants will gather knowledge from various disciplines and apply them together until they can create innovations that promote value, reduce costs or increase efficiency in the work process (Chairat, 2020). Professional accountants not only have knowledge and competence in their professional field but also need to have the ability to digital technology. They need to know how to use digital technology in their accounting operations for the best benefit for themselves and their organization (Laonumta and Aobthong, 2017). Professional accountants are important to be central in every organization. They have to enhance their work methods by combining professional competence with knowledge, communication skills and work efficiently (ACCA, 2016).

2. Research Objectives

To study the relationship between self- potential development and efficiency of accountants in digital economy era

3. Related Literature Review

3.1 The concept of digital economy

Tapscott (2009) claimed digital economy meant economy applying information technology in agriculture to business. It was the application of information technology in people's daily life to doing business to create added value especially in the small and medium sized businesses (SMEs). Tapscott also identified the internet will change the way we do business and live. Therefore, the world from now on needs to be ready for this change in terms of infrastructure, IT, rules, laws, efficient management as well as adjusting and adjusting people's attitudes.

Inthiso (2017) mentioned the digital economy is an economy formed by the use of information and communication technologies in various manufacturing sectors that would enable Thailand to increase efficiency and competitiveness. The new digital economy is different from the old digital economy. The difference was while the old digital economy was used of personal computers connected to the Internet, the new digital economy was applied of smart devices such as smartphones and tablets which would communicate via wireless broadband, causing widespread use of these devices even among those who have never used computers and the internet. This creates new business opportunities in almost every economic sector.

3.2 The concept of self-potential development

Thongpandee (2008) mentioned self-potential development meant promoting people to have knowledge and the ability to have better work skills as well as having a good working attitude which would result in better performance, and personal development should be promoted and develop physically, emotionally, socially and intellectually. Therefore, it can be concluded that the development of self-potential means the development by continually increasing knowledge, competence, professional skills and experience from the educational process, training or other processes to achieve work goals and living. The components of accountant's self-development include 5 aspects: 1. Learning is the primary process by which a person acquires competence, including knowledge, values, ethics and professional attitudes. 2. Communication is important. The form of communication of information changes over time, so education on information communication is essential. 3. Thinking is the basic skill of managing thought systems or the ability to think, plan or anticipate in order to achieve goals. 4. Information technology is the application of scientific knowledge that is true about nature and the environment to bring benefits. Technology is therefore a method to increase the value of things to be more useful. 5. Leadership is a person who has the ability to command another person by being recognized and praised by others with the trust and cooperation of others (Yawirat, 2010).

3.3 The concept of efficiency

Thongnoot (2019) efficiency meant the process, method or action leading to success by using various resources including natural resources, labor, capital, and the highest quality methods of operation or entrepreneurship to operate to their full potential. However, it depended on the resource at that time of quality and quantity. If it had high quality, it needed to be used in small quantities to be effective. On the other hand, a resource with a large quantity but low quality must choose how to maximize its potential. Therefore, it can be concluded that efficiency refers to the performance of any activity or project with the most cost-effective use of administrative resources and the least amount of resource utilization. After all, goals and work methods will determine what performance is appropriate for the organization. However, smaller companies may not have enough resources to measure results. For example, employees may have a lot of work that they do not have time to enter information or the company may not have a budget to buy an internal system that can link all departments together. Each organization has to find a point of equilibrium between measuring performance and effectiveness in its own specific way.

4. Research Methodology

4.1 Population and sample

1) Population in the study was accountants from 143 metal products and machinery manufacturing companies in Amata City Industrial Estate which is the largest number of industrial estates in the industry in Chonburi province (Industrial Estate Authority of Thailand, 2020).
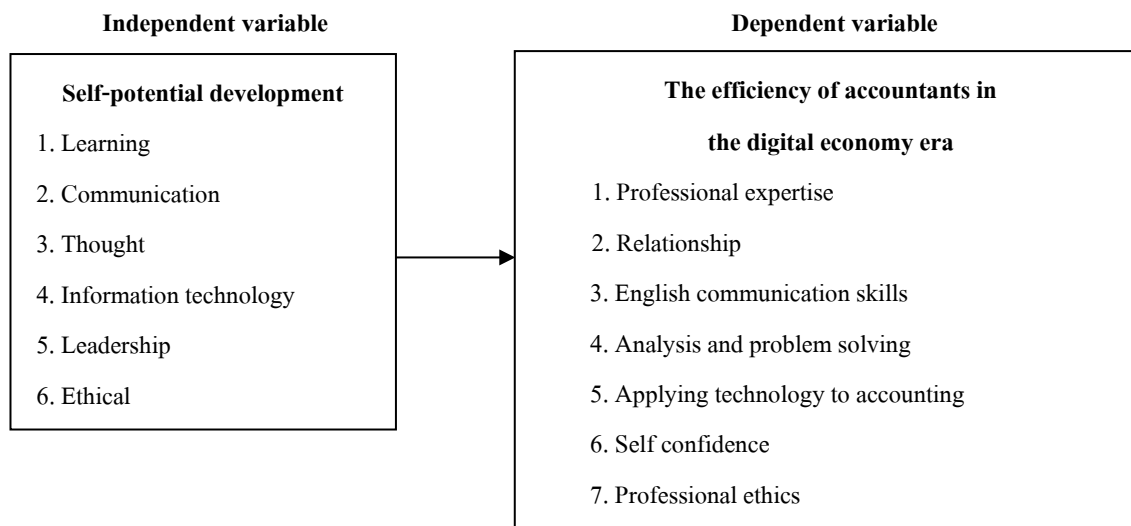
2) The sample in this study was 236 accountants in Amata City Industrial Estate in Chonburi province by applied W.G.Cochran formula to find common proportions with the confidence level 95% and error 5%.

4.2 Research hypothesis

H0 : The development of one's potential is related to the efficiency of accountants in the profession of accountants in the digital economy era.

H1: Self-development has no relationship with the efficiency of accountants in the profession of accountants in the digital economy era.

4.3 Conceptual framework

Independent variable	Dependent variable
Self-potential development 1. Learning 2. Communication 3. Thought 4. Information technology 5. Leadership 6. Ethical	**The efficiency of accountants in the digital economy era** 1. Professional expertise 2. Relationship 3. English communication skills 4. Analysis and problem solving 5. Applying technology to accounting 6. Self confidence 7. Professional ethics

4.4 Research instruments

The research applied a questionnaire for collecting the data. There were 177 from 236 questionnaires were answered (75%). The questionnaire contained the following information:

1. Opinions on self-improvement of efficiency in the digital economy era (Rating Scale) which consisted of learning, communication, attitude, information technology and leadership

2. Opinions on the efficiency of accountants in the digital economy era (Rating Scale) consisting of professional expertise, relationship, English communication skills, analysis and problem solving, applying technology to accounting, self-confidence and professional ethics To determine the score for the answers to the questionnaire (Srisaart, 2002) as followed:

Excellent = 5   Very good = 4   Good = 3   Weak = 2   Poor = 1

4.5 Statistics used in data analysis

The data was analyzed by computer program as followed:

1. To analyze the opinions on the self-development of accountants in the digital economy era and opinions on the efficiency of accountants in the digital economy era used descriptive statistics such as mean and standard deviation. The criterion for interpretation of mean by Srisaart was applied. The mean criteria involved Excellent (4.51 – 5.00), Very good (3.51 – 4.50), Good (2.51 – 3.50), Weak (1.51 – 2.50) and Poor (0.51 – 1.50).

2. To test the hypothesis about the relationship between self-development and the efficiency of accountants in the digital economy used multiple regression analysis with F-distribution and t-distribution.

5. Research Findings

Table 1 Result of the study in opinions on self-development of accountants' efficiency in the digital economy era

self-development of accountants' efficiency in the digital economy era	$\overline{\text{X}}$	S.D.	Level of opinion
1. Learning	4.16	0.75	Very good
2. Communication	4.10	0.88	Very good
3. Thought	4.06	0.78	Very good
4. Information technology	4.19	0.77	Very good
5. Leadership	4.24	0.83	Very good
Total	**4.15**	**0.80**	Very good

From table1, the overall of opinions on self-development of accountants in the digital economy age of learning is very good (mean = 4.15 and S.D. = 0.80). The top 3 of highest opinion are leadership (mean = 4.24 and S.D. = 0.83), information technology (mean = 4.19 and S.D. = 0.77) and learning (mean = 4.16 and S.D. = 0.75) respectively.

Table 2 Result of a study of opinions on the efficiency of accountants in the digital economy era

the efficiency of accountants in the digital economy era	$\overline{\text{X}}$	S.D.	Level of opinion
1. Professional expertise	4.15	0.85	Very good
2. Relationship	4.10	0.88	Very good
3. English communication skills	3.76	0.80	Very good
4. Analysis and problem solving	4.20	0.81	Very good
5. Applying technology to accounting	4.17	0.76	Very good
6. Self-confidence	4.22	0.77	Very good
7. Professional ethics	4.26	0.67	Very good
Total	**4.13**	**0.80**	**Very good**

Table 2 shows that the overall of opinions on the efficiency of accountants in the digital economy era is very good (mean = 4.13 and S.D. = 0.80). The top 3 of highest opinion are professional ethics (mean = 4.26 and S.D. = 0.67), self-confidence (mean = 4.22 and S.D. = 0.77) and analysis and problem solving (mean = 4.20 and S.D. = 0.81) respectively.

Table 3 Result of multiple regression analysis in self- potential development using the dependent variable as efficiency (Professional expertise)

Variable	Standardized Coefficients Beta	t-value	P-value
1. Learning	0.589	8.625	0.000**
2. Communication	-0.217	-2.269	0.015*
3. Thought	0.230	3.423	0.001**
4. Information technology	0.359	4.444	0.000**
5. Leadership	0.024	0.302	0.763

n=177, R=0.901, Adjusted R^2 =0.807, SE_{est}=0.180, F=147.201

*P<0.05, **P<0.01

Table 3 reveals R^2 = 0.807. This means it can be use (80.70%). Self-potential developments such as learning, thought, and information technology are positively statistically significant correlation with the professional competence of accountants in the digital economy. Moreover, self-potential development in leadership aspect aren't correlated statistically significant with professional competence of accountants in the digital economy.

Table 4 Result of multiple regression analysis in self- potential development using the dependent variable as efficiency (Relationship)

Variable	Standardized Coefficients Beta	t-value	P-value
1. Learning	0.053	0.715	0.475
2. Communication	0.306	3.186	0.002**
3. Thought	0.431	5.873	0.000**
4. Information technology	0.110	1.235	0.218
5. Leadership	0.045	0.517	0.606

n=177, R=0.878, Adjusted R^2 =0.765, SE_{est}=0.206, F=115.395

*P<0.05, **P<0.01

Table 4 reveals $R^2 = 0.765$. This means it can be use (76.50%). Self-potential developments such as communication and thought have a positively statistically significant correlation with the efficiency of relationship of accountants in the digital economy era. Furthermore, self-potential development in learning, information technology and leadership aren't correlated statistically significant with relationship aspect.

Table 5 Result of multiple regression analysis in self- potential development using the dependent variable as efficiency (English communication skills)

Variable	Standardized Coefficients Beta	t-value	P-value
1. Learning	0.271	2.503	0.013*
2. Communication	-0.238	-1.714	0.088
3. Thought	0.374	3.521	0.001**
4. Information technology	0.207	1.609	0.109
5. Leadership	0.181	1.448	0.149

n=177, R=0.721, Adjusted R^2 =0.520, SE_{est}=0.272, F=37.088

*P<0.05, **P<0.01

Table 5 reveals $R^2 = 0.520$. This means it can be use (52.00%). Self-potential developments such as learning and attitude have a positively statistically significant correlation with the efficiency of English communication skills. Also, self-potential development in communication, thought, information technology and leadership aren't correlated statistically significant with the aspect of English communication skills.

Table 6 Result of multiple regression analysis in self- potential development using the dependent variable as efficiency (Analysis and problem solving)

Variable	Standardized Coefficients Beta	t-value	P-value
1. Learning	0.234	3.110	0.002**
2. Communication	0.045	0.470	0.639
3. Thought	0.196	2.645	0.009**
4. Information technology	0.173	1.933	0.055
5. Leadership	0.321	3.679	0.000**

n=177, R=0.876, Adjusted R^2 =0.761, SE_{est}=0.192, F=112.843

*P<0.05, **P<0.01

Table 6 reveals $R^2 = 0.761$. This means it can be use (76.10%). Self-potential developments such as learning, thought and leadership have a positively statistically significant correlation with the efficiency of analysis and problem solving. Besides, self-potential development in communication and information technology has no statistically significant correlation with the aspect of analysis and problem solving.

Table 7 Result of multiple regression analysis in self- potential development using the dependent variable as efficiency (Applying technology to accounting)

Variable	Standardized Coefficients Beta	t-value	P-value
1. Learning	0.395	5.183	0.000**
2. Communication	-0.580	-0.596	0.552
3. Thought	0.082	1.094	0.276
4. Information technology	0.465	5.134	0.000**
5. Leadership	0.066	0.751	0.454

n=177, R=0.873, Adjusted R^2 =0.755, SE_{est}=0.182, F=109.518

*P<0.05, **P<0.01

Table 7 reveals R^2 = 0.755. This means it can be use (75.50%). Self-potential developments such as learning and Information technology have a positively statistically significant correlation with the efficiency of analysis and problem solving. Also, self-potential development in communication, thought and leadership has no statistically significant correlation with the aspect of analysis and problem solving.

Table 8 Result of multiple regression analysis in self- potential development using the dependent variable as efficiency (Self-confidence)

Variable	Standardized Coefficients Beta	t-value	P-value
1. Learning	0.181	2.075	0.040*
2. Communication	0.257	2.292	0.023*
3. Thought	0.063	0.735	0.463
4. Information technology	0.375	3.620	0.000**
5. Leadership	0.031	0.303	0.762

n=177, R=0.830, Adjusted R^2 =0.680, SE_{est}=0.209, F=75.790

*P<0.05, **P<0.01

Table 8 reveals R^2 = 0.680. This means it can be use (68.00%). Self-potential developments such as learning, communication and information technology have a positively statistically significant correlation with the efficiency of analysis and problem solving. Furthermore, self-potential development in thought and leadership has no statistically significant correlation with the aspect of analysis and problem solving.

Table 9 Result of multiple regression analysis in self- potential development using the dependent variable as efficiency (Professional ethics).

Variable	Standardized Coefficients Beta	t-value	P-value.
1. Learning	-0.099	-1.206	0.229
2. Communication	0.262	2.480	0.014*
3. Thought	0.171	2.122	0.035*
4. Information technology	0.528	5.427	0.000**
5. Leadership	0.045	0.470	0.639

n=177, R=0.852, Adjusted R^2=0.717, SE_{est}=0.172, F=90.226

*$P<0.05$, **$P<0.01$

Table 9 reveals R^2 = 0.717. This means it can be use (71.70%). The hypothesis test can be summarized as follows:

Self-potential developments such as communication, thought and information technology have a positively statistically significant correlation with the efficiency of analysis and problem solving. Additionally, self-potential development in learning and leadership has no statistically significant correlation with the aspect of analysis and problem solving.

6. Discussion

The study of self- potential development and efficiency of accountants in digital economy era of metal products and machinery manufacturing companies indicated that the relationship between self- potential development and efficiency of accountants in digital economy era consists with Srichai (2018) who mentioned that the relationship between self- potential development and profession of accountants in the digital economy era should continually improve knowledge and other abilities. Also, accountants should be enhanced technology skill in their work basing on professional ethics.

1. Self- potential developments and efficiency of accountants in digital economy era in leadership, information technology and learning was consistent with research of Srichai (2018) who recommended that the relationship between self- potential development and profession of accountants in the digital economy era focused on decision-making in the process of performing tasks leading to improve continuously of the work quality of leadership. In addition, In addition, the importance of using information technology in communication was convenience, quickness, and timeliness.

2. The relationship between self- potential developments had a positive relationship with efficiency of accountants in digital economy era in learning, information technology, communication and leadership was consistent with Kueket (2020) who mentioned professional accountants in digital economy era had statistically significant factors that correlated with the performance of a partnership limited business. These factors were

information technology knowledge, ability to analyze financial data, accountant's unique skills and ethics for accountants.

7. Recommendations

Recommendations for applying the results

1. Professional accountants should apply information technology to use in communication, data analysis and should study information related to the accounting profession continuously in order to work with efficiency, quality and accuracy.

2. Professional accountants should be aware and develop themselves in learning professional accountants in leadership and thinking in order to obtain effective accounting information for decision making of business operators.

3. Accountants should participate in professional accounting learning activities for continuous professional skill development and effective practice quality.

Recommendations for further studies

1) Other elements or variables related to the development of accountants' potential and efficiency in the digital economy should be explored more, such as performance quality or performance effectiveness.

2) Data should be collected in addition to in-depth interviews with questionnaires to obtain useful information for greater accuracy.

8. References

Amata City Industrial Estate in Chonburi province. (2020). *List of metal products and machinery industries.* https://view.officeapps.live.com

Chairat, R. (2020). *The role of an accountant in the future from accountant to accountant innovator.* https://www.tfac.or.th/Article/Detail/126212

Federation of accounting professions. (2020). *Executive Accountant in the Digital Era.* https://www.tfac.or.th/Article/Detail/126283

Inthasor, B. (2009). The Relationship between Self – Development and Professionalism of Certified Public Accountants in Thailand. *Journal of management Science and accounting*, *1*(1), 102-116. https://so02.tci-thaijo.org/index.php/mbs/article/view/235833/161970

Klaysuban, N. (2018). *Qualifications of desirable accountant of enterprises in the digital era.* [Unpublished material dissertation]. Rajamangala University of Technology Thanyaburi.

Kueket, P. & Promtem, P. Phaiboonvessawat, W. (2020). The relationship between professional digital accountants and performance efficiency of limited partnership in Yala province. *Journal of management Science and accounting*, *12*(1), 153-166.

Laonamtha, U. & Aobthong, N. (2017). Computerized accounting system capability and accounting information advantage of electronics parts businesses in Thailand. *Journal of Management Walailak University, 6*(3), 17-31.

Laonamtha, U. (2019). *Accountant's digital technological capabilities.* https://www.dst.co.th/index.php?option=com_content&view=article&id=3613:ability-digital-technology-accountant&catid=29&Itemid=180&lang=en

Numprasert, S. (2015). *Knowledge management.* Se-education.

Rogers, M. Everett. (2003) Diffusion of Innovations (5th ed.) London: Simon &Schuster.

Srichai, A. (2018). *Relationship between self-development potential and professional skills of accountants in the digital economy era*. [Unpublished material dissertation]. Sripatum University.

Srisaart, B. (2002). *Statistical Methods for Research*. (5th ed). Suveeriyasart.

The Association of chartered certified accountants. (2016). *Professional accountants–the future.* https:// www.nba.nl/globalassets/projecten/visie/professional-accountants---the-future.pdf.

The comptroller general's department. (2019). *Digital Economy*. https://www.cgd.go.th

Thongnoot, S. (2019). The development of participative management system to effective promotion high school cluster. *Journal of education and social development, 5*(2), 1-9.

Thongpandee, S. (2008). *Study of Self-Development Need to Increase Quality of Service, Case Study: Airline Flight Attendants.* [Unpublished material dissertation]. Ramkhamhaeng University.

Yawirat, N. (2010). *Modern management.* (7th ed). Tripple group.

IMPROVING SUPPLY CHAIN MANAGEMENT SUSTAINABILITY WITH THE EMERGING E-COMMERCE LOGISTICS TECHNOLOGY

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ABSTRACT

Due to the convenience and popularity of online shopping, e-commerce is crucial to consumers' daily purchasing habits. Effective logistics are needed to move more products to specific clients and run a profitable e-commerce business. Effective transportation will be facilitated by the development of e-commerce logistics operations, which is possible thanks to cloud computing. The objective of this study was to review cloud computing technology can develop e-commerce logistics in supply chain management (SCM) for sustainability. An optimal cloud computing platform serves the e-commerce logistics process of SCM, which greatly increased effective usability, and finally, it supports the efficient transportation of e-commerce

Keywords: Cloud Computing, Logistic, E-Commerce, Supply Chain Management

1. Introduction

Businesses must constantly evolve, use technology, and logistics and supply chain management to optimize their business to compete or stay ahead of competitors for sustainable growth (Patt, 2020). The development of E-commerce affects the success of supply chain management, which developed the economy and emerging economies (Gyenge et al., 2021; Yu et al., 2017). The logistics process is a part that can help supply chain management in E-commerce.

The value of B2C e-commerce in 2021 remains the highest for the third year in a row, with a value of 2.03 trillion baht (50.59%) (ETDA, 2022). Higher E-Commerce sales, which also means the volume of goods being transported increases accordingly. Logistics business grows by 34.1%, which compared to the previous year. The value of foreign investment in logistics business is 48,743.73 million baht or 10.2% of the investment.

It is expected to be a result of the expansion of e-commerce both domestically and internationally (TPSO, 2022). The growth of e-commerce has resulted in massive capital gains to drive the country's business. This situation directly affects the logistic business, which has to adjust heavily to cope with the expansion that has occurred (ETDA, 2022). E-commerce goods are transported to individual customers, causing multiple shipments to be doubled. Therefore, the increase in the number of goods deliveries, resulting in traffic congestion. Urban traffic is unsustainable (Mwamba et al., 2021; Amling, and Daugherty, 2018, p.323). E-commerce logistics are unique to Thailand and must be managed by a qualified specialist.

The one of technologies for supporting e-commerce logistics sustainability in the future is Cloud Computing (Yu et al., 2017). It is approximately 37 percent of all generated data in the enterprise uses complex storage on cloud space, from the market forecasts in 2020 (Penthin, and Dillman, 2015). Gartner forecasts, the global cloud technology market is likely to grow by 54.5% between now and 2022 (Martin, and Monnier, 2020). Cloud computing helps to create better decision-making strategies (Maelah et al., 2021). Cloud computing brings a competitive advantage to the logistics system. As a result, entrepreneurs can adjust business strategies according to real-time consumer needs. This includes insight into customer behavior (Swaminathan, 2020).

The development of logistics processes using e-commerce will facilitate cross-border transportation. This will help reduce traffic congestion due to the disruption of transportation. Providing extensive connectivity support and promoting logistics and application availability will lead to sustainable performance. This study will identify how cloud computing technology to develop e-commerce logistics in supply chain management for sustainability.

2. Objective

To review how cloud computing technology to develop e-commerce logistics in supply chain management for sustainability.

3. Literature review

3.1 E-commerce Logistics in Supply Chain Management

The concept of supply chain management has been developed from the expansion of industrial production volumes. The obvious advantage and suggested benefit of using supply chain management is that it can improve the rate of on-time delivery more efficiently, increased productivity, increased asset turnover efficiency, order execution, faster inventory purchases, improved cash to cash cycle times, and improved total cost of procurement (John Katz, 2006). Supply chain management encompasses all operational activities, processing from raw materials to final goods, procurement through parts production, and final process for distribution to the destination market, and includes material management and storage/logistic activities. Logistics involves transportation and materials storage, including inbound and outbound processes to and from the warehouse, internal and external material management, transportation operations, service delivery, and data transmission in the procurement process. Proper logistics implementation depends on planning, purchasing, production scheduling, packaging, and consumer service (Zijm et al., 2019).

E-commerce is defining the use of electronic communications and digital data processing technologies in commercial transactions, data exchange, or other services. E-commerce transactions include sell-side or buy-side between business or business to customers and manage other issues. E-commerce relates changes and new relationships that create online value for businesses (Chaffey et al., 2019). E-commerce involves online transportation, online order, online market, and online payment system (Amiruddin, and Romdhony, 2020).

E-commerce logistics in supply chain management covers the complete electronic transaction process. To achieve business cooperation, leveraging information technology, information flow management, logistics, and capital flows in all areas through e-commerce platforms (Wang et al., 2019).

The main thing is to use warehouses and distribution centers to adapt to online ordering, customer service, logistics, as well as using IT systems throughout the process. Delivery of all orders for picking, receiving, shipping, and handling of returns. There are specific requirements for users to make transactions through the e-commerce platform. At a higher level than the typical customer, they pay attention to the components associated with the transaction service. (Wang et al., 2019) The measurement of consumer satisfaction is the service quality of e-commerce. The new challenges of e-commerce include consumer logistics services and consumer demand. The increase in customer demand and perception leads to new forms and ways to reach customers (Zijm et al., 2019). Nowadays, selling online, in the same way, doesn't appeal to customers' needs anymore.

The characteristics of E-commerce logistics in supply chain management including: 1) First of all, manufacturers are responsible for producing and publish product sales data directly over the internet for sale to consumers (Wang et al., 2019). 2) Consumers' use of online shopping services enables the business to know the needs of the market (Ashraf et al., 2016). 3) E-commerce platforms have reduced the number of stakeholders in the supply chain (Zhou et al., 2018). And 4) The application of technology in logistics was used in material management and inventory, distribution, transportation, and workflows. (Pagano, and Liotine, 2019, p.7)

3.2 Cloud computing in the Logistics process of Supply Chain Management in E-Commerce

Cloud computing for e-commerce logistics has a significant impact on supply chain management because the implementation of cloud computing will enable the business to continue to grow. E-commerce cloud computing helps to manage information sharing and transportation in the supply chain (Tiwari, and Jain, 2013, p.152). Cloud computing for e-commerce logistics in supply chain management covers transport management systems, warehouse management systems, purchasing management systems, supply chain planning, customer service, and business intelligence (Bhoir, and Principal, 2014, pp.4-5). Cloud computing for e-commerce logistics in supply chain management solves a number of problems and offers the benefits the following:

3.2.1 Transportation management systems: Cloud computing technology is an important part of the advancement of smart logistic systems. It manages services innovation in the country with an administration strategy and built smart executive networks that stimulate effective collaboration. It is used in providing and support ubiquitous and real-time connections. Large data route maps rely on cloud computing to make urban traffic and transportation smarter with digging and model displays (Wang, and Li, 2016, p.4). The researchers reviewed the risk factors and solutions of cloud computing technology. It focuses on the various methods that

maintain the security and privacy of such systems (Sahmim, and Gharsellaoui, 2017, p.1516) Improvements in the security of cloud-based smart transport have resulted in a 29% increase in computational speeds, especially while securing data (Lidkea et al., 2019)

3.2.2 Warehouse management systems: Barcode technology and wireless services have been adopted by many organizations for the improvement of warehouse management. The interoperability of central cloud-based information management systems and RFID systems enables the identification and tracking of items in the global supply chain management cycle (Tiwari, and Jain, 2013, p.154). Large organizations agree to the implementation of SaaS in warehouse management and manufacturing applications at a lower rate. In the enterprise supply chain management application, such as global commerce management system and logistics management system is the leading. It has a higher adoption rate, especially for large organizations with complex needs (Bhoir, and Principal, 2014, p.5). The demand for direct transport from distribution centers to customers is greater, which has a significant impact on warehouse management. Cloud computing improves the flexibility and acceptability of traditional selection and delivery operations. In addition, it can work with multiple organizations' Enterprise Resource Planning (ERP) systems (Pagano & Liotine, 2019, p.30).

3.2.3 Procurement management systems: Cloud computing is used in high-rate procurement processes, especially applications used for procurement and supply of indirect materials or plant materials with higher cloud computing usage rates. Cloud computing is truly collaborative and can be accessed. Companies that deal with multiple suppliers and companies that have to manage contracts together on a regular basis can benefit greatly. Cloud collaborative work is conducive to the development of multi-vendor. Online procurement and purchasing capabilities are rapidly increasing, such as purchasing reports, database center integration, and future vision of the supply chain (Bhoir, and Principal, 2014, p.5). The database platform based on cloud computing consists of multiple data from suppliers that provide different services and benefits in the list. The company has the opportunity to choose suppliers who can negotiate the appropriate supply in accordance with the requirements and within the time limit. They can develop contracts together and improve contract management using cloud computing tools. (Tiwari, and Jain, 2013, p.153)

3.2.4 Collaborative sourcing: Cloud computing will lead to a new kind of collaborative work. The cloud computing utilization rate in supply chain management for collaborative sourcing is higher than in the past. The usages of cloud computing technology for the supply chain is a collaborative provision with multiple bids from a centralized cloud server platform (Al-jawazneh, 2016, pp.145-158). Cloud computing improves the service level of the business by collaborating with network partners (suppliers, distributors, and retailers), who important in anticipating needs. The benefits of a cloud computing platform for all supply chain stockholders include more accurate demand analysis and forecasting. It receives data from the internet and performs basic operations. This will help understand the needs of fluctuating affiliate partners and make it easily manageable (Tiwari & Jain, 2013, p.154).

3.2.5 Supply chain planning: Commercial businesses use ERP applications widely in supply chain management, including planning, allocation, forecasting, and fulfillment capabilities. Customers can call

the manufacturer's services. Rather, take advantage of the best planning/forecasting application of other stakeholders over the internet (Bhoir, and Principal, 2014, p.5). The data saving in cloud computing includes shipment and status information of orders, which can be used to observe supplier data flow and logistics providers. In case of disruption, an alert will be circulated. The system can help build certain brands of suppliers or service providers by sharing notifications over time. Thus, firms manage their risks better (Pagano & Liotine, 2019. p.13).

3.2.6 Customer services: Customer satisfaction influences the profitability of two-way cloud service providers. The first view is an important point that affect consumer satisfaction, namely that cloud configuration affects service quality. Second view consumer satisfaction affects the arrival request rate of cloud providers. This procedure includes SaaS for the consumer platform of supply chain management. (Eg computers, laptops, or smartphones) consumer behavior, customer feedback, customer needs, service level agreement, specific information, rental rate, and personal interaction (Jing Mei, and Kenli Li, 2017, p.17).

3.2.7 Business Intelligence and Analytics: Intelligent business systems and analysis, comprehensive logical data management, reporting, and technology development for between unlike companies or several departments of the same company. The entire development procedure is shared through a safety network between other companies. In addition, the development of Internet communication technology is gradually towards success, security, and stability. The compatibility is constantly improved and all applications are constantly expanding, becoming a universal form of transmission. (Tiwari, and Jain, 2013, p.154). One online retailer's revenue problem is due to warnings of unreliable real-time service issue alerts within a cloud-based e-commerce platform. The solution to this problem is to use SaaS called Alacer. It is a cloud monitoring system using big data algorithms that can provide responsive and proactive alerts. The result reduces the response time to an event from one hour to a second. This gives customers greatly increased satisfaction and eliminates service level agreement penalties (Hashem et al., 2015).

Cloud computing technology used to develop e-commerce logistics in supply chain management for sustainable following as decentralized production environments, order management, transportation system, consumer buying platforms, social media contents, goods lifecycle productions, and source of data developed with technology. As an example of IaaS: radio frequency-based identification (RFID) tracking, global positioning systems (GPS), surveillance videos, mobile devices, (Govindan et al., 2018), and an example of SaaS: iCloud (services by Apple), Azure (services by Microsoft), EBS (services by Amazon), and others (Ding et al., 2017). Cloud computing data centers are available for companies to access data. The complete data update covers the entire supply chain. The technology can track the history of suppliers and buyers, as well as provide financial reliability reports for better risk assessment (Pagano, and Liotine, 2019. p.13).

Cloud computing is used in e-commerce logistics to improve the sustainability of supply chain management in various operational processes ranging from procurement, inventory management, warehousing: 1)receiving 2)put-away 3)packing 4)checking and packing, scheduling, shipping, distribution, purchase, order fulfilment, order query and tracking, transportation / delivery management, and customer service.

3.3 Relate previous research studies

Previous research studies on cloud computing adoption of e-commerce theory used in e-commerce logistics to enhance sustainability of SCM have been various results and benefits. The final model includes organizational, technological, managerial, and environmental variables that affect e-commerce adoption in SMEs in less developed countries (Miao & Tran, 2013). The research model was too narrow since it ignores important factors like security, which are essential for promoting the use of cloud computing. Perceived security and safety, cost, trust, the regulatory environment, and energy efficiency are the new elements that have been added to the list of criteria that have already been supplied. The various elements from the four key domains of individual, organization, technology, and environmental influences on adoption and spread of technological innovations (Alkawsi, et al. 2015). The issues have been identified: the infrastructure, security, stakeholders' support, regulatory framework, user acceptance and business size/types themes are particularly relevant to Indonesia. The fact that certain companies among e-commerce adopters within the same operating environment have implemented e-commerce at a more advanced level while others have not helped us to partially explain an existing fact (Budiono, et al. 2018).

Perceived Technological Support: perceived benefits and perceived challenges, the main benefits of using cloud computing can help lower operators' procurement and purchasing costs (Bhoir, and Principal, 2014, p.5). Perceived benefits of e-commerce help business to improve management issues, competitive advantages, and its appearance in the working environment. The assessment of obstacles to implementing and institutionalizing e-commerce, such as security, standards, and cost, is referred to as perceived challenges (Miao & Tran, 2013).

Perceived Organizational Support, includes resources, commitments, governance, managers' IT ability & perception, and top managers' leadership style. Resources refer to business resources, human resources, technological resources, and information resources (Tran, et al., 2012; Tran & Huang, 2014). Commitments include a clear-cut e-commerce vision & strategy championed by top management, e-commerce leadership and organization wide support of e-commerce ideas & projects. Governance refers to the strategic, tactical, and operational model. Managers' IT ability & perception refer to perception of environment, perception of business, perception of e-procurement, IT & change management ability. Top managers' leadership style includes risk-taking leadership style, IT-oriented leadership style, and strategic-oriented leadership style (Miao & Tran, 2013; Alkawsi, et al. 2015).

Perceived Environmental Support, includes government support (a strong strategic commitment: a comprehensive vision, clear-cut actions plans, and incentive policies), market forces support (facilitating the market demand), related industries infrastructure supports (legal issues, standards, security), and social-economic & knowledge infrastructure's supports (available to share, develop, improve, manage the community's knowledge of innovation; and awareness, positive attitudes towards e-commerce) (Miao & Tran, 2013).

Perceived Security and Safety, such as data integrity, payment, and privacy of sensitive information. There are high level security concerns in the cloud computing model (Sahmim, & Gharsellaoui, 2017, p.1519).

Intelligent E-commerce logistics platform helps in keeping detailed information about the procurment. It can browse through online stores for product sales information, purchase products, reviews and online payments. This impact to customer satisfaction (Barenji, et al, 2019). The entrepreneur can display the order on the page, count the order information, or add, modify or delete order information (Cui, and Xie, 2020).

Perceived Cost refer budget for cloud computing of e-commerce logistics. Smart global logistic which effect on times, security, and costs. Lead time reduction and cost reduction, with the higher goods security level and a real-time data sharing policy. The use of smart technology easy-to-use for the teams to have instant access to all their SaaS, software to analyze and edit encoded data reduced many waste activities. Process from pick-up to delivery, downtimes, streamlining borders controls, accurate zones split and a strict pick-up time windows from factories, and VAT procedures (Frontoni, et al., 2020)

Perceived Energy Efficiency, E-commerce logistics orders offer processing very efficiently, reducing in the order processing time and traveling distance. Cloud computing related warehouse postponement into intelligent system for re-engineering the e-order fulfillment pre-processing system, by incorporating the genetic algorithm approach for e-commerce order grouping decision support (Leung et al., 2018).

The papers under consideration provide theoretical knowledge and information related to the adoption of cloud computing of e-commerce logistics to enhance sustainability of SCM. The Technology, Organization, and Environment framework was used in the most of investigations.

4. Conclusion

This study reviews the literature on cloud computing studies the logistics process for e-commerce. The researchers reviewed papers in relevant classification to identify important advances and focused on sustainable supply chain management. An increasing amount of shipments require cloud computing tools to organize their logistics processes. Cloud computing technologies in e-commerce logistics improve sustainability in supply chain management: It brings insights to create better decision-making strategies and to adapt strategies to response consumer needs. Sharing information in an intelligent transport management system. Identify and track items in warehouse management systems in the global supply chain. Distributing data from the center of the intelligent transportation management system. Access to the supplier's network partner information on conditionally appropriate procurement systems within the specified time. Analysis and forecasting of demand accurate collaborative sourcing. Configuring the real-time event notification system, flowing information in supply chain planning, quality and customer service complaint handing, which are things that deserve attention. Proactive and interactive in data analytics and update information regularly. It helps to increase speed, reduce time, safety, resulting in higher levels of customer satisfaction. Academics and industry practitioners can gain momentum to transform supply chain management with the help of cloud computing. The Technology, Organization, and Environment framework was used in the most of studies. The new components include perceived safety and security, cost, trust, the regulatory environment, and energy efficiency. This review paper can be useful to academics and cloud computing practitioners in the logistics process of supply chain management in e-commerce.

A future study will implement data collection from entrepreneur of SMEs using indebt-interview with using a qualitative methodology for the emerging e-commerce logistics technology in improving SCM sustainability.

5. References

Al-jawazneh, B. E. (2016). The prospects of cloud computing in supply chain management (A theoretical perspective). *Journal of Management Research*, *8*(4), 145.

Alkawsi, G. A., Mahmood, A. K., & Baashar, Y. M. (2015, May). Factors influencing the adoption of cloud computing in SME: A systematic review. In *2015 International Symposium on Mathematical Sciences and Computing Research (iSMSC)* (pp. 220-225). IEEE.

Amiruddin, B. P., & Romdhony, D. R. (2020). *A study on application of automation technology in logistics and its effect on e-Commerce.*

Amling, A., & Daugherty, P. J. (2018). Logistics and distribution innovation in China. *International Journal of Physical Distribution & Logistics Management*, *50*(3), 323-332.

Ashraf, A.R., Thongpapanl, N., Spyropoulou, S., (2016). The connection and disconnection between e-commerce businesses and their customers: exploring the role of engagement, perceived usefulness, and perceived ease-of-use. Electron. Commer. Res. Appl, 20, 69–86.

Barenji, A. V., Wang, W., Li, Z., & Guerra-Zubiaga, D. A. (2019). Intelligent e-Commerce logistics platform using hybrid agent based approach. *Transportation Research Part E: Logistics and Transportation Review*, *126*, 15-31.

Bhoir, H., & Principal, P. R. (2014). Cloud Computing For Supply Chain Management. *International Journal of Innovations in Engineering and Technology (IJIET)*, *1*(2), Dec-2014

Budiono, F., Lau, S., & Tibben, W. (2018). Cloud computing adoption for e-commerce in developing countries: contributing factors and its implication for Indonesia.

Chaffey, D., Hemphill, T., & Edmundson-B., D. (2019). *Digital Business and E-commerce Management.* 7th ed. Publisher Pearson Education Limited, Harlow, United Kingdom.

Cui, X., & Xie, C. (2020). Design and implementation of logistics management system based on SSH technology. *Journal of Physics: Conference Series*, *1533*, 042057.

Ding, S., Wang, Z., Wu, D., & Olson, D. L. (2017). Utilizing customer satisfaction in ranking prediction for personalized cloud service selection. *Decision Support Systems*, *93*, 1-10.

ETDA. (2022). *Value of e-Commerce Survey in Thailand 2021.* Electronic Transactions Development Agency.

Frontoni, E., Rosetti, R., Paolanti, M., & Alves, A. (2020). HATS project for lean and smart global logistic: A shipping company case study. *Manufacturing Letters*, *23*, 71-74.

Govindan, K., Cheng, T. E., Mishra, N., & Shukla, N. (2018). Big data analytics and application for logistics and supply chain management. *Transportation Research Part E: Logistics and Transportation Review*, *114*, June 2018, 343-349.

Gyenge, B., Máté, Z., Vida, I., Bilan, Y., & Vasa, L. (2021). A new strategic marketing management model for the specificities of E-commerce in the supply chain. *Journal of Theoretical and Applied Electronic Commerce Research*, *16*(4), 1136-1149.

Hashem, I. A., Yaqoob, I., Anuar, N. B., Mokhtar, S., Gani, A., & Ullah Khan, S. (2015). The rise of "big data" on cloud computing: Review and open research issues. *Information Systems*, *47*, 98-115.

Jing Mei, & Kenli Li. (2017). Customer-Satisfaction-Aware Optimal Multiserver Configuration for Profit Maximization in Cloud Computing. *The IEEE Transactions on Sustainable Computing (T-SUSC), 2*(1), January-March 2017.

John Katz. (2006). *Supply Chain Management: Strategy, Planning, and Operations*. 2nd ed., Oversea Publishing House.

Kim, W., Kim, S. D., Lee, E., & Lee, S. (2009). Adoption issues for cloud computing. *Proceedings of the 7th International Conference on Advances in Mobile Computing and Multimedia - MoMM '09.* (December 2009).

Kong, X. T., Zhong, R. Y., Zhao, Z., Shao, S., Li, M., Lin, P., & Huang, G. Q. (2020). Cyber physical ecommerce logistics system: An implementation case in Hong Kong. *Computers & Industrial Engineering*, *139*, 106170.

Leung, K., Choy, K., Siu, P. K., Ho, G., Lam, H., & Lee, C. K. (2018). A B2C e-Commerce intelligent system for re-engineering the E-order fulfilment process. *Expert Systems with Applications*, *91*, 386-401.

Lidkea, V., Muresan, R., Al-Dweik, a., & Zhou, S. (2019). Improving the Security of Cloud-Based Intelligent Transportation Systems. *2019 IEEE Canadian Conference of Electrical and Computer Engineering (CCECE).*

Maelah, R., Al Lami, M. F. F., & Ghas, G. (2021). Usefulness of management accounting information in decision making among SMEs: the moderating role of cloud computing. *Asia-Pasific Management Accounting Journal*, *16*(1), 59-92.

Martin, J., & Monnier, P. (2020, August 10). *Cloud technology is surging* [online]. Consulting, Solutions and Ventures. Retrieved April 1, 2022, from https://www.bearingpoint.com

Mwamba, E., Masaiti, G., & Simui, F. (2021). Dynamic Effect of Rapid Urbanization on City Logistics: Literature Gleened Lessons for Developing Countries. *Journal of City and Development*, *3*(1), 37-47.

Pagano, A. M., & Liotine, M. (2019). Technology in supply chain management and logistics: Current practice and future applications. *Elsevier.*

Patt. 2020. (November 20, 2020). *Logistics & Online Business* [online]. Retrieved April 1, 2022 from https://www.mycloudfulfillment.com/logistics-online-business-e-commerce/

Penthin, S., Dillman, R. (2015). *Digital SCM* [online]. Retrieved April 1, 2022 from www.bearingpoint.com, Germany.

Sahmim, S., & Gharsellaoui, H. (2017). Privacy and security in internet-based computing: Cloud computing, Internet of things, cloud of things: a review. *Procedia Computer Science*, *112*, 1516-1522.

Swaminathan. (2020). The effects of big data on the logistics industry: Profit Oracle Technology Powered. *Business Driven* [online]. Retrieved April 1, 2022 https://www.oracle.com/us/corporate/profit/ archives/opinion/021512-sswaminathan-1523937.html.

Tiwari, A., & Jain, M. (2013). Analysis of Supply Chain Management in Cloud Computing. *International Journal of Innovative Technology and Exploring Engineering (IJITEE), 3*(5), October 2013, 152-155.

TPSO. (2022). Thai logistics business situation. (January issue). Trade Policy and Strategy Office.

Tran, Q. D., & Huang, D. C. (2014). *e-Procurement institutionalization in construction industry in developing countries: A model and instrument.* Wseas Transactions on Computers.

Tran, Q. D., Huang, D. C., & Zhang, C. Z. (2012). An assessment method of the integrated e-commerce readiness for construction organizations in developing countries. *International Journal of E-Adoption, 5*(1), 37–51. doi:10.4018/jea.2013010103.

Wang, C. N., Dang, T. T., & Nguyen, N. A. T. (2021). Outsourcing reverse logistics for e-commerce retailers: A two-stage fuzzy optimization approach. *Axioms*, *10*(1), 34.

Wang, X., & Li, Z. (2016). Traffic and Transportation Smart with Cloud Computing on Big Data. *International Journal of Computer Science and Applications, Technomathematics Research Foundation*, *13*(1), 1-16.

Wang, Y., Yu, Z., & Jin, M. (2019). E-Commerce supply chains under capital constraints. *Electronic Commerce Research and Applications*, *35*, 100851.

Yang, M., Mahmood, M., Zhou, X., Shafaq, S., & Zahid, L. (2017). Design and implementation of cloud platform for intelligent logistics in the trend of intellectualization. *China Communications*, *14*(10), 180-191.

Yu, Y., Wang, X., Zhong, R. Y., & Huang, G. (2017). E-Commerce logistics in supply chain management. *Industrial Management & Data Systems*, *117*(10), 2263-2286.

Zhou, L., Wang, W., Xu, J., Liu, T., Gu, J., (2018). Perceived information transparency in B2C e-commerce: an empirical investigation. *Inform. Manage*, *55*(7), 912–927.

Zhou, L., Zhang, L., & Fang, Y. (2020). Logistics service scheduling with manufacturing provider selection in cloud manufacturing. *Robotics and Computer-Integrated Manufacturing*, *65*, 101914.

Zijm, H., Klumpp, M., Regattieri, A., & Heragu, S. (2019). *Operations, logistics and supply chain management*. Springer. Springer International Publishing AG, part of Springer Nature, Switzerland, 33-34.

FACTORS INFLUENCING THE DEVELOPMENT OF EXCELLENCE OF THAI ATHLETES

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ABSTRACT

This research aimed to 1) study the level of development and excellence of Thai athletes. 2) study the factors influencing the development of excellence in Thai athletes. The researcher used a questionnaire as a tool to collect data from 400 undergraduate students at Central National Sports University. The statistics used in the data analysis were mean, standard deviation, and multiple regression analysis. The results showed that 1) the development of excellence for Thai athletes is at a high level. When considering each aspect, it was found that being a gentleman athlete was the most average. Following that was being a symbol of national reconciliation, promoting national economic value, and winning competitions at all levels. 2) Factors in club and sports association activities, government policy, family activities, and motivation influenced 69.80 percent of Thai athletes' development of excellence.

Keyword: Developing Excellence Thai Athletes

1. Introduction

Professional sports are a sport that is important in many countries and a career that generates income for professional athletes, professional sports personnel, and people involved in professional sports. In addition, the organization of professional sports competitions or activities related to professional sports. It is also a factor that promotes the tourism industry and spreads the country's reputation and prestige. For example, soccer is the most popular professional sport in the world. Whether it is the European Club Championships (UEFA Champions League), the English Football League (Premier League), the Spanish Football League (La Liga), the German Football League (Bundesliga), the Italian Football League (Calcio Seria A), or the United States, some of the most popular professional sports with great commercial strength are American football (NFL), basketball (NBA), baseball (MLB), and ice hockey (NHL). There are also other professional sports that are popular and organized around the world, including professional tennis (ATP Tour and WTA Tour), professional golf (PGA Tour, European Tour, and LPGA Tour), and cars. Formula 1 (Formula 1), Motorcycle World Championships (Moto

GP), etc. These professional sports all generate income for event promoters and professional athletes with income from broadcast rights, club sponsors, event tickets, selling souvenirs, etc. (Kampoch Trachu, 2018, p. 9).

In Thailand, the situation of professional sports is similar to that of other countries as mentioned above, which is the Thai League, which is the most popular sport and is likely to be a sustainable professional sport. The type/category/and other professional sports events are still in the early stages of serious development and are becoming more professional sports. Examples include professional volleyball, professional takraw, and professional motorcycles. In addition, other professional sports such as professional golf, professional tennis, professional snooker, and motorsport are organized as a basis for young professional athletes to have a platform to compete in order to prepare them for a higher level of professional sport. However, there are still some professional sporting events. This is a professional sport that brings world-class events to compete in Thailand, such as professional motorcycles (Motocross World Championship), professional bowling (World Bowling Tour), and jet skis (King's Cup) to create economic value for the country. Generate income for athletes and professional sports personnel and create a good image in sports for the country as well. However, due to the COVID-2019 epidemic situation, sporting events around the world have been postponed or canceled. Both in the part of international sports events or professional sports, such as the 32nd Olympic Games in Japan or various professional sports competitions. Many other items, as mentioned above. This situation has resulted in many countries around the world focusing on the care and development of healthy people in order to be physically and mentally healthy to prevent people from getting infected with COVID-2019 disease. When people in the nation have quality, they will develop the nation to be strong and sustainable. By doing this in parallel with the emphasis on the development of sports for the sake of national excellence and to build reputation and prestige for the country by representing the country, they have extended to being a professional athlete to create income for themselves and create economic value for the country. (Sports Authority of Thailand, 2016, p. 4)

The development of athletes should be developed in 3 areas that are considered extremely important. 1) Athlete physique and physical performance development use sports science and sports technology to develop all aspects of sports so that athletes have perfect physical fitness. 2) mental development of athletes so that athletes are mentally developed to be sportsmanship, disciplined, and responsible, capable of effectively managing themselves and their benefits; and 3) developing athletes' ability and experience through technical training to become proficient and to a higher level of competence, which requires tactical training to be in line. It can be said that the development is holistic, which is the development of sports potential to be outstanding at full potential together with the fulfillment of academic, social, language, life skills, aesthetics, and information technology. (Chanchai Phoklang, 2009, p. 49)

The Sports Authority of Thailand (2016, p. 31) said that the development of excellence for Thai athletes requires serious cooperation from both the public and private sectors through the selection and development of athletes with sporting abilities for excellence, which is a system that There is a search for athletes from local levels across the country. The government provides financial support to provincial sports development projects to encourage sports organizations and associations across the country to find talented youths to develop activities.

Organizing sports camps to find talented athletes and young athletes to expand the athlete base to become athletes for excellence and advance to a professional level. There are steps to continue by creating and promoting a system of continuous and sustainable athlete development by establishing standards and improving youth athlete development programs. Modernize and encompass the coaching system, whether it is sports skills or discipline, to enhance athletic success. From studying and analyzing good case studies from abroad and applying them to support scholarships and asking for cooperation from the private sector to develop professional athletes from a young age as well.

At present, the Sports Authority of Thailand has cooperated with both government and private agencies in order to continuously develop athletes in various fields, and it appears that it has always been effective in promoting and creating opportunities for participation in sports competitions. At all levels, by creating equality in participation in sporting events, sports schedules are established. Along with public relations through educational institutions and various media that athletes across the country can access, it can be regarded as promoting the selection of representative athletes at various levels to compete fairly. Establishing benchmarks for schools across the country to allow students to take academic leave to participate in sporting events; promoting and supporting developments to increase the number of promising sports. By supporting sports organizations that have the potential to grow and prosper in the future, such as weight division sports, precision sports, and those with no physiological drawbacks. By focusing on collaborating with the private sector in public relations and financial support for athlete development, and organizing competitions at both regional and national levels to build an athlete base for these sports. However, there are still some problems in relation to the development of sports for excellence in Thailand that are not able to develop Thai athletes to progress and succeed in international sporting events consistently due to a lack of personnel in the field of sports. Sports with international knowledge, especially the coaching group, therefore cannot develop the potential of Thai athletes so that they can be on par with other countries that have achieved international sporting success. There is also insufficient clarity and continuity from the government regarding the management system for the development of athletes from basic to excellence. As a result, the development of Thai athletes today lacks sustainability. This also includes the development of sports as professional sports in order to be continuously promoted during the past period. Many professional sports still rely on budgets and other aid from government policies, and many professional athletes are unable to make a sustainable income. There is also a lack of assessment of the impact caused by professional sports in terms of the development of sports science and technology. The general public lacks a basic understanding and a lack of awareness of the importance of sports science. The number of sports science personnel is insufficient at all levels, and sports knowledge is gained from studies or research. It has not been used for the benefit it should be for enhancing public health and developing the potential of athletes at all levels. (Sports Authority of Thailand, 2020, p. 29)

Based on the above information and reasons, the researcher is interested in conducting a study on factors influencing the development of excellence of Thai athletes in various fields, namely, club and sports association activities, government policy, family activities, and incentives. Study and measure the factors influencing the

development of excellence in Thai athletes. The information obtained from this study can be used to benefit relevant agencies, both in the public and private sectors, as well as family institutions in order to work together to improve and promote the foundation and development of sports management systems with clarity and continuity from the basics to the excellence in sports for Thailand to continue.

2. Objectives

(1) To study the level of development of excellence of Thai athletes.

(2) To study the factors influencing the development of excellence of Thai athletes.

3. Literature review

3.1 Theory and related research

Concepts and theories on the development of athlete excellence.

Elements of athletic excellence are as follows:

1. Winning a competition at any level refers to the victory or excellence or excellence an athlete gains by participating in a sport at different levels. Whether it is a situation of competition between individuals or groups (teams) who work together to win for oneness or excellence and for a greater benefit or share than the competition. Both win directly against the individual and win with points according to the conditions of the committee. (Chalermchai Charoensuk,2018, p. 5)

2. Promoting a country's economic value means gaining support from the public and private sectors. Sports equipment used in training and competition that meets international standards; business support of retail/wholesaler and import/wholesaler sports equipment; supporting sports industry operators and related businesses. In sports, the promotion of research, development, and product certification processes to obtain production licenses and brand promotion to develop the marketing and sports industry into an internationally competitive market. (Ministry of Tourism and Sports, 2016, p. 23).

3. To be a symbol of national unity means promoting sport as a medium that expresses the significance or condition of the idea of working together to manage sporting events at all levels. Individuals in both the public and private sectors have understood that sport is a media that shows elimination and triumph. (Thomas & Dyall, 1999, p. 119) and know forgiveness until it became an image that conveyed solidarity as one and peaceful coexistence. (Kasem Nakhonkhet, 2017, pp. 89-90).

4. Being an athlete means promoting and supporting athletes from both the public and private sectors (Jones, 2002, p. 209) to be honored as a badge of honor or pride that athletes with good manners know the season, have virtue, have the spirit of being a sportsman and help others both in competition with competitors and beyond the competition. (Jones & Connaughton, 2007, p. 256).

The following factors must be improved for success in the development of athlete excellence: 1) Club activities and sporting associations that need to be organized form a club or association and a committee is formed. 2) Government policies requiring the establishment of activities or guidelines, as well as government

decision-making on sports development. 3) Family activities in which all family members are encouraged to participate for the benefit of athletes; and 4) Motivation encourages athletes to engage in demanding behaviors in order to achieve their desired sporting goals. (Office of the Council of State, 2021).
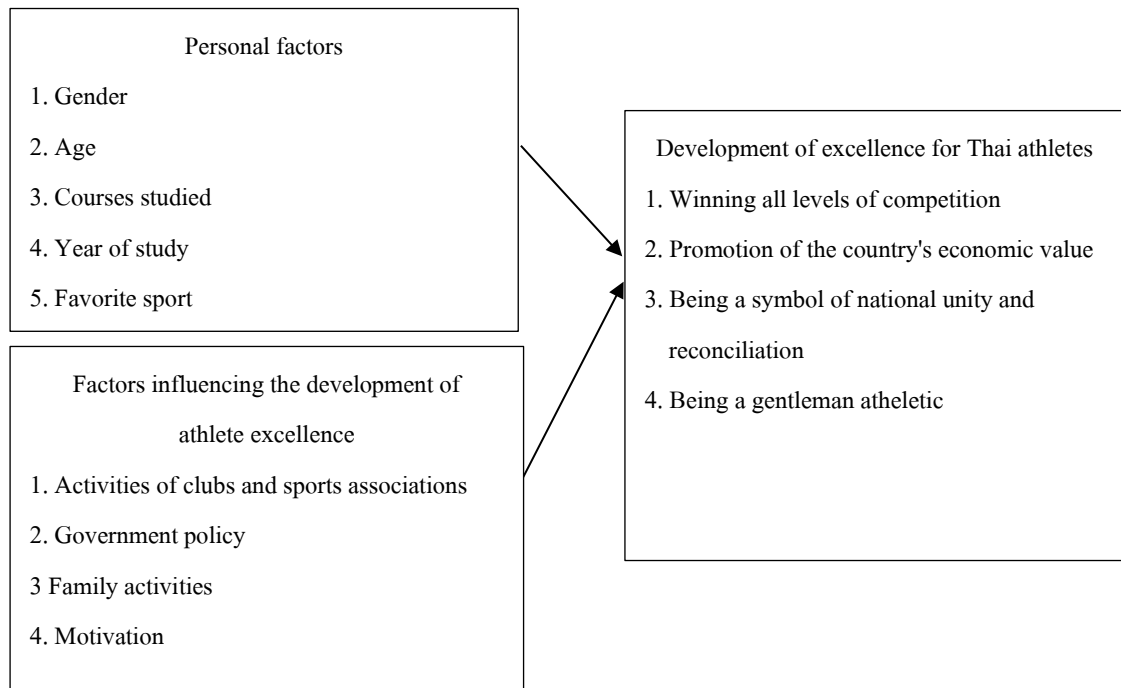
3.2 Conceptual framework

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┌──────────────────────────────────┐
│        Personal factors          │
│  1. Gender                       │
│  2. Age                          │          ┌──────────────────────────────────┐
│  3. Courses studied              │          │ Development of excellence for Thai │
│  4. Year of study                │          │ athletes                           │
│  5. Favorite sport               │          │ 1. Winning all levels of           │
└──────────────────────────────────┘          │    competition                     │
                                               │ 2. Promotion of the country's      │
┌──────────────────────────────────┐          │    economic value                  │
│ Factors influencing the          │          │ 3. Being a symbol of national      │
│ development of athlete excellence │          │    unity and reconciliation        │
│ 1. Activities of clubs and       │          │ 4. Being a gentleman atheletic     │
│    sports associations           │          └──────────────────────────────────┘
│ 2. Government policy             │
│ 3 Family activities              │
│ 4. Motivation                    │
└──────────────────────────────────┘
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Diagram 1 Conceptual Framework

3.3 Hypotheses

H1 Factor Activities of clubs and sports associations influence the development of excellence in Thai athletes.

H2 Factor Government policy influence the development of excellence in Thai athletes.

H3 Factor Family activities influence the development of excellence in Thai athletes.

H4 Factor Motivation influence the development of excellence in Thai athletes.

4. Research methodology

4.1 Research design

This research was quantitative research using questionnaires to collect data.

4.2 Population and samples

The population in this research was 7,001 undergraduate students at the Central National Sports University The sample consisted of 400 undergraduate students of the Central National Sports University from the Taro Yamane sample calculation formula (Yamane, 1970) at 95% confidence and stratified sampling. Calculation according to the proportion of students in the National Sports University in the central region. The campuses are classified as 1) Bangkok Campus 2) Samut Sakhon Campus 3) Suphan Buri Campus 4) Ang Thong

Campus and 5) Chonburi Campus. (Main campus) and using a simple sampling method according to the proportion calculated in each campus.

4.3 Research instruments

The instrument for this research was a questionnaire consisting of 3 parts as follows:

Part 1 The questionnaire on personal factors of the respondents were gender, age, course of study, year of study, and favorite sport. The questionnaire was a multiple choice.

Part 2 The questionnaire on factors influencing the development of Thai athletes' excellence included club and sports association activities, government policies, family activities, and motivation. The questionnaire was based on a rating scale of 5 levels, i.e. very good, good, fair, poor, very poor.

Part 3 Questionnaire on the development of excellence of Thai athletes. The questionnaire was based on a rating scale of 5 levels, i.e., very good, good, fair, poor, very poor.

4.4 Data collection

The researcher conducted the data collection according to the following steps:

1. The researcher requested a letter from the Graduate School of Suan Sunandha Rajabhat University to the administrators of the National Sports University in the central region asking for assistance in collecting data with athletes.

2. The researcher conducted the data collection by himself. The researcher received the questionnaire back after the respondents filled out the information.

3. The returned questionnaires were used to verify their integrity for data analysis.

4.5 Data analysis

1. The personal factors of the respondents classified by gender, age, course of study, year of study, and favorite sport. Frequency and percentage.

2. Data on the development of Thai athletes' excellence and factors influencing the development of Thai athletes' excellence were analyzed by means of mean and standard deviation, decision-making criteria and criteria. The researcher determined the interpretation of employee feedback scores into 5 levels and used a 5-level estimation scale as follows:

Average Score 4.21 – 5.00 very good

Average Score 3.41 – 4.20 good

Average Score 2.61 – 3.40 fair

Average Score 1.81 – 2.60 poor

Average Score 1.00 – 1.80 very poor

3. Multiple regression analysis using enter method to determine the influence of factors affecting the development of excellence of Thai athletes. The statistical significance was set at the 0.05 level.

5. Data conclusion

      1. The majority of respondents were female,50.50 percent. Most respondents were between the ages of 21 -25 years,47.77%. Most of the respondents studied Bachelor of Education,46.78 percent and they are studying the third year, representing 32.67 percent and their most favorite sport is football for 17.33 percent.

      2. The overall development of excellence of Thai athletes important at a high level ($\overline{X}$=3.93, S.D.=0.60). When considering each aspect, it was found that it was at a high level in every aspect. Sorted in descending order of averages, namely, being a gentleman-athlete with the highest average ($\overline{X}$=4.01, S.D.=0.74). Followed by the symbol of national unity and reconciliation ($\overline{X}$=3.94, S.D.=0.79) in terms of promoting the country's economic value ($\overline{X}$=3.89, S.D.=0.75) and the aspect of winning competitions at all levels ($\overline{X}$=3.87, S.D.=0.84) respectively, with details in Table 1.

Table 1 Mean and Standard Deviation of the Excellence Development of Thai Athletes.

Field	Name List	$\overline{X}$	S.D.	Result
1.	Winning the competition at all levels	3.87	0.84	Good
2.	Promoting the country's economic value	3.89	0.75	Good
3.	Being a symbol of national unity and reconciliation	3.94	0.79	Good
4.	Being a gentleman, athlete	4.01	0.74	Good
	Total	3.93	0.60	Good

      3. Factors relating to club activities and sports associations, government policies, family activities and motivation influenced 69.80 percent of Thai athletes' development of excellence.

6. Summary and Discussion

      1. The development of excellence for Thai athletes is at a high level. When considering each aspect, it was found that being a gentleman athlete was the most average. As a symbol of national reconciliation, national economic value promotion, and winning competitions at all levels, respectively, which is consistent with the results of the study by Bongkot Chansukwong (2019), who studied the sports management model for excellence in sports schools under the National Sports University, Ministry of Tourism and Sports. The results showed that sports management for excellence in sports schools under the National Sports University, Ministry of Tourism and Sports, was at a high level.

      2. Factors relating to club activities and sports associations, government policies, family activities, and incentives influenced 69.80 percent of Thai athletes' development of excellence. Thailand has the policy to support sports, has established clubs and sports associations, and has athletes' motivation and family support. The results of the study are consistent with those of Roberto, Carlos, and Adrian (2019), who studied the development of excellence in mixed martial arts athletes in Spain. The results showed that government policy factors and

athlete incentives contribute to the development of mixed martial arts excellence among mixed martial arts athletes in Spain.

7. Suggestions

7.1 Suggestions for applying the research results

1) In terms of activities, clubs and sports associations need to improve and develop benefit management. In the matter of the Professional Sports Promotion Fund, Sports of Thailand provides working capital for expenses related to aid and assistance and welfare, promotion, support, development, and other things related to professional sports, professional athletes, and professional sports personnel. In addition, clubs and sports associations must not harass and exploit athletes and must be audited by outside agencies every fiscal year.

2) In terms of policy, the government must improve the development of athletes' education. In the matter of having welfare, prize money, and scholarships according to the National Sports Development Fund Strategic Plan 2021–2024 Strategy 1: Preparation and development of athletes, sports personnel, and sports associations; provision of welfare, prize money, and scholarships to athletes and sports personnel in a comprehensive way; and studying sports events both in the country and abroad.

3) In terms of motivation, it is necessary to improve the development of awards. In terms of providing various awards, relevant agencies need to have criteria in the reward system or rewards to motivate athletes to devote themselves to training or playing sports to the fullest and to the best of their ability. This will have a positive effect on building more reputation and honor.

4) Family activities with the need to improve the development of viewing and personal expenses. In terms of encouraging athletes and sports personnel to set realistic savings goals to have savings, knowing income and expenses is a guideline for correct financial planning.

7.2 Suggestions for future research

In the next study, the development of excellence of Thai athletes should be studied in detail with other factors such as mental strength and endurance in the training of athletes, dedication to training, and willpower. Athletes' sparring, support from people around athletes, etc. to be able to apply for further benefits.

8. References

Bongkot Chansukwong. (2019). *Sports Management Model for Excellence in Sports Schools Under the National Sports University Ministry of Tourism and Sports.* Graduate School Research Naresuan University

Chalermchai Charoensuk. (2018). *Factors Affecting Success of Thai National Team Dragon Boat Athletes.* Graduate School Research Siam University.

Chanchai Phoklang. (2009). *Fundamentals of science in sports training. Revised edition.* Bangkok: Odeon Store.

Jones, G. (2002). What is This Called Mental Toughness? An Investigation of Elite Sport Performers. *Journal of Applied Sports Psychology, 14*(3), 204-218.

Jones, G. & Connaughton, D. (2007). A Framework of Mental Toughness in the World's Best Performance. *The Sport Psychologist*, *21*, 243-264.

Kampot Trachu. (2018). *Problems with the status of the contract for professional footballers.* Bangkok: Ramkhamhaeng University.

Ministry of Tourism and Sports. (2016). *National Sports Development Plan No. 6 B.E. 2560 (2017).* Bangkok: The War Veterans Organization.

Office of the Council of State. (2021). *National Sports Policy Act B.E. 2561 (2018). Revised Edition.*Bangkok: The War Veterans Organization.

Roberto, R., Carlos, G.G. & Adrián, P.M. (2019). Psychological Characteristics of Developing Excellence in Mixed Martial Arts Athletes. *Revista de Artes Marciales Asiaticas*, *14*(2), 37-39.

Sports Authority of Thailand. (2016). *Strategic Sports Plan of Thailand, B.E. 2560 (2017).* Bangkok: Sports Authority of Thailand.

Sports Authority of Thailand. (2020). *History, administration, committee, Sports Association of Thailand and major sports buildings.* Agency documentation. Bangkok: Sports Authority of Thailand.

Thomas D. & Dyall L. (1999). Culture Ethnicty and sport. *Management Review, 2*(2), 115-132

Yamane Taro. (1973). *Statistics: An Introductory Analysis*. (3rd Ed). New York. Harper and Row Publications.

MANAGEMENT FACTORS INFLUENCE THE EFFECTIVENESS OF A DIRECT SELLING BUSINESS ORGANIZATION

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ABSTRACT

This research aims to 1) study the level of effectiveness of the direct selling business organization in Bangkok. 2) study the factors influencing the effectiveness of the direct selling business organization in Bangkok. The researcher used a questionnaire as a tool to collect data from 400 direct sales operators in Bangkok. The statistics used in the data analysis were mean, standard deviation, and multiple regression analysis. The results showed that: 1) the effectiveness of the direct selling business organization in Bangkok was at a high level. When considering each aspect, it was found that the consumer and consumer side had the highest average, followed by internal processes, financial statements, and learning and development, respectively. 2) The factors of service excellence standards, creative organization culture, organizational affinity, and organizational environment influenced the effectiveness of direct-selling business organizations in Bangkok by 72.43%. The effectiveness of the direct selling business will become more attractive to include financial budgets, consumers, internal processes, and learning and development.

Keyword: Effectiveness Direct Selling Business

1. Introduction

Direct selling network marketing is a new form of marketing that has stepped into the lives of consumers who are consumers in today's world and that allows consumers to become owners of businesses that make a lot of money without any risk or requiring large investments like normal business operations. Starting from being a consumer of the product, when it appears that the product works well, impresses with the product used and then recommends it to people who know it. The direct selling business in Thailand is growing rapidly. A direct salesperson can refer products and have the opportunity to do business with others, which they will refer to more and more in a way that is dependent on each other for mutual benefit. As a result, direct-selling companies can save a lot more budget than they used to advertise sales and distribution. If compared, it can be seen that in other

types of businesses, the most successful people have to be salespeople who have the ability to distribute products in large enough quantities, but in network marketing, direct sales are possible. The opposite way to be successful in this business is to have a large number of people spread over a small area. Therefore, it makes entering the direct selling network business easy and highly competitive. The reason why the direct selling business is highly competitive. This is because the direct selling business focuses primarily on merchandising and, as a result, has to focus on building personnel, namely salespeople or sales representatives, independent distributors, or self-employed, which will depend on each business model. Specific words instead of calling each position as much as possible, including training courses in the manner of copying the work of those who have been successful continuously, so that everyone who enters this business has the ability to build an affiliated sales team. The network of their direct sales business to expand the next team is important (Pitchapa Thongdeeying, 2018, p. 2).

Being a salesperson isn't easy, but it's not too difficult. If there is determination, persistence, and patience to endure various obstacles, success in winning customers' hearts will be achieved. Therefore, salespeople must learn and practice themselves in relation to their own direct sales career. The salesperson must have knowledge of the following matters: 1) Regarding the products to be sold, the salesperson is responsible for recommending or consulting to customers about products and services in order to obtain accurate and sufficient information to make a purchasing decision. 2) Regarding business, the company's representatives have the ability to win the hearts of customers. Salespeople are considered important to all types of businesses in order to perform their duties in accordance with that policy successfully. At the same time, it also builds confidence in customers. 3) It's about the customer because the customer is the most important person to the salesperson. Salespeople need to know who their customers are, how they feel, and what they like or don't like in order to find a way to properly meet their needs. Because each customer is different, the method of selling to win each customer's heart will also be different. By knowing all the aspects of the customer, the salesperson can use a variety of methods to effectively resolve the immediate situation. 4) Research your competitors. Having business competitors is like motivating salespeople to be more active in their work to sell products. For a career in sales, they must know what they have to compete with. Who are the potential competitors? How much do you dominate the market? How are their products good or better than ours? What are the strengths and weaknesses? How does he use it, etc.? These are the things that the salesperson must be aware of in order to present the advantages of their own products. Including bringing to meet customers who will buy products according to the purpose, having good sales knowledge will enable salespeople to analyze customers correctly and use methods to attract or create the right attention for customers as a technique to build trust, confidence, and acceptance of the products to be presented by the salesperson, which is considered another way to win the hearts of customers (Chantana Wongprasat, 2021).

With the current economic situation that is recovering from various problems, it is important that those interested in the direct selling business be very careful. That is, the scammers that come in the form of direct sales can lead the interested parties to believe and be deceived into losing money or assets to the scammers. For the chain sharing business (Ponzi Scheme), it is a process that looks like inviting people to become members to invest

in an organization by raising funds from interested parties that are widespread and rapidly expanding. This is because of the high-yield payouts in the early stages and the fact that the payments are made on time. Entrepreneurs often claim to invest their money in something that has a high return in a short period of time, such as trading in oil or buying cheap land, etc. In which the investors will receive real returns in the early stages and will find more members until the founder of the business can not pay the old members. It will close the business and damage the members who invested, and there are still many people who have been victims of the fraudulent process in the scheme of such pyramid schemes. The direct selling business that is hidden as a pyramid scheme is legally registered but does not follow the legal process. This type of business has evolved from a syndicate but has changed the way it operates and the new business model by bringing products and services to the front. This business will have propaganda impersonating important people to build credibility and exaggerate the properties of the product to attract attention and increase the price of the product. A direct selling business that is hidden under a chain share will mainly focus on recruiting members to join the network but not on selling products. Most of the products that are sold directly include food supplements, herbs, gems, and courses. The target groups that fall prey to the hidden direct selling chains are usually middle-income people or fresh graduates and job seekers, newspapers, websites, and recruiters for various positions; but in fact, when someone wanders in, entrepreneurs will apply for membership to do direct sales business that is hidden in a chain of schemes according to the conditions set by the organization group. (Chulalak Tuathong and Donya Sriprakhon, 2012, pp. 9–10).

With the current situation in the direct selling network business, there are problems that reflect the effectiveness of the management of each company differently. Most of the problems in direct selling businesses are caused by sales representatives or salespeople, or members in each company that may covertly operate in a chain, and some also include dealers, direct sales networks, and internal management. In order to study the various problems that arise and affect the effectiveness of the direct selling business organization, it is also necessary to prepare the organization to cope with the changes in the constantly changing conditions and to achieve efficiency in operations to aim for the goal of future success. Organizations that operate direct-selling businesses must build credibility with consumers and be constantly adapting. This is necessary to be able to compete in the direct selling business in the long run. Therefore, it is necessary that the organization's leaders or executive committees jointly plan to create and improve the management system within the organization.

Based on the above information and reasons, the researcher is interested in conducting a study on management factors influencing the effectiveness of a direct-selling business organization to determine what factors influence the effectiveness of the direct-selling business organization. The data obtained from this study can be used to benefit the organization of direct sales business operators for the development and improvement of service excellence standards, creative organizational culture, organizational commitment, and atmospheric environment in the organization to create the effects of the direct selling business organization that will create a competitive advantage in business and promote the growth of the country's economy in the future.

2. Objectives

(1) To study the level of effectiveness of the direct selling business organization in Bangkok.

(2) To study the management factors influencing the effectiveness of the direct selling business organization.

3. Literature review

3.1 Theory and related research

Concepts and theories about the effectiveness of direct selling business organizations.

The effectiveness of a direct selling business organization consists of the following components: (Kaplan & Norton, 1996)

1. Financial budget refers to the objectives of direct sales network business in 2 aspects, namely cost reduction and revenue growth or increased productivity improvement. (Nongluck Suthiwatthanaphan, 2011, p. 16) This includes making the most efficient use of available resources. The organization must determine the objectives so that the organization has guidelines on how to achieve increased revenue (Wachara Satondee, 2016, p. 8).

2. On the consumer side, it means that real data from customers will help organizations adjust their strategies to keep up with competitors. Nowadays, every organization will focus on customers and ask for real customer needs. This can be seen in customer relationship management in order for the organization to reach more customers. (Stanton & Futrell, 1987, pp. 664-665) focuses on creating service satisfaction, whether it is product quality that meets standards, quick turnaround time, reasonable price, including strategies to retain existing customers and find new customers, and so on. (Siriwan Sereerat, 2009, p. 79).

3. The internal process refers to the management within the organization. There must be a good process for creating satisfaction for personnel and employees in the organization and customers in order to strengthen the organization more. (Wilawan Rapeepisan, 2008, pp. 32–33)

4. Learning and development refer to future development consisting of human resources in the organization, such as the ability to obtain sufficient personnel skills and skill development, turnover rate, attitude, and employee satisfaction. (Senge, 1990).

The effectiveness of a direct-selling business organization depends on the following management factors: 1) The standard of service excellence is the level of sensitivity that a direct sales organization has to deliver an impression of service. 2) A creative organizational culture is having a good understanding of the systems of beliefs, values, and customs accepted by members of the organization and used as a model of action by members of the organization. 3) Organizational commitment occurs when the organization's members have positive attitudes or feelings toward the organization. 4) The organizational environment is a feature of the organizational environment and is the environment in which the individual in the organization perceives these conditions both directly and indirectly (Katz & Kahn, 1969).

3.2 Conceptual framework

From the review of literature related to the effectiveness and efficiency of the direct selling business organization, The researcher has applied the concepts of Kaplan & Norton (1996) as a conceptual framework of dependent variables and the concept of management factors of Katz & Kahn (1969) as an independent variable conceptual framework with details as follows:

Personal factors

1. Gender

2. Age

3. Marital status

4. Education level

5. Average monthly income

6. Business period

Effectiveness of Direct Selling Business Organizations in Bangkok

1. Financial budget

2. Consumer

3. Internal processes

4. Learning and development

Management Factors Influencing the Effectiveness of Direct Selling Business Organizations

1. Excellent service standards

2. Creative organization culture

3 Conditions of commitment to the organization

4. The environment of the atmosphere in the organization

Diagram 1 Conceptual Framework

3.3 Hypotheses

The management factors of service standard of excellence, creative organizational culture, organizational commitment, and the organizational environment influence the effectiveness of the direct selling business organization in Bangkok.

4. Research methodology

4.1 Research design

This research was quantitative research using questionnaires to collect data.

4.2 Population and samples

The population in this research consisted of 69,650 direct-selling businesses in Bangkok, and the sample group is the direct-sales businesses in Bangkok. A sample of 400 people can be obtained from the formula for

calculating the sample of Taro Yamane. (Yamane, 1970) at 95% confidence and stratified sampling. According to the proportion of products and trademarks with simple random. They are direct sales staff of the Direct Selling Business Organization of 4 trademarks, namely 138 direct sales staff for Amway products; 122 direct sales staff for Giffarine products; 91 direct sales staff for Zulian products; and 49 direct sales representatives for Nu Skin products.

4.3 Research instruments

The tool for this research was a questionnaire consisting of 3 parts as follows:

Part 1 The personal factors of the respondents were gender, age, marital status, educational level, average monthly income and period of business. The questionnaire was a multiple choice.

Part 2 The management factors influencing the effectiveness of the direct selling business organization in Bangkok were questionnaire of excellent service standards, creative organizational culture, organizational commitment and organizational climate environment. The questionnaire was based on a rating scale of 5 levels, i.e.very good, good, fair, poor, very poor.

Part 3 Questionnaire on the effectiveness of direct selling businesses in Bangkok. The questionnaire was based on a rating scale of 5 levels, i.e.very good, good, fair, poor, very poor.

4.4 Data collection

The researcher conducted the data collection according to the following steps:

1. The researcher requested a letter from the Graduate School of Suan Sunandha Rajabhat University to the direct selling business operator in Bangkok for assistance in data collection.

2. The researcher conducted the data collection by himself. The researcher received the questionnaire back after the respondents filled out the information.

3. The returned questionnaires were used to verify their integrity for data analysis.

4.5 Data analysis

1. The personal factors of the respondents classified by gender, age, marital status, educational level, average monthly income and period of doing business. Frequency and percentage.

2. Information on the effectiveness of the direct selling business organization in Bangkok and management factors influencing the effectiveness of the direct selling business organization were analyzed by means of mean and standard deviation, decision-making criteria and consideration criteria. The researcher defines the interpretation of employee feedback scores into 5 levels and uses a 5-level estimation scale as follows:

Average Score 4.21 – 5.00 very good

Average Score 3.41 – 4.20 good

Average Score 2.61 – 3.40 fair

Average Score 1.81 – 2.60 poor

Average Score 1.80 –1.80 very poor

3. Multiple regression analysis using enter method to determine the influence of management factors affecting the effectiveness of direct selling business organizations in Bangkok. The statistical significance was set at the 0.05 level.

5. Data conclusion

1. The majority of respondents were female, 50.73 percent. Most respondents were aged 30-40 years, 36.23 percent. Most respondents were marital, 47.40 percent, most respondents 52.60% graduated with a bachelor's degree. Most of the respondents had an average monthly income of 15,001 - 25,000 baht, 45.91%, and 40.45% had a business period of less than 3 years.

2. The overall effectiveness of the direct selling business organization was found to be of high importance ($\overline{X}$= 4.18, S.D.= 0.56). When considering each aspect, it was found that the consumer and consumer side had the highest average ($\overline{X}$= 4.22, S.D.= 0.60). Followed by internal processes ($\overline{X}$= 4.19, S.D.= 0.64) financial budget ($\overline{X}$= 4.18, S.D.= 0.57) and learning and development ($\overline{X}$= 4.12, S.D.= 0.63) respectively, with details in Table 1.

Table 1 Mean and Standard Deviation of Effectiveness of Direct Selling Business Organizations in Bangkok.

Field	Name list	$\overline{X}$	S.D.	Result
1.	Financial budget	4.18	0.57	Good
2.	Consumer	4.22	0.60	Very Good
3.	Internal process	4.19	0.64	Good
4.	Learning and development	4.12	0.63	Good
	Total	4.18	0.56	Good

3. The management factors of service excellence standards, creative organization culture, organizational commitment and organizational environment influenced the effectiveness of direct selling businesses in Bangkok by 72.43%.

6. Summary and Discussion

1.The effectiveness of the direct selling business organization in Bangkok was at a high level. When considering each aspect, it was found that the consumer and consumer side had the highest average, followed by internal processes, financial statements, and learning and development, respectively. This is because direct sales operators focus on their customers, consumers, and consumers. There are internal organization processes and adequate budget allocation for learning and business development. The study results are consistent with the research results of Kingkaew Pornapiraksasakul (2017), who studied the performance of direct sales staff of pharmaceutical companies in Thailand. The results showed that the performance of the direct sales staff of pharmaceutical companies in Thailand was at a high level.

2. The management factors of service excellence standards, creative organizational culture, organizational affinity, and organizational environment influencing the effectiveness of the direct selling business organization In Bangkok 72.43%, this is because direct sales business operators have standards of service, have a creative organizational culture, have love and commitment to the organization and have a better internal environment which the study results are consistent with the research results of Pitchapa Thongdeeying (2018, pp. 37-38) who have studied the factors affecting the effectiveness of direct selling network business in Thailand. The results showed that the factors of service excellence standards, creative organization culture, organizational commitment, and organizational environment influenced the effectiveness of direct selling network business in Thailand.

7. Suggestions

7.1 Suggestions for applying the research results

1. The effectiveness of the direct-selling business organization must be improved in terms of learning and development. In the matter of encouraging members of the organization to have the opportunity to study both within the country and abroad in order to continually develop the skills or abilities of members, promote benefits and give back to society as appropriate, and strengthen the working system for members to create cooperation.

2. Excellent service standards, which must be improved in terms of excellence in service In the matter of arranging training for members to serve customers or consumers with creativity, in order to provide members with good knowledge of the service and to be enthusiastic, knowledgeable, and gentle.

3. Creative organizational culture must be improved in terms of focusing on relationships with other organizations. In the matter of strengthening good relations with relevant government agencies, promoting goods and services between organizations, organizing meetings or seminars to exchange knowledge between organizations, and not engaging in any hidden business. In the matter of strict instructions in order not to covertly or continue to do illegal business that is a pyramid scheme, not focusing on recruiting new members in the hope of getting paid for subscriptions, and not bringing other products to offer alongside.

4. The condition of commitment to the organization must be improved and developed in the provision of benefits and welfare. In the matter of providing other severance pay according to labor law, overtime pay, car fuel allowance, and having a vacation or other leave as entitled, there is money to help with medical expenses, accommodation costs, and practical aspects of management and colleagues. In terms of being independent and free from harassment, the staff are not taken advantage of by each other, and the management can advise when there is a problem at work.

5. The atmosphere in the organization must be improved in terms of sanctions. In the matter of providing a declaration of punishment. It is admonished in mild cases and punishes offenders with equality and fairness, thus reducing conflict. In terms of focusing on satisfying all departments, management seeks solutions when problems or conflicts arise and is aware of the signs of conflict.

7.2 Suggestions for future research

In subsequent studies, other independent variables should be studied. In addition to the variables used in this research, for example, the enforcement of government agencies in the case of recruiting for membership of hidden organizations in the form of pyramid schemes or fraudulent misconduct to sell low-quality products to consumers, including secretly selling products that evade tax by entrepreneurs, etc.

8. References

Chulalak Tuathong and Donya Sriprakhon. (2012). *The process of entering the chain sharing business.*

Chantana Wongprasat. (2021). *direct sales.* [online] Retrieved March 20, 2021, from
https://sites.google.com/site/chantanattc1/wichakar-khay-trng

Kingkaew Pornphiraksasakul. (2017). *Performance efficiency of direct sales staff of pharmaceutical companies in Thailand.* Funds to support Sripatum University.

Kurtz, D.L. & Clow, K.E. (1998). *Services marketing.* New York: John Wiley & Sons.

Nongluck Wiratchai. (2009). *Lisrell Model: Analytical Statistics for Research. 6th printing.* Bangkok: Pimluck.

Pitchapa Kittinanwattana. (2011). *Consumer Attitudes and Motivations Affecting Selection Behavior of Nissan March in Bangkok.* Research Srinakharinwirot University.

Senge, P.M. (1990). *The Fifth Discipline: The Art and Practice of the Learning Organization.* London: Doubleday.

Siriwan Sereerat. (2009). *Consumer behavior. Revised edition. B*angkok: Thira Film and SITEX.

Stanton, W.J. & Futrell, C. (1987). *Fundamentals of Marketing.* (8th ed). New York: McGraw-Hill.

Watchara Satondee. (2016). *Internal factors affecting the effectiveness of the Office of Education's annual budget disbursement Bangkok.* Research Thammasat University.

Wilawan Rapeepisan. (2008). *Human Resource Management.* Bangkok: Wichit Hatthakon Printing House.

Yamane, Taro. (1973). *Statistics: An Introductory Analysis.* (3rd Ed). New York. Harper and Row Publications.

THE BENEFITS OF SUFFICIENCY ECONOMY PHILOSOPHY TO THE APPLICATION OF SUSTAINABLE MARKETING FRAMEWORK

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ABSTRACT

Sufficiency Economy Philosophy (SEP) is derived from His Majesty King Bhumibol Adulyadej remarkable speech on his 58 years of the throne. The focus of 'middle path' is the key. The theory is introduced after the crisis in Asia in 1997. Many businesses were bankrupted, and Thai economy was crashed. To protect the economy in the future, His Majesty King Bhumibol Adulyadej had attenuated the middle path practice to recover and sustain the economy (Kantabutra, 2019). The theory creates resilience to prepare when encounter the crisis both from internal and external according to the globalization. (Ketprapakorn & Kantabutra, 2019).

In the marketing context, sustainable marketing, green marketing, social marketing or sustainable consumption are the current topics among marketer nowadays. Numerous of marketing campaign, model and strategy have emphasized on sustainable marketing. The sustainable marketing campaign or activities aim to create sustainability. To create business sustainability, there are three elements involved which are lifelong profitability, satisfied stakeholders and consumer behavior change. Many studies found that there is strong relationship between consumer attitude, values and roles toward behavior change of people. SEP or sufficient economy philosophy aims the result of sustainability as well. When examining the five practices of SEP which are perseverance, resilience, moderation, sharing and geosocial development found that there is main similar theme among those two theories. So, the implementation of SEP practices has applied to sustainable marketing and the model has been propose.

Keywords: SEP, Sustainable Marketing, Sustainability, Green Marketing, Marketing Framework

Introduction

Over the last thirty years, sustainable marketing was introduced to the marketer and has widely used for few decades. There are numerous sustainable marketing campaigns across the globe lately with increasing degree of concerns toward environment and society. More importantly, major pressure which push the changing in marketing practices comes from consumer (Kotler, 2011). "LOHAS", an abbreviation of "Lifestyle of health and sustain-ability" labeled some customers and the market of this segmentation is growing (Kotler, 2011).

The relationship between the willingness to purchase green products and attitudes is very strong (Laroche, Bergeron, & Barbaro-Forleo, 2001). Not only attitude but also customer values, norms and habits drive

the purchase intention of green products (Peattie, 2010). The business implements the three‑bottom line theory: environment, ethic and economic (Goodland, 1995) into marketing campaign for example CSR (Corporate Sustainability Responsibility). Not only try to employ the marketing strategies which based on environment, society and economy to satisfy costumers' need, but also accepted by all level of stakeholders (Mitchell et al., 2010). When we look at the perception of stakeholders, looking forward to long‑term interests could bring more sustainability than emphasizing on the short term‑margin (Mitchell, Wooliscroft, & Higham, 2010).

The last decade, "Sufficiency Economy" theory from by His late Majesty King Bhumibol Adulyadej of Thailand which focus on has been developed to Business practices (Ketprapakorn & Kantabutra, 2019) consists of five practices: Resilience, Perseverance, Moderation, Sharing and Geosocial social development. The underlying of the theory is derived from ethic and knowledge to create sustainability in society, environment and culture. Interestingly, two theories expect the same outcome is to generate business sustainability originally based on moral and ethical basis.

This paper discusses about sustainable marketing and its outcomes to create sustainability and the impact on consumer values and attitudes. The associated models of sustainable marketing and market orientations are discussed. Moreover, sufficiency economy philosophy or SEP is applied to propose the framework called SEP Marketing Framework.

Objectives

(1) To explore and discuss sustainable marketing and its impact on consumer values and attitudes

(2) To explore the concepts and practices of SEP in Thailand context.

(3) To discuss about sustainable marketing framework in the current studies.

(3) To propose SEP sustainable marketing framework for future study.

Development of Sustainable Marketing

Environmentally Concern Marketing

Since 1970s, green marketing has evolved overtime. At very first stage, the implication of marketing, Ecological marketing, involved reducing harmful products which can cause environmental effects (Ken Peattie, 2001). Moreover, environment is major factor of mankind social sustainability to enhance quality of life (Goodland, 1995). In the service industry, according to the research on hotels that performed environmental practices, consumers prefer the hotels which applied green practices in their services (Manaktola & Jauhari, 2007).

Green Marketing

The concept of green marketing has been developed since 1970s. The early stage was Ecological marketing which reducing the resource use of the material to produce less waste. The second stage was Environmental Marketing, creating green product and green customer to build the competitive advantage. From the study shown that the purchase behavior of green product of Americans has gradually increased overtime since

the research in 1989. Only 5-10% more for environmentally friendly products Americans were willing to pay (Coddington, 1990). The number has grown to 15-20% in the research in 1991(Suchard &Polonsky, 1991). In 1993, the survey has collected in UK and found that 79 % of sample would like to pay up to 40% on green products on the product category of cloth detergent (Myburgh-Louw & O'Shaughnessy, 1994).

Green marketing was supported by welfare marketing by goods and services produced would not harm health, destroy the environment including wildlife or animals, not create unnecessary waste in term of product production, use and disposal (Elkington & Hailes,1989; Varey, 2010). Green consumption or environmental concern marketing is strong impacted by consumer values, norms and habits (Peattie, 2010).

Social Marketing

Social marketing implementation try to solve or improve the problems or concerns in the society applied to many social issues. The aim of it is to change people behaviors. (Andreasen, 2006; Peattie & Peattie, 2009). Social Marketing has been used or introduced to the society more than 40 years ago to create awareness among people for quality-of-life improvement for example the campaigns of 'Stop smoking' or 'say no to drug' (Kotler, 2008).

The strategies and techniques used for social marketing is to influence customers to accept and behave differently (Kotler et al., 2002). Moreover, social marketing is related very closely to government policies along with media to support the campaign (Michaelis, 2003). Critical Marketing emerges from the rule and regulation which control the marketing activities in the society mainly dominant by institutes or the systems for example the government policies (Gordon et al., 2011).

Sustainable Marketing Framework

In the sustainable marketing conceptual framework, there are three concepts in marketing strategy to position the organization as sustainable. The model consists of green marketing, social marketing and critical marketing (Gordon, Carrigan, & Hastings, 2011). This sustainable marketing framework needs corroboration from all stakeholders to pursuit the sustainable objectives (Gordon et al., 2011).

Figure 1. Sustainable Marketing Framework. (Gordon et al., 2011)

Sustainable Marketing toward Consumer Behavior

The sustainable consumption affected by green marketing and social marketing campaign is strongly impacted by customer values, norms and habits. The demand for goods and services is derived from values and attitudes (Peattie, 2010; Prothero et al., 2011) Customer willing to pay on sustainable products is dominated by customer attitudes. (Laroche, Bergeron, & Barbaro-Forleo, 2001; Prothero et al., 2011) Another factor effected consumer consumption of sustainable products is role and responsibility in the society. (Prothero et al., 2011; Schaefer & Crane, 2005)

Moreover, along the changing society and culture, customer themselves has changed so that marketing practices must adjust accordingly. The businesses shift the way to market and deploy the marketing strategies (Foster, Sampson, & Dunn, 2000; Kotler, 2011).

The performance of the company shows its attitude which directly effects consumers' attitude. People tend to purchase the products from the business that cares and shares the same value. Two-third avoid purchasing products from the company conveying different believes and values(Gerzema, 2010; Kotler, 2011)

Figure 2 A pyramid of priorities for societal change.

In order to change human behaviors to develop sustainability, values and believes need to be built among individuals and communities because it is the profound and hard to change (Fischer, 2012).

Market Orientation and Sustainable Marketing Orientation Model

Market orientation is the core of the corporate execute the marketing management and stregeties(Gebhardt, Carpenter, and Sherry 2006; Gronroos, 1989; Hunt and Lambe 2000; Jaworski and Kohli 1993; McKitterick 1957; Narver and Slater 1990). Corporate, first, conducts market research and information and then distribute to related departments and finally response to customer needs by creating products and services to serve them (Atuahene-Gima, 1996). From the figure 3, the model of market orientation emphasizes on customer needs along with innovation to response to market with highest possible profit creation. The model is lack of stakeholders' involvement especially secondary stakeholders and social and political concerns (Mitchell et al., 2010)

New model of market orientation is proposed as Sustainable Marketing Orientation (SMO). It implements three key objective elements of sustainability: economic orientation, societal orientation and ecological orientation (Mitchell et al., 2010). The performance of the corporate reflects on business learning and knowledge. The result of the implement of SMO, the higher corporate involves with SMO, the longer performance in market. It is because SMO involve more of stakeholders based on integration of geosocial responsibilities. Moreover, SMO supports the organization to generate more revenue and increases corporate performance (Dean and McMullen 2007; Epstein and Roy 2003; Menon and Menon 1997; Orlitzky, Schmidt, and Rynes 2003).
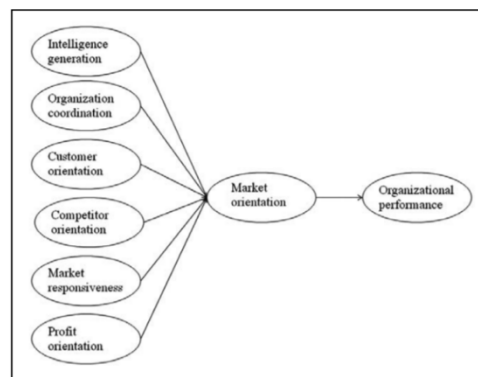
Figure 3 Model of market orientation (Mitchell et al., 2010)
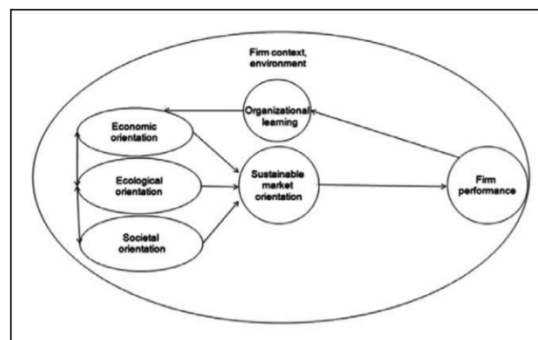
Figure 4 Model of sustainable market orientation (Mitchell et al., 2010).

In the conclusion, SMO is the marketing strategies and practices developed from MO intergraded with sustainable development of stakeholder satisfaction and responsibility. (Goodland 1995; Lawer and Knox 2008; Mahon and Wartick 2003; Maignan, Ferrell, and Ferrell 2005; WCED 1987). The overall performance of the business lead to positive customer satisfaction, market effectiveness and profitability for sustaining competitive advantage (Vorhies & Morgan, 2005).

Marketing MIX

In this study, marketing mix or 4 Ps (Perreault, 2002) will emphasize on idea of sustainable aspects from the current scholars. For product, the companies must consider of developing the new products which demonstrating environmental concerns along with energy conservation (Kotler, 2011). Because customers are

willing to pay more, the companies can offer the vary price range for sustainable products. In term of distribution channel, not only to concern about where to present the products but also consider the environmentally friendly location production base. Moreover, online trading is the good options to distribute the product instead of physical store. Finally, the companies need to shift form offline to online and more importantly the campaign need to create the involvement and commitment with the customers in term of sustainable activities engagement. (P. Kotler, 2011)

The external factors that impact the company practices to execute the marketing plan or strategies is society and culture. For example, to achieve social marketing campaign, the business evolves with social problems and social change for all time (Andreasen, 2006). In order to create sustainable business is to drive along with changing market (P. Kotler, 2012). From the sufficiency economy philosophy practices theory, the outstanding characteristic of its approach is consideration of culture and society (Wibulswasdi, Piboolsravut & Pootrakool, 2011). To deal with culture change, business create their share value to the customers and implant the practices to portray the new business model (Philip Kotler, 2012). So sustainable marketing is the process of integrate economy along with society change for serving human need and this is important for corporate to handle the changes for sustainable competitive advantage.

Sufficiency Economy Background

This section reviews the approach toward sustainability of business of sufficiency economy theory. The theory is derived from His Majesty King Bhumibol Adulyadej remarkable speech on his 58 years of the throne. The focus of 'middle path' is the key and the theory can be conducted in all individuals, communities and organizations for all levels. The theory is introduced after the crisis in Asia in 1997. Many businesses were bankrupted, and Thai economy was crashed. To protect the economy in the future, His Majesty King Bhumibol Adulyadej had attenuated the middle path practice to recover and sustain the economy (Kantabutra, 2019). The theory creates resilience to prepare when encounter the crisis both from internal and external according to the globalization. (Ketprapakorn & Kantabutra, 2019).

Sufficiency economy theory consists of three components: Moderation, reasonableness and Self-immunity means moderation, reasonableness, and the need for self-immunity (Piboolsravut, 2004) to prepare for the change underlying with acquired knowledge and moral condition. (Wibulswasdi, Piboolsravut & Pootrakool, 2011).

Sufficiency Economy Philosophy or SEP

The theory of Sufficiency Economy in business by Ketprapakorn and Kantabutra (2019) to form a solid theoretical foundation for the present study. Below are five practices of corporate to apply the Sufficiency Economy Philosophy or SEP.

Perseverance

Perseverance can be explained by Self‑determination theory. The perseverant person who determines to accomplish tasks or work even though faces with many challenges and difficulties. Self-motivated person does not give up easily and strengthen himself to peruse the success and endure with obstacles. In the organization, to create persistence, sharing the same goal and purpose need to be done. Persistent personnel can uplift the organization performance (Kantabutra, 2019). Perseverance also includes the preparation of oneself to cope with holistic change in the society and culture for achieving sustainable development based on SEP (Wibulswasdi et al., 2011).

As the sustainability can occur in the business when it can shift itself through changing marketing (Kotler, 2012). In the organization construction, readiness for change mindset need to instruct among the employees (change commitment) and encourage them the share value of efficiency of change management (change efficacy) (Weiner, 2009).

For the businesses, perseverance displays the way they adjust or initiate the business model or product developments (National Economic and Social Development Board [NESDB], 2007). Improve the business activities such as enhancement of production by using technology or market research which focus on the customer needs.

Geosocial Development

Geosocial development stresses on ethical responsibility for all stakeholders and environment. To create sustainable development, all involved stakeholders need to be considered stakeholders such as consumers, staff/ workers, business partners, and shareholders. The organization or business ensures satisfaction of stakeholder is reached within long‑term aspects of lifelong profitability. The relationship of corporate and stakeholders can help the company during crisis or challenges (Kantabutra, 2014; NESDB, 2007) Perceived happiness of stakeholders create high relationship with organization (Winit & Kantabutra, 2017).

From the marketing aspects, welfare marketing emerged after the new mind set of consumers has developed. The value of Quality of Life or QOL means the balance of human needs and environmental concerns. The concept has replaced the consumerism (Varey, 2010).

Welfare marketing ensures that products and services are not danger to the environment including animals and plants for the whole value chain. It refers to the process of production, use and disposal. Welfare marketing is closely support green marketing theory. (Elkington & Hailes, 1989; Varey, 2010).

Table 1 Comparison between Competitive Marketing and Sustainable Marketing (Varey, 2010).

	Reformed Marketing (Orthodox, Reformist)	Welfare Marketing (Transindustrial, Radical)
Economic assumption	Growth in material consumption—technoeconomic model (more), materialism, competitive accumulation	Development of quality of life—socioenvironmental model (better)
Focus	Individuality expressed in "product" selection, purchase, and use	Citizen and community well-being
Role of marketing process	Respond to, and manufacture of, demand	Change demand
Nature of demand	Choice, novelty, preference	Sustainability, durability, nonmaterial, equitable distribution
Social purpose	Sell green lifestyles	Communitarian provisioning and contentment
Method	Value appropriation, market choice	Value creation, participatory democracy
Source of value	Utility embodied in "products" and realized by destroying (consuming) material things	Produced in resource exchanges (including nonmaterial resources) and cooperative/social activity
Reward	Pleasure: short-term, self-centered, oblivious to cumulative societal consequences, carefree	Happiness: lifelong, socially defined, aware of consequences, caring
Success criteria	Pleasure, accumulated Wealth	Welfare, habitat health

Stakeholders also consist of society institutions such as community groups, non-governmental cultural community, non-profit organization and foundations, economic related and government institutions.

Moderation

Sustainability of the firms needs long-term perspectives to focus on and emphasize those over short-term goals. (Mitchell, 2001). For business aspect, moderation concerns on sustainable long-term profit than chasing the short-term outcome (NESDB, 2007).

In sustainable enterprises, executives are accountable for the short- and long-term consequences of their decisions, allowing for long-term planning and investment to take place through designing compensation schemes based on the long-term corporate performance (Ketprapakorn & Kantabutra, 2019).

When business need to invest, it should be done with moderation or middle path with fully consideration. It can infer of setting up business with appropriate size so that if it is not success, the whole organization would not collapse. It refers to Royal Speech of King Rama Nine, given at Dusit Palace, 4 December 1997. SEP stresses on good risk management along with well business plan and good corporate governance with social responsibilities (NESDB, 2007).

Moderation is related with responsible consumption while sustainable companies perceived themselves as the part of the sustainable society. They are responsible for the well-being of population (Kantabutra, 2019). Moderation can be explained by non-overconsumption theory view. The happiness of quality of life is more concerned than prosperity. Well-being has nothing to related with income (Speth, 2008).

Resilience

Resilience means the capabilities to endure the crisis and challenges of one from internal and external factors. It can be practiced by the individuals, communities or in business sectors. Organizations need to adapt themselves to encounter with emerging issues. Staffs are well-prepare and knowledgeable for the situations. Thereby creating corporate sustainability (Ketprapakorn & Kantabutra, 2019).

The resilience also related with crisis management. It consists of three guidelines. They are pre-crisis management; post crisis management and recovery phase (Smith, 1990). The recovery phase can be learning knowledge for the organization.

Sharing

As the virtue and morality underlines the SEP, sharing is the important part. Sharing can be counted as an action of give and received. Belk, R. (2009). Goods and products can be shared in term of its utility (Benkler, 2004). Sharing can create emotion of compassion and linked to idea and knowledge (John, 2013). For sustainable firms, knowledge sharing among employee(internal) and competitors is crucial. It can initiate innovation in organization. (Kantabutra, 2017).

Ethics and Morality

SEP is profound with ethic and morality. Good governance practices in business organization nowadays have focused on ethic and implement it as core value. With the emphasis on morality, SEP believes that human development is the way to sustainability. Thus, to sustain the business, ethics such as honesty and integrity need to be administered (NESDB, 2007).

SEP Sustainable Marketing Framework

With implementation of five practices of SEP, below are the sustainable marketing strategies based on SEP theory practices. The content discusses theoretical framework as well as propositions.

Sustainable product: Product development to serve fast changing market. Circular economy for whole supply chain. Environmental and social concern. Energy and resource reserve. Sharing resources.

Moderate Price: Reasonable price with long‐term sustainability aspects. Benefits to all stakeholders. Cost construction benefiting to all suppliers and partners.

Supportable Distribution: Right online channel and offline which serve and support all stakeholders. Environmentally and socially friendly for the whole VALUE CHAIN: Produce, transportations and channels. Community support. Integrated channels to subsidize the risk.

Suitable communication: Moderate and suitable campaign and promotion. Risk management and middle pathway practice. Empathize customer and all stakeholders. Focus on moral and ethical generation among society such sharing, honesty and responsibility toward society.

Staff: Training and developing staffs in every aspect. Provide basic welfare while promoting human developments. Prepare staffs for crisis and change. Encourage and create value of sustainability.
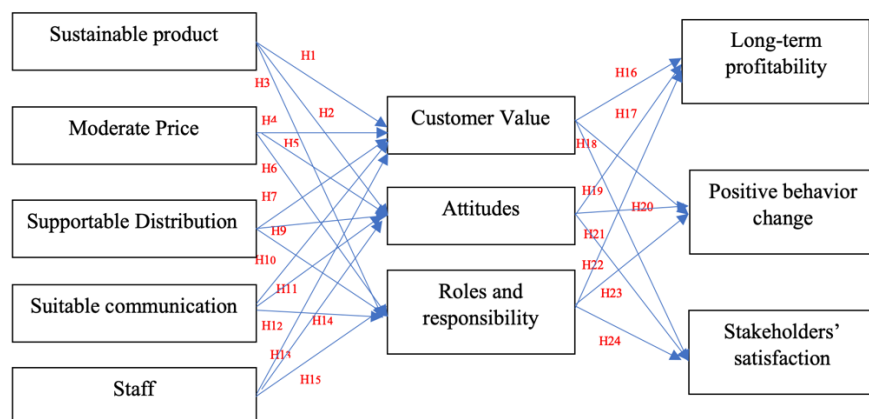
Propositions.

P1- Sustainable product positively effects on customer value.

P2- Sustainable product positively effects on attitudes.

P3- Sustainable product positively effects on customer's role and responsibility.

P4- Moderate price of products and services positively effects on customer value.

P5- Moderate price of products and services positively effects on customer attitudes.

P6- Moderate price of products and services positively effects on customer's roles and responsibilities.

P7- Supportable Distribution positively effects on customer value.

P8- Supportable Distribution positively effects on attitudes

P9- Supportable Distribution positively effects on customer's roles and responsibility

P10- Suitable communication positively effects on consumer value.

P11- Suitable communication positively effects on attitudes.

P12- Suitable communication positively effects on customer's roles and responsibility.

P13- Well trained staffs with good qualification positively effects on consumer value.

P14- Well trained staffs with good qualification positively effects on attitudes.

P15- Well trained staffs with good qualification positively effects on customer's roles and responsibility.

P16- Consumer value create business long-term profitability

*P17-*Consumer value create positive consumer behavior change.

P18- Consumer value enhance stakeholder satisfaction.

P20- Consumer attitudes create business long-term profitability

P21- Consumer attitudes create positive consumer behavior change.

P22- Consumer attitudes enhance stakeholder satisfaction.

P23- customer's roles and responsibility positively effects on business long-term profitability

P24- customer's roles and responsibility create consumer behavior change.

P25- customer's roles and responsibility enhance stakeholder satisfaction.

Conclusion

Sufficiency Economy Philosophy has been introduced to Thailand during King Rama IX for decades. Since then, Thai and international scholars have been researched and applied the philosophy into many industries including business practices in corporates. The theory of Sufficiency Economy in business by Ketprapakorn and Kantabutra (2019) to form a solid theoretical foundation for the present study. Those concepts include Perseverance, Geosocial development, Sharing, Moderation, Resilience and Sharing. Moreover, ethics and morality are the profound of the theory. The concept indicates that five practices lead to sustainability in organization with long‑term profitability. The similar theme has been found with the concept of sustainable

marketing. Sustainable marketing is the tool for corporates to deploy those practices to create sustainability to the society and itself. The purpose of sustainable marketing is to drive profitability, to satisfy all related stakeholders and to encourage positive consumer behavioral changes. Sustainable consumption is derived from customer value, attitudes and roles and responsibilities. There are the common themes of sustainability of SEP in corporate practices and sustainable consumption. Thus, the SEP is applied with the theory of Marketing MIX or 4Ps to SEP Sustainable Marketing Framework

Suggestion

Control variables are company size, corporate culture, time of conducting the study and location. To conduct the research, firm size I would suggest deploying the research on small and medium enterprise where can implement marketing theory thorough. More importantly, the model is derived from ethic and morality, organization selection is concerned. Company culture where ethic applied as core value should be criteria of firm chosen.

For further study, the whole model can be tested or partial selection of it. It is suggested to define what is count as customer value and attitudes and build the criteria to measure. Lastly, in the future study, measurement in each outcome such as lifelong profitability, stakeholder's satisfaction and customer behavior change must be clarified and stated clearly.

References

Andreasen, A. R. (Ed.). (2006). *Social marketing in the 21st century*. Sage.

Ang, S. H., Leong, S. M., & Kotler, P. (2000). The Asian apocalypse: crisis marketing for consumers and businesses. *Long Range Planning*, *33*(1), 97-119.

Atuahene-Gima, K. (1996). Market orientation and innovation. *Journal of business research*, *35*(2), 93-103.

Belk, R. (2009). Sharing. *Journal of consumer research*, *36*(5), 715-734.

Benkler, Y. (2004). Sharing nicely: On shareable goods and the emergence of sharing as a modality of economic production. *Yale LJ*, *114*, 273.

Della Corte, V., Del Gaudio, G., Sepe, F., & Sciarelli, F. (2019). Sustainable Tourism in the Open Innovation Realm: A Bibliometric Analysis. *Sustainability*, *11*(21), 6114.

Diaconeasa, M. C., Popescu, G., & Boboc, D. (2019). SUSTAINABLE FOOD CONSUMPTION IN THE WEB OF SCIENCE ABSTRACTS. *Economic Computation & Economic Cybernetics Studies & Research*, *53*(1).

Fischer, J., Dyball, R., Fazey, I., Gross, C., Dovers, S., Ehrlich, P. R., ... & Borden, R. J. (2012). Human behavior and sustainability. *Frontiers in Ecology and the Environment, 10*(3), 153-160.

Goodland, R. (1995). The concept of environmental sustainability. *Annual review of ecology and systematics*, *26*(1), 1-24.

Gordon, R., Carrigan, M., & Hastings, G. (2011). A framework for sustainable marketing. *Marketing theory*, *11*(2), 143-163.

John, N. A. (2013). The social logics of sharing. *The Communication Review*, *16*(3), 113-131.

Kantabutra, S. (2019). Achieving Corporate Sustainability: Toward a Practical Theory. *Sustainability*, *11*(15), 4155.

Kantabutra, S. (2017). A Thai Rhineland leadership model: In search for corporate sustainability model for Asia. *International Journal of Business Excellence*, *13*(1), 16-40.

Kantabutra, S. (2014). Measuring corporate sustainability: a Thai approach. *Measuring Business Excellence*, *18*(2), 73-88.

Ketprapakorn, N., & Kantabutra, S. (2019). Sustainable Social Enterprise Model: Relationships and Consequences. *Sustainability*, *11*(14), 37-72.

Ketprapakorn, N., & Kantabutra, S. (2019). Culture Development for Sustainable SMEs: Toward a Behavioral Theory. *Sustainability*, *11*(9), 2629.

Kotler, P. (2011). Reinventing marketing to manage the environmental imperative. *Journal of Marketing*, *75*(4), 132-135.

Laroche, M., Bergeron, J., & Barbaro-Forleo, G. (2001). Targeting consumers who are willing to pay more for environmentally friendly products. *Journal of consumer marketing*, *18*(6), 503-520.

Mitchell, L. M. (2001), Corporate Irresponsibility: America, s Newest Export.

National Economic and Social Development Board (NESDB). *What is Sufficiency Economy?* NESDB: Bangkok, Thailand, 2004.

National Economic and Social Development Board (NESDB). *Sufficiency Economy Implications and Application.* NESDB: Bangkok, Thailand, 2007.

Peattie, K. (2010). Green consumption: behavior and norms. *Annual review of environment and resources*, *35*, 195-228.

Peattie, K. (2001). Towards sustainability: The third age of green marketing. *The Marketing Review*, *2*(2), 129-146.

Peattie, K., & Peattie, S. (2009). Social marketing: A pathway to consumption reduction?. *Journal of Business Research*, *62*(2), 260-268.

Perreault, W. D., & McCarthy, E. J. (2002). Basic marketing: A managerial approach. *Homewood, Ill: RD Irwin*.

Piboolsravut, P. (2004). Sufficiency economy. *ASEAN Economic Bulletin*, *21*(1), 127-134.

Smith, D. (1990). Beyond contingency planning: Towards a model of crisis management. *Industrial Crisis Quarterly*, *4*(4), 263-275.

Thongpakde, N. (2005). Thailand's economic development and the philosophy of sufficiency economy. *Unpublished. Cited in Prasopchoke Mongsawad (2010),"The Philosophy of the Sufficiency Economy: A Contribution to the Theory of Development", ibid*.

Van Gelderen, M. (2012). Perseverance strategies of enterprising individuals. *International Journal of Entrepreneurial Behavior & Research*, *18*(6), 630-648.

Vorhies, D. W., & Morgan, N. A. (2005). Benchmarking marketing capabilities for sustainable competitive advantage. *Journal of marketing*, *69*(1), 80-94.

Weiner, B. J. (2009). A theory of organizational readiness for change. *Implementation science, 4*(1), 67.

Wibulswasdi, C., Piboolsravut, P., & Pootrakool, K. (2011). *Sufficency Economy Philosophy and Development*. Sufficiency Economy Research Project, Bureau of the Crown Property.

SUSTAINABLE SUCCESS OF ENTREPRENEURS IN THE FOOD SUPPLEMENT BUSINESS IN BANGKOK AND METROPOLITAN

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ABSTRACT

The purpose of this study is 1) to study the level of sustainable success of food supplement business entrepreneurs in Bangkok and the metropolitan area. 2) to study the factors affecting the sustainable success of food supplement business entrepreneurs in Bangkok and the metropolitan area. Using questionnaires as a tool to collect data from manufacturing, business entrepreneurs, and distributors. There were 400 distributors of food supplements in Bangkok and the metropolitan area. The statistics used in the data analysis were mean, standard deviation, and multiple regression analysis. The results of the research were as follows: 1) sustainable success of food supplement business entrepreneurs in Bangkok the and metropolitan. Overall, it was found to be of high importance. When considering each aspect, it was found that the trust aspect was the most average, followed by profitability, repeat service, and referral, respectively. 2) strategic factors in business management, features of business operators, marketing strategy, and overall quality control capability are affecting the sustainable success of food supplement business entrepreneurs in Bangkok and the metropolitan area.

Keywords: Sustainable Success, Food Supplement Business

1. Introduction

The COVID-19 outbreak has impacted the economic activities of countries around the world, causing revenue disruptions and sharp drops in purchasing power. It has expanded into a global economic crisis on both the supply and demand sides, causing the world and Thai economies to tend toward recession and Thai society to adjust to the new normal. While the reform of the economic system that is conducive to business growth is sustainable. The need to increase the level of technology tools that will support the economy, awareness-raising, and participation in the development of labor skills, as well as being flexible in adapting to economic activities under a new lifestyle basis (Brinca, Pedro, Joao B. Duarte, and Miguel Faria-e-Castro, 2020). Thailand's economy is projected to contract by 5.3 percent in 2021 due to high levels of dependence on foreign economies and long-

standing low domestic investment. This makes most small and medium-sized businesses unable to compete under the critical constraints of business recovery. Short-term impact variations cause labor health, social, and economic problems. The ability of people, businesses, and governments to adapt to the new lifestyle and changes in the economic structure will determine the recovery. Under the high level of overall liquidity. It has low financial costs and high competition in the digital market. This will have an impact on the food supplement business and the development of ways to reach consumers, especially during the economic crisis. The crisis from natural disasters and epidemics forces the development of business models of entrepreneurs to adapt to the changes and respond to market demands for food supplements to create acceptance of the properties that help to strengthen, restore, heal, and repair the body as well as to build confidence in the product quality and production standards and reduce the risk of contamination or effects on the body (Economic Office Bank of Thailand, 2021).

Food supplement business operators must adjust their entrepreneurs to change in order to survive and grow their businesses to have sustainable continuity. Since food supplement business operators have limited access to consumer groups and must meet the needs of consumers under marketing regulations, they must focus on creating innovative services and access to products in the form of different types. (Simon Kennedy, 2020). As for the economic situation in 2017, e-commerce marketing has a market value of approximately 214,000 million baht and will increase to more than 470,000 million baht in 2022 with an average growth rate (the years 2017–2021) of about 17.0 percent per year (Kasikorn Research Center, June 2017). Therefore, it is a huge obstacle to adaptation to be used in the creation of marketing tools to achieve tangible results. Entrepreneurs must adjust their use of capital and investment in technology to support their business operations.

Food supplement business operators at present have adapted product quality to meet the needs of the consumer market rather than the dealer market, resulting in the development of a strategy to support barriers to reaching consumers. Solving the problem of product quality acceptance is to build confidence in the standard and production quality of the product as well as ensure the use of products that meet the needs of consumers in care, therapy, rehabilitation, and body repair. However, the problem of formulating new strategies helps food supplement operators to apply them in business continuity development and build beliefs about using the product. (Harms and Rainer, 2019). How the food supplement business develops production innovation and production standards to support research and development of products to meet quality certification standards and build confidence in the products of consumers by focusing on providing comprehensive services and a variety of products (Uky, Achmad,et al., 2019) However, the issue of new business practices affects consumers in terms of health care and strengthening the body to have a strong lifestyle. Entrepreneurs need to think of strategies to gain confidence in products and build acceptance of manufactured products to meet consumer demand.

This research aims to study the success of dietary supplement business operators in Bangkok and the metropolitan. It is a search for strategies used in business operations to cope with changes during the economic crisis and the epidemic crisis that have a severe impact on business operations. (Triggs, Adam, and Homi Kharas, 2020). While the adaptation of the food supplement business has limitations in marketing competition under the requirements of the FDA's law and limits consumer acceptance of food supplements. In addition, the competition

of business operators has a strategy to compete on price and promotions with dealers. It is the management of production and distribution plans, contract manufacturing, product rights ownership, and being a dealer. This causes the nutritional supplements in the market to overlap with similar products in terms of properties, production sites, and market areas, which affects consumer confidence in using food supplements. (Gartner, Inc., 2020) Therefore, the researcher is interested in finding strategies for marketing trajectories to reach consumers directly to replace the dealer trade that can create continuity and sustainability in the supplement business. (Daniel Rohn, Peter M.Bican, Alexander Bremb, Sascha Krause, Thomas, Claussc, 2021) Including business operations, they need to be able to expand the business in the future with business alliances that will cooperate with both manufacturers and distributors. (Homburg, C., Jozic, D., & Kuehnl, C., 2017)

Problems in the food supplement business today point out the research gap that means sustainable success is not short-term in this business. Exaggerated advertising deceives consumers and produces standards that exaggerate their health benefits. This is related to management strategy, features of business operators, marketing strategy, and overall quality control. Therefore, the researcher is interested in studying the subject of the sustainable success of food supplement business entrepreneurs in Bangkok.

2. Objectives

(1) To study the level of sustainable success of food supplement business entrepreneurs in Bangkok and metropolitan.

(2) To study the factors affecting the sustainable success of food supplement business entrepreneurs in Bangkok and metropolitan.

3. Literature review

3.1 Theory and related research

Concepts and theories of sustainable success of supplement business entrepreneurs.

The entrepreneurial crisis situation is a turning point that requires the search for successful strategies and the discovery of influences on success. It is based on the entrepreneurial character of building aspiration and motivation for business goals, a measure of the level of talent and experience cultivated that often reflects short-term success. (Rapeephan Leesuwat, Sarawut Anantachat, and Suthilak Wangsantithum,2019) while trying to use the potential to support internal and external businesses to aim for long-term success. The key point is how to use intrinsic rewards to stimulate the success of the business. (Chanchai Phonthanukitithaworn, Chavis Ketkaew, and Phaninee Naruetharadhol, 2019). In this regard, the transmission of success orientation is learning how to think and practice together with stakeholders to know the true capabilities of the business. The need for success, to a greater or lesser extent, depends on the motivation of the entrepreneur who likes to work hard or not. (Vongsraluang, N., & Bhatiasevi, V. 2017).

The shift from the COVID-19 epidemic had a huge impact on the economy as businesses and industries had to stop. Consumer behavior in a new way of life. Entrepreneurs must adjust their marketing concepts by

reinforcing consumer concepts with the use of social media technology and applications. This causes many entrepreneurs to formulate various strategies to be more competitive by focusing on digital marketing. (Nambisan, S, 2017). The concept of the product to experience is about a product or service that provides a good experience for consumers because the production of products or services at present is easy and has a factory that produces products according to the business owner's concept of doing business. Therefore, there is no need for a large amount of capital to build a factory or produce products, resulting in more competitive products in the market and causing entrepreneurs to enter digital marketing to learn about the difference in products. Entrepreneurs must focus on providing a good experience for consumers to impress and inform consumers through digital tools. While the concept of price to exchange is about buying and selling prices due to changing consumer behavior. Therefore, the price does not determine whether the operator will be able to sell goods and services. (Gupta, V. K., Niranjan, S., Goktan, B. A., & Eriskon, J. (2016). But making consumers feel "worth it" both physically and mentally to buy, to feel that quality is right for the price they pay in exchange for convenience, is essential for doing business in the era of COVID-19. Both the concept of the place to everyplace and the internet are about distribution channels to access goods and services, which in the past focused on selling in front of the store, but nowadays, the internet is playing a more important role as a new way of daily life for purchasing goods and services. This means businesses need to reach target consumers both online and offline. It is the creation of website pages to sell via online marketplaces such as Lazada, Shopee, or the Lineman platform. (Gartner, Inc., 2020).

Therefore, the platform is important to help the businesses of distribution channels of goods and services transition into the digital age. In addition, equally important are the payment options that must be convenient for customers, such as cash payment, credit card payment, PromptPay, or cash on delivery. However, the concept of promotion to evangelism is a marketing communication in the current context that must focus on the target customers' experience in the organization. There is a feeling of liking and wanting to come and try or use the service, which becomes the word of mouth to invite friends. (Thananthorn Mahapornprajak, 2020) How to respond to the work being done to make the work more successful, leading to higher sales volume, increasing the price of the product, and keeping consumers alive. It also encourages participation in learning the relationships that affect the success and failure of the business to cope with the risk situations that arise under the guidelines as follows. (Thomas B. Long, Arnold Looijen, and VincentBlok, 2018).

3.2 Conceptual framework

Personal factors

1. Gender

2. Age

3. Education level

4. Average monthly income

5. Business period

Organizational Management Factors

1. Business Management Strategy

2. Business Entrepreneur's Qualifications

3. Marketing Strategy

4. Overall Quality Control Ability

Sustainable success of entrepreneurs in the food supplement business in Bangkok and metropolitan

1. Recommendation

2. Repeat Service

3. Trust

4. Profitability

Diagram 1 Conceptual Framework

3.3 Hypotheses

Strategic factors in business administration, features of business operators, marketing strategy, the ability to control overall quality are affect the sustainable success of food supplement business entrepreneurs in Bangkok and metropolitan.

4. Research methodology

4.1 Research design

This research was quantitative research using questionnaires to collect data.

4.2 Population and samples

The population in this research was 2,000 food supplement business entrepreneurs in Bangkok and metropolitan areas, and the sample was: food supplement business entrepreneurs in Bangkok and metropolitan areas, 400 people was obtained from the formula for calculating the sample of Taro Yamane (Yamane, 1970) with 95 percent confidence. Bangkok and metropolitan areas were used as random units in stratified random sampling and simplified sampling methods.

4.3 Research instruments

The tool for this research was a questionnaire consisting of 3 parts as follows:

Part 1 The questionnaire on personal factors of the respondents were gender, age, educational level, average monthly income, and period of business. The questionnaire was a multiple choice.

Part 2 The questionnaire on organizational factors are Business Management Strategy, Business Entrepreneur's Qualifications, Marketing Strategy and Overall Quality Control Ability. The questionnaire was based on a rating scale of 5 levels, are very good, good, fair, poor, very poor.

Part 3 Questionnaire of Sustainable Success Food Supplement Business Entrepreneurs in Bangkok and metropolitan. The questionnaire was based on a rating scale of 5 levels, are very good, good, fair, poor, very poor.

4.4 Data collection

The researcher conducted the data collection according to the following steps:

1. The researcher requested a letter from the Graduate School, Suan Sunandha Rajabhat University to food supplement business operators in Bangkok and metropolitan to request assistance in collecting information.

2. The researcher conducted the data collection by himself. The researcher received the questionnaire back after the respondents filled out the information.

3. The returned questionnaires were taken for integrity checks for data analysis.

4.5 Data analysis

1. The personal factors of the respondents classified by gender, age, educational level, average monthly income, period of business, frequency, and percentage.

2. Information on sustainable success of food supplement business entrepreneurs in Bangkok and metropolitan, and organizational management factors analyzed by averaging and standard deviation, decision criteria and consideration criteria. The researcher determined the interpretation of opinion scores. It is divided into 5 levels and uses a 5-level estimation scale as follows:

Average Score 4.21 – 5.00 Very Good

Average Score 3.41 – 4.20 Good

Average Score 2.61 – 3.40 Fair

Average Score 1.81 – 2.60 Poor

Average Score 1.00 – 1.80 Very Poor

3. Enter multiple regression analysis to determine the influence of organizational management factors on the sustainable success of food supplement business entrepreneurs in Bangkok and metropolitan. The statistical significance was set at the 0.05 level.

5. Data conclusion

1. Most of the respondents were female at 56.01%. They aged 31 - 40 years at 59.12%. They are having a bachelor's degree at 79.10%. The average monthly income more than 150,000 baht at 56.89%. They are being in business between 6-10 years at 64.00%.

2. The results of the study found that overall, it was found that the sustainable success level of food supplement business operators in Bangkok and metropolitan was at a high level ($\overline{X}$=4.00, S.D.=0.54). When

considering each aspect, it was found that the trust aspect had the highest average ($\overline{X}$=4.05, S.D.=0.40), followed by the profitability aspect ($\overline{X}$=4.02, S.D.=0.51) the use of repeat service ($\overline{X}$=3.98, S.D.=0.48) and the referral aspect ($\overline{X}$=3.94, S.D.=0.54) , respectively, as detailed in Table 1.

Table 1 The Mean and Standard Deviation of Sustainable Success of Food Supplement Business Entrepreneurs in Bangkok and Metropolitan.

Field	Name List	$\overline{X}$	S.D.	Result
1.	Recommendation	3.94	0.54	Good
2.	Repeat Service	3.98	0.48	Good
3.	Trust	4.05	0.40	Good
4.	Profitability	4.02	0.51	Good
Total		4.00	0.54	Good

3. The results showed that strategic factors in business administration, features of business operators, marketing strategy, the ability to control overall quality are affect the sustainable success of food supplement business entrepreneurs in the Bangkok and metropolitan by 68.92%.

6. Summary and Discussion

1. Entrepreneurs in the food supplement business in Bangkok and the metropolitan area have sustained success overall. It was found to be of high importance. When considering each aspect, it was found that the trust aspect had the highest average, followed by the profit aspect, the use of repeat service, and referrals, respectively. This may be due to food supplement business operators focusing on formulating strategies in business management, marketing strategy, and comprehensive quality control of products and services that contribute to the success of sustainable business operations. The study results are consistent with the research work of Yaowapa Pathomsirikul (2018) that studied the success model of health service business management of private hospitals in Thailand. The results showed that the success of health service business management of private hospitals in Thailand was at a high level.

2. The sustainable success of food supplement business entrepreneurs in Bangkok and metropolitan areas is affected by strategic factors in business administration, features of business operators, marketing strategy, and overall quality control capability. This is because of the food supplement business in Bangkok and the importance of the metropolitan areas in developing business management strategies and marketing strategies, and there is quality control of products and services. In addition, entrepreneurs have qualifications in business administration, resulting in the success of sustainable business operations, and the results of the study are consistent with the research results of Eriksson and Li (2018). The research factors for the success of small and medium-sized business entrepreneurs in Quinosjo. The results showed that business management strategy,

features of the business, operators' marketing strategy, and the ability to control overall quality affect the success of small and medium-sized business operators in the municipality of Quinosjo.

7. Suggestions

7.1 Suggestions for applying the research results

(1) Food supplement business operators should have a marketing strategy to give advice to consumer groups to buy more products.

(2) Food supplement business operators should have the policy to formulate a marketing strategy to attract consumers to buy products and services again.

(3) Food supplement business operators should focus on developing their corporate image to be more accepted by customers.

(4) Food supplement business operators should have more control over the quality of raw materials used in the production of food supplements sold to customers.

7.2 Suggestions for future research

The next study should be a combination of both qualitative and quantitative studies with food supplement business operators. There was an in-depth interview with food supplement business entrepreneurs to gain insights to strengthen and develop the organization to be more successful and to study the factors affecting the sustainable success of the food supplement business operators, such as external environmental factors, strategic personnel factors, etc.

8. References

Brinca, Pedro, Joao B. Duarte and Miguel Faria-e-Castro (2020). Is the COVID-19 Pandemic a Supply or a Demand Shock. *Economic Synopses*, *8*(15), 18- 39.

Chanchai Phonthanukitithaworn, Chavis Ketkaew, and Phaninee Naruetharadhol, (2019). Relevant Factors for Success as an Online Entrepreneur in Thailand. *SAGE Review, 1*(20), 158-181

Daniel Rohn, Peter M.Bican, Alexander Bremb, Sascha Krause, Thomas, Claussc (2021). Digital platform-based business models–An exploration of critical success factors., *Journal of Engineering and Technology Management*, *60*(12), 101-125.

Economic Office Bank of Thailand. (2021). *Know the regional economy in the Covid 19 era. What do you have to follow? Results of the Monetary Policy Committee Meeting No. 1/2021*. [online] Retrieved October 1, 2021 from https://www.bot.or.th.

Eriksson, J., and Li, M. (2018). Success factors of entrepreneurial small and medium sized enterprises in the Gnosjö municipality. *Academy of Management Excutive, 1*(13), 43 -57.

Gartner, Inc., (2020). *Key Findings From the 2019 Gartner Customer Experience Management Survey*. [online] Available on 20 March 2022 from https://www.gartner.com/en/marketing /insights/articles/3-key-findingsfrom-the-2019-gartner-cx-management-survey.

Gupta, V. K., Niranjan, S., Goktan, B. A., & Eriskon, J. (2016). Individual entrepreneurial orientation role in shaping reactions to new technologies. *International Entrepreneurship and Management Journal*, *12*(12), 935-961.

Harms, & Rainer. (2019). A Multivariate Analysis of the Characteristics of Rapid Growth Firms, Their Leaders, and Their Market." Their Leaders, and Their Market. *Journal of Small Business and Entrepreneurship*, *22*(4), 429-454.

Homburg, C., Jozic, D., & Kuehnl, C. (2017). Customer experience management: Toward implementing an evolving marketing concept. *Journal of the Academy of Marketing Science, 45*(5), 377–401.

Kasikorn research center. (2017). *K SME Analysis 5 business trends that will overtake the curve in 2017.* [online] from https://www.kasikornbank.com/th/business/sme/KSMEKnowledge/ article/KSMEA.pdf

Nambisan, S. (2017). Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrepreneurship Theory and Practice*, *41*, 1029-1055.

Thanaporn Khamthip. (2018). *Motivation and service use Mobile-Banking behavior of the Government Savings Bank, a case study of the Government Savings Bank Phetchabun Province.* Master's degree University of the Thai Chamber of Commerce.

Thomas B.Long, Arnold Looijen, Vincent Blok, (2018). Critical success factors for the transition to business models for sustainability in the food and beverage industry in the Netherlands. *Journal of Cleaner Production*, *175*(20), 82-95.

Triggs, Adam and Homi Kharas (2020), The Triple Economic Shock of COVID-19 and Priorities for An Emergency G-20 Leaders Meeting. *Future Development, The Brookings Institution*, *17*(1), 189-193.

Uky, Achmad, et al. (2019). Data to model the effect of awareness on the success of IT Governance implementation: A partial least squares structural equation modeling approach (PLS-SEM). *Journal of Small Business and Entrepreneurship*, *25*(2), 189-193.

Vongsraluang, N., & Bhatiasevi, V. (2017). The determinants of social commerce system success for SMEs in Thailand. *Information Development*, *33*(1), 80–96.

Yaowapa Pathomsirikul. (2018). Health service business management success model of private hospitals in Thailand. *Business Administration Journal*, *34*(130), 14-35.

BRAND COMMUNICATION VIA MOBILE APPLICATION FOR NEW ENERGY AUTOMOBILE: A CONTENT ANALYSIS OF NIO BRAND IN CHINA

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ABSTRACT

This study examine the brand communication via mobile APP of NIO, a new energy vehicle manufacturer in China. It used both quantitative and qualitative content analysis to identify genres of brand communication in terms of 112 randomly selected posts generated by the stakeholders. The data analyses reveal that brand communication via social media is very important for the success of NIO, and that stakeholders communicated to NIO via its mobile APP in order to satisfy various needs in terms of congitive, emotional, social,and entertainment needs. Findings of this study provide not only managerial implications for brand managers and/ or marketers of automobile industry to strategically use social media to get product ad brand feedback from stakeholders and to build relationship with them, but also academic implications for brand communication scholars.

Keywords: Mobile APP, Social Media, Brand, Stakeholders, Uses and Gratification Theory

1. Background

In recent years, the new energy vehicle industry has become an important new industry. Traditional European and American auto companies are transforming to producers of more environmentally friendly products by virtue of their profound technological accumulation. Europe and China are the main markets for new energy vehicle products. Chinese domestic new energy vehicle brands are rapidly rising.The sales volume of new energy vehicles in China during 2020 and 2021 also indirectly proves the market's gradual recognition of the product (iResearch, 2020).

In order to gain market share, brands have begun to focus on creating personalized channels such as user communities in social media or mobile application (APP) to communicate with their customers more directly and to become more closely engaged with them. The advantages of APP technology in customer relationship management are obvious.

Academia has developed various methods and models to identify topics and discussions in social media by qualitatively analyzing the content and identifying relevant information (i. e. Sommer, Schieber,

Hilbert, & Heinrich, 2011). To date, few research has been done to collect and analyze communication between brand and stakeholders. As a result, it is difficult for businesses to develop an appropriate brand communication strategy and connect social media activities with their target audience (Culnan et al., 2010).

Our research focuses on the communication in the mobile APP of NIO, a global manufacturer and brand of smart electric vehicles. Posts in NIO APP generated by stakeholders regarding media uses of the two parties to communicate were examined based on the Uses and Gratification Theory (UGT). Findings of study would enable brand managers to learn about their products from the stakeholders' perspectives, which is useful for an improvement of their brand communication in social media.

2. Literature

Brand communication aims not only to enhance brand awareness and establish a good brand image, but also to maintain emotional connection with consumers and build brand loyalty and influence (Yu & Shu, 2002). Liu and Ji (2009) support Yu's and Shu's proposition, pointing out that the Web 2.0 community can be understood as an open place where companies can learn more about customers' knowledge and preferences (Schneider, Stieglitz, & Lattemann, 2008). At the same time, more and more academics are starting to focus on social media marketing, as social media allows businesses to create an integrated communication process that enables them to gather customer input and build stronger relationships with them, fostering two-way connections (Bruhn, Schoenmueller & Schäfer, 2012).

Despite the growing popularity of social media as a platform for communication, few research explores the use of communication within these platforms from both the brand and consumer perspective (Dolan & Goodman, 2017). Zhang Yong, Shen Jiahong, and Xiang Yongsheng (2020) proved the above assumptions, and suggested that traditional auto companies should pay attention to the operation of brand APPs, and put the brand in a good social environment, which is conducive to customer relationship management. Communication within social media is different from interaction in traditional web 2.0 platforms. Social media offers an overall higher openness, and posts are theoretically readable by everyone (Krüger et al., 2012). In addition, Bermingham and Smeaton (2010) recommend analysis of content in social media, since longer documents are easier to analyze by sentiment, such as blogs. According to Sommer and colleagues (2011), a method is proposed to identify Twitter posts, assign the tweets to a previously defined encoding, then focus on categorization and analysis in terms of content, and perform sentiment analysis in order to better understand the communication that occurs in social media.

In order to understand audiences' use of social media, this study reviewed the UGT by Katz (1974) and relevant studies by McQuail and colleagues (2015), and Zhou (2016). The UGT believes that the audience is active and individuals with specific needs and motives, and they use media to "gratificate" four types of needs: (1) diversion, (2) personal relations, (3) personal identity, and (4) surveillance (Lowery & De Fleur, 1983). Due to the lack of existing research on brand communication beween business and stakeholders via social media, this study intends to fill this research gap.

3. Research Goals

This study aims to examine stakeholders' responses to brand messages via NIO APP, genres of brand communication, and their motivations for using the mobile APP. The proposed reseach question of this paper is "What is the brand communication of NIO EV in terms of stakeholder to business (S2B) via NIO mobile app?

4. Case Study

4.1 Methodology

This study used a combination of quantitative and qualitative content analysis of brand communication in NIO APP, covering 10-month period (January 2021-October 2021). Five reasons for choosing NIO APP are 1) this platform provides the opportunity to download the relevant communication, 2) it has large number of active users and posts, allowing to identify NIO official account, NIO employee account (subscripted with NIO), and stakeholder account (car owner subscripted with V), 3) it allows the identification of answers and replies (@replies as @accountname), 4) it has high data transparency by which users can interact directly with senior executives and can leave their complaints in the APP, and no posts are deleted, and 5) nearly half of the active users are not NIO product users, co-users, and deposit car owners, but fans who have not bought a car (Wu & Wang, 2021). This richness of users represents stakeholders with different identities.

The communication in the NIO App were extracted based on the daily communication around the keyword "NIO". According to Krüger and colleagues (2012), posts were classified into two categories -- business-to-stakeholder (B2S) versus stakeholder-to-business (S2B). These 112 sampled posts of S2B were randomly selected based on the descending order of the popular rankings in the #NIOGOODIDEAS topic.

Genre-defined coding schemes based on Krüger and colleagues (2012) were used to classify genres of the posts. In terms of S2B communication, statistical analyses were conducted for both records of the use of NIO APP by stakeholders to communicate with brands, and use experience of stakeholders. In addtion to quantiative content analysis of the sampled data, performing a textual analysis allows us to gain a deeper understanding of what stakeholders are communicating and their motivations for using the APP to talk with the brand. Analysis results of the stakehelers' gratifications in terms of "entertainment needs", "cognitive needs", "emotional needs" and "social needs," reveals the problems in the uses and gratifications of NIO APP, which will be helpful for furthur discussions.

The research tools for examining S2B communication based on Krüger and colleagues (2012) include coding scheme for the genre of S2B communication and that for stakeholders' motivation to use NIO APP (Appendix A).

4.2 Results and Interpretation

Based on NIO's S2B communication section established in the APP, the main conversations took place in #NIOGOODIDEAS and #Faultfeedback (see Appendix B), and NIO said 400,000 people have participated in the discussion since the topic was created. By analyzing four main accounts and two popular discussion boards, content of the S2B communication were categorized into 14 genres -- 1) Product informaton, 2) Sales promotion, 3) Product statement, 4) Brand statement, 5) Driving statement, 6) Event statement, 7) Brand-related news, 8) Driving question, 9) Product question, 10) Brand question, 11) Self-expression, 12) Game, 13) Comments, and 14) Others (see Table 1).

The rest of the S2B conversation uses *@reply* to directly mention NIO employees. Based on a randomly selected sample of 112 posts regarding the above genres, the most mentioned brand accounts and topics were *@CEO William* (33.9%, n = 38), followed by *@NIO User Manager* (25%, n = 28), #NIOGOODIDEAS (22.3%, n = 25) and #Faultfeedback (8.9%, n = 10). The analyses yield that "Comments" from stakeholders was the most commonly used genre (36.6%, n = 41). These comments are mostly about suggestions and expectations from car owners, and they gave feedback after using the product [P30] (see Appendix C). Its difference from "Questions" and "Self-expression" is that communication under these two genres do not involve product defects and failures.

The B2S communication [P17 software update | NIO OS 3.0.0 version release] correspondingly solved user's suggestions [P36 Opinion about car system] in S2B communication. For suggestions on hardware upgrades, NIO provided users with options to solve needs or to make changes on the next-generation models through accessories.

Table 1: Frequency and Percentage of Genres and Reply in S2B Communication

		S2B Communication on NIO							Frequency (Percentage)	Reply (Percentage)
Genre		@CEO William	@President Qin lihong	@NIO User Manager	@NIO Life	#NIO GOOD IDEAS	#Fault Feed back	#Others		
Genre	Product info	2	1	1	0	0	0	1	5 (4.5%)	4 (80%)
	Sales promotion	0	0	1	0	0	0	0	1 (0.9%)	1 (100%)
	Product statement	2	0	1	0	0	0	0	3 (2.7%)	2 (66.6%)
	Brand statement	17	2	0	0	0	0	0	19 (16.9%)	18 (94.7%)
	Driving statement	0	0	0	0	0	0	1	1 (0.9%)	1 (100%)
	Event statement	0	0	0	0	0	0	0	0 (0%)	0 (0%)
	Brand-related news	3	0	0	0	0	0	0	3 (2.7%)	3 (100%)
	Driving question	0	0	0	0	2	3	0	5 (4.5%)	4 (80%)
	Product question	3	0	8	0	2	7	0	20 (17.9%)	18 (90%)
	Brand question	3	0	0	0	2	0	0	5 (4.5%)	5 (100%)
	Self-expression	1	1	0	0	3	0	2	7 (6.3%)	5 (71.4%)
	Game	1	0	0	0	0	0	0	1 (0.9%)	1 (100%)
	Comments	6	1	17	0	16	0	1	41 36.6%	34 82.9%
	Others	0	0	0	1	0	0	0	1 (0.9%)	1 (100%)
Total		38	5	28	1	25	10	5	112 (100%)	97 (86.6%)

Stakeholders directly stated the changes they desired from the brand, such as product and service changes [P31]. *CEO William* being the most mentioned account with posts mentioning him (33.9%, n = 38), "Brand statement" (16.9%, n = 19) is where stakeholders expressed gratitude or supports to the brand [P32]. Product information (4.5%, n = 5) and games (0.9%, n = 1) are rarely seen in S2B communication, proving that this is not their sustainable way to keep in touch with brands [P33; T34].

In addition to expressing gratitude to the CEO, 21% of stakeholder established contact with *William* [P35] and asked for help [P36], which are distributed in three genres of "Product information," "Product statement," and "Brand-related news." In the two genres of "Driving question (Dynamic)" (4.5%, n = 5) and "Product question (Static)" (17.9%, n = 20), there were posts about NIO product defects and failures [P37; P38], which reflect that NIO has not experienced safety failures during driving in the past 10 months, but there are still problems in product quality and reliability.

In the NIO APP, an important goal of NIO is to build relationships with stakeholders. A study of official NIO-related communications in the NIO APP shows that, without any special circumstances (such as a crisis), with a large number of stakeholders talking about the brand's product or image, the brand can still maintain a high level of engagement. The NIO official replied to the messages seriously, felt the thoughts of stakeholders with heart, and could arouse the emotional recognition of users. It is like an exchange between friends, a subtle, lasting, and strong emotional connection over time. The response efficiency of NIO in S2B communication is quite high such that 86.6% (n = 97) posts get the official reply from NIO.

5. Discussions

Through the classification and statistical investigation of the samples, it was found that NIO used its mobile APP to build an online user community, and stakeholders collected information about companies (brands) and products through the APP. In short, companies are interested in gathering information from stakeholders to improve their products. Each official account in the NIO APP is responsible for a specific stakeholder group and builds a topical community operated by NIO based on the interests and occupations of stakeholders, which further evolves into S2S communication. Each official account in the NIO APP is responsible for a specific stakeholder group, as well as establishing a topical community run by NIO based on stakeholder interests and occupations, which can further evolve into S2S communication.

In the S2B communication, the good interactive communication with the audience can establish an emotional connection and form a secondary communication, thereby enhancing the reputation and brand image of the enterprise. Brands can detect consumer dissatisfaction in time by monitoring comments about companies and brands in online communities, thereby reducing or preventing the possible brand crisis. In addition, research can prove that Zhou Di (2016)'s statement is correct. Likes and replies can not only maintain the normal relationship between people, but also can resonate the relationship of both parties. Analyzing the content of communications from stakeholders can reveal that the dialogues initiated by stakeholders have a clear purpose to meet their needs for the NIO APP. Through the study of S2B communication, there are no topics related to new energy vehicles and environmental protection, but more feedback on charging issues,

while in B2S communication, NIO's charging solutions frequently appear, alleviating stakeholders' concerns about the car or anxiety about inconvenient charging. This indirectly proves the findings of Florenthal and Grossman (2009) that the environmental advantages of new energy vehicles are not sufficient reasons to attract consumers of Generation Y, and consumers still have concerns about the performance of hybrid vehicles. On the downside, it was noticed that while NIO responded promptly to users in S2B communications, subsequent conversations took place in separate chat rooms, where other stakeholders could not see in the public space whether the issue was actually resolved.

6. Recommendations

According to the research findings, the following suggestions are provided for new energy vehicle brands, brand planners, consumers and governmental offices or Policy Makers. Firstly, the brand manager should pay attention to the brand communication operation of social platforms. For automobile companies, social media is a high-quality platform for information release, and its value lies mainly in the promotion of core communication information such as brand information, corporate culture, company dynamics, and promotional activities, thereby enhancing the visibility of the company. The executives should interact with the audience, establishes emotional connections, and forms secondary communication, thereby enhancing the reputation and brand image of the company. Any member of the enterprise has the obligation to monitor the conversations about the enterprise and the brand on the Internet, to detect the dissatisfaction of consumers in time, so as to reduce the probability of crisis. Secondly, analyzing the user's needs based on the UGT, the company can occupy the user market better and faster. Through S2B communication, brands can better understand the demands of stakeholders, and then integrate and respond to these contradictions through B2S communication. Thirdly, the dissemination of brand APP is still quite limited because the reach of this medium is naturally lower than other social media such as WeChat, especially in terms of information flow. Fourthly, potential consumers currently tend to refer to product reviews from various reliable sources, before making a final purchase decision. The words of mouth of car owners often have important informational value as a reliable reference. Therefore, potential consumers can refer to the information in the APP to assist their decision-making. For consumers who have purchased products, they should actively participate in the user's communities, actively give feedbacks regarding product problems, and establish good communication with the relevant brands, which is conducive to promoting product updates and technological progress. As for recommendations for future research, researchers should focus on communication between stakeholders, and the communication effect of the consumer perspective should be considered, such as word-of-mouth marketing to promote the mass audience to participate in the brand's marketing communication. Further investigation can be done regarding the potential impacts of brand communication strategy such as brand awareness, brand image, and brand reputation. Cultural dimension by Hofstede such as individualism versus collectivism or masculinity versus femininity may be added into the investigation when studying this topic.

7. References

Bermingham, A. & Smeaton, A. (2010). Classifying Sentiment in Microblogs: Is Brevity an Advantage? In *Proceedings of the 19th ACM international conference*, 1833-1836.

Bruhn, M., Schoenmueller, V., & Schäfer, D.B. (2012). Are social media replacing traditional media in terms of brand equity creation? *Management Research Review*, *35*(9), 770-790.

Culnan, M. J., McHugh, P. J., & Zubillaga, J. I. (2010). How large US companies can use Twitter and other social media to gain business value. MIS Quarterly Executive, 9(4).

Dolan, R., & Goodman, S. (2017). Succeeding on social media: Exploring communication strategies for wine marketing. *Journal of Hospitality and Tourism Management*, *33*, 23-30.

Blumler, J. G., & Katz, E. (1974). The Uses of Mass Communications: Current Perspectives on Gratifications Research. Sage Annual Reviews of Communication Research Volume III.

iresearch. (2021, January 28). *2020 China's New Energy Vehicle Industry Report*.

Krüger, N., Stieglitz, S., & Potthoff, T. (2012, December). Brand Communication in Twitter-A Case Study on Adidas. In PACIS, 161.

Liu, Y. & Ji, S. (2009). Gathering Customer's Demand Data through Web 2.0 Community: Process and Architecture. In CONF-IRM, 11.

Lowery, S., & De Fleur, M. (1983). Milestones in mass communication research. *Media Effects*. Nueva York, 93-111.

McQuail, D., & Windahl, S. (2015). Communication models for the study of mass communications. Routledge.

Schneider, A. M., Stieglitz, S., and Lattemann, C. (2008). Social Software as an Instrument of CSR. In *Transparency, Information and Communication Technology*, Vaccaro, A.; Horta, H.; Madsen, P. (eds.). Philosophy Documentation Center, Virginia, 124-138.

Sommer, S., Schieber, A., Hilbert, A. and Heinrich, K. (2011). Analyzing customer sentiments in microblogs – A topic-model-based approach for Twitter datasets. In *Proceedings of the Americas Conference on Information Systems* (AMCIS).

Wang Yeqiao. (2017). Research on Brand Communication Strategy and Communication Effect of Fitness App--Take Keep as an example. (Doctoral dissertation, Guangxi University).yiche.com (2021).

Yu, M., & Shu, Y. (2002). Brand Communication. *International Journalism*, *3*, 63-68.

Zhang, Y., Jia, H., & Yong, S. (2020). Research on CRM in User Service Innovation: Taking Weilai as an Example. *China Economic and Trade Guide*, *026*, 145.

Zhou, D. (2016). A study on WeChat likes among college students: From the perspective of use and satisfaction theory. *Southeast Communication*, *6*, 37-38.

Appendix A

Coding Scheme for the Genre of S2B Communication

	Item NO.	Genre	Keywords	
S2B	1	Product information	Total/ Sales/ Selling Price/ Average Price/ Down-payment/ Transfer Fee/ Common Fee/ Sinking Fund/ Payment process/ New products	
	2	Sales promotion	Temporal product discounts/ Special offers (special down payment / 0% interest for loan / free maintenance service)	
	3	Product statement	Design by owner/ Retrofit/ DIY	
	4	Brand statement	Thanks for NIO/	
	5	Driving statement	Driving feeling	
	6	Event statement	Time/ Location/ Interesting/ Boring/	
	7	Brand-related news	Enterprise-related issues/ Driving resort/ New sponsoring/ Brand news/ Enterprise's strategy/ Enterprise achievements/ Cooperate/ History/ Cross-mediating reprint	
	8	Driving question (Dynamic)	Loss of power/ Manipulate/ Out of control/ Auto pilot/ While driving/ Acceleration/ Deceleration/ Fault light	
	9	Product question (Static)	Software	Bug/ Lag/ System/ GPS/ Black screen/ No reaction/ Program issues/ Paid service/ App
			Hardware	Error/ Product defect/ Product confuse/ Noise/ Seat/ Security function/ Air conditioner/ Wiper/ Key/ Shock absorbers/ Buy & Sell/ EV/SUV Saloon/ EP9/ ES6/ EC6/ ES8/ ET7/ NIO Life/ Power Swap station/ Nomi
	10	Brand question	Rights & Interests/ Service problem	
	11	Self-expression	Like/ Dislike/ Talk about.../ Diary/ Life Experience/ Self-story/ Complaints	
	12	Game	Vote	
	13	Comments	Suggestion/ Update/ Opinions/ UI/ Inconvenience/ Add/ Improvement	
	14	Others	Keywords that are not fit with item no.1 - 13	

Coding Scheme for S2B Motivation to use NIO APP

Item NO.	Uses and Gratifications	Content Example	Title Example
1	Entertainment needs	Sharing mood and daily life	"Food recommendation, hope to join NIO Life".
2	Cognitive needs	Getting information	"When will NIO EVE come to mass production?"
3	Emotional needs	Getting care	"NIO Macau Supercharger keeps building but doesn't work".
		Finding empathy	"The tail makes the most beautiful curve, my EC6 has a soul".
		Satisfying vanity	NIO Track Day "First Experience", Experience EP9 with William
		Asking for help	"Accelerator pedal problem!"
4	Social needs	Participating in activities	Hot quiz: Who will William vote for?
		Meeting friends	Heilongjiang NIO Club "Thanksgiving Tour of William"
		Gaining sense of group belonging	"Former fashion industry entrepreneur, talk about NIO Fashion Week."

Appendix B

Official Explanation of Hashtag

#NIOGOODIDEAS #蔚来好想法 370,000 joining: When the same people gather on the road, age, industry, and gender are no longer important. What is important is mutual recognition of values, thinking about the value of product experience, and empathy for service and experience. Please continue to explore, continue to search, great innovation comes from your inadvertent. (NIO APP, 2021)

#UserCreativeGala #我是蔚来创意官 174,000 joining: This is a carnival stage exclusively for the creative photographers of NIO users. Use the camera to speak and show the most beautiful moments of your NIO car. Your work will have the opportunity to become NIO's global communication images. The NIO brand is created by you!

#Ihaveastory #我有故事 128,000 joining: Everyone is a luminous planet, and our gathering can make a little bit of starlight converge into a galaxy. Welcome to add the topic #Ihavestory# to share the true story in your life, as long as the story touches people's hearts, you can get points rewards.

#NIOBOOK 62,000 joining: NIO BOOK is a video guide for NIO car owners. We sincerely invite all drivers to create together. The event is effective for a long time. Bring NIO BOOK and related topics to publish a small video within 60 seconds. Use text to explain the main knowledge points of the shooting. We will power you up!

#TalkaboutBaas #我来说说 BaaS 12,000 joining: The BaaS NIO battery rental service launched on August 20, 2020 is an innovative battery rental model for car owners. Users can choose BaaS service to realize the separation of car and electricity to purchase cars and can flexibly realize battery upgrades. For your experience, welcome to talk about your feelings about BaaS services.

#NIORoadtrip #自驾路书 80,000 joining: The "Road Book" solicitation activity is open, and everyone is invited to share the dry goods content and pleasant experience of the self-driving tour. If you like to drive Wei to travel everywhere, if you are good at planning and like to share, welcome to share with topics!

#FatewithNIO #说说我和蔚来的缘分 170,000 joining: Story with NIO.

Appendix C

Examples of S2B Communication on NIO

[P1] NIO delivered 8,083 units in June to a new high, positive growth for 5 consecutive quarters.

[P2] NIO connects the first Qinghai-Tibet charging route in the country, with an average of one charging station or swapping station every 170 kilometers.

[P3] Deepening cooperation Hefei City and NIO jointly build a world-class intelligent electric vehicle industrial park.

[P4] Hello Norway, NIO Norway strategy will be released soon.

[P5] Yan Yupeng: Is it the responsibility of the "high-level sense" of Chinese brands?

[P6] "People's Daily" praised the NIO road service team, let's take a look at the day of NIO's road service staff photographed by reporters from "People's Daily".

[P7] NIO donated RMB 15 million to help Henan Province. We also remind our users and friends of NIO to pay attention to safety. Your safety is the most important thing. If you have any need, please feel free to contact us, we will do our best to help you.

[P8] Join the Blue Dot Program and practice environmental protection. Through the "Blue Dot Plan", NIO will better implement the original intention of the user enterprise, so as to jointly promote green and sustainable development with users.

[P9] The Secret of ET7 Autonomous Driving Black Technology ｜ Ultra-long-distance high-precision LiDAR.

[P10] 2021 NIO annual color release, EC6 & ES6 Aurora Green allowed to pre-order.

[P11] NIO Space ｜ Harbin Central Street, the northernmost cow house warmly opened.

[P12] Intention payment, deposit adjustment.

[P13] "Spring Outing" limited-time car purchase package is online!

[P14] Spoiler | You have a NIO Life 3rd anniversary benefit to be checked

[P15] One hundred thousand offline, welfare online! 100,000 offline, benefits online! From now on, invite

friends to test drive, you can receive surprises, points, and boutiques, 100% courtesy!

[P16] National Day welfare, listen to the arrangement of the junior sister, invite friends for a test drive, and get tickets for the auto show!

[P17] Software Update | NIO OS 3.0.0 release.

[P18] Power North free charging benefits are available.

[P19] The total number of NIO charging stations exceeded 1,000, and charging benefits are available for a limited time.

[P20] Happy New Year to everyone!

[P21] NIO owners start to apply for emergency window hammer.

[P22] 400 battery swap stations!

[P23] Everyone! EP9 joins the world's top racing game "Asphalt 9"!

[P24] Ding! The Summer Blind Box is a new surprise, the super "lineup" is not to be missed, participate in the #topic interaction, and randomly collect 5 lucky partners!

[P25] The accumulated mileage of NIO users exceeds 3 billion kilometers.

[P26] News ｜ NIO Day 2021 Candidate Cities Announcement.

[P27] Buying Guide｜Do you know all the common problems before buying NIO?

[P28] A "recommendation" get win-win | High points are waiting for you to pick!

[P29] Blue Sky Lab ｜ Looking for "NIO Life User Designer".

[P30] 360-degree camera recommendations.

[P31] Suggestions after getting the car.

[P32] NIO's "first experience" on track day, experience EP9 with Brother Bin (CEO William).

[P33] Hot quiz: Who will Brother Bin (CEO William) vote for?

[P34] NIO's second-generation ES8 flagship SUV guess.

[P35] William, would you like to say a few words about the car advertisement?

[P36] A little opinion on the car system @William.

[P37] Navigation problem feedback.

[P38] It took a month and a half to pick up the car. The first time I drove halfway, there was no network. After restarting, the parking image disappeared.

[39] Buy ES8's first post in half a year, dedicated to Model Y

Appendix D

Products of NIO (Sort by Time to Market)

Time to market	Product	Position	Introduction	Price (USD)	Competitor
Nov. 2016	EP9	Sport EV	Break the boundaries in design. Breaking six world records, one of the world's fastest electric cars	1.48M	Ferrari Lamborghini
Dec. 2017	ES8	Full-size SUV	High-end full-size SUV, suitable for business and family travel	94,783	Tesla Model X BMW X5 Lexus RX
Apr. 2018	ES6	Mid-size SUV	Fashionable and sporty, Exquisite, and technological interior	75,000	Tesla Model Y BMW X3 Audi Q5
Sep. 2020	EC6	Mid-size SUV	ES6 coupe Edition	77,000	Tesla Model Y BMW X4
Q1. 2022	ET7	4-door sedan	Smart & Luxury sedan	89,200	Tesla Model S Mercedes EQS Mercedes E BMW 5 & 7 Volvo S90

Room 4:

Science, Technology, Engineering

BRAND PERSONALITY ANALYSIS IN SOCIAL MEDIA NETWORK WITH TOPIC MODELLING AND WORD EMBEDDING

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ABSTRACT

The vast amount of data available on social media is a rich source of information that can be used to gain marketing insight. Brand personality is indicative of the relationship that customers have with the brand. It is a tool to understand customers' perceptions of a brand. As a result, businesses can use this information to create a more sustainable business. Although there is a large body of knowledge on social media analysis, brand personality extraction is extremely limited, particularly in Thai. In this paper, we purpose the brand personality extracting algorithm for Thai texts from Twitter. We used Latent Dirichlet Allocation combined with Word Embedding (Thai2fit) that can be done automatically with minimal human manual intervention to observe the similarity between Thai texts and brand personalities. Then, we visualize 20 largest Cosine similarity words of each brand personality scale with a word cloud and the word vector representation to classify personality of a brand with Euclidean distance. Finally, we discuss the challenge of analyzing the Thai language data.

Keywords: Text Mining, Brand Personality, Unsupervised Learning, Word Embedding, Data Analytics

1. Introduction

Brand personality is related to human personality traits. Brand personality differentiates brands and can express customers' individuality and social needs. People use these brands to reflect their personalities, such as being friendly, confident, or expressing how they differ from other people. People's opinions about a company's product or service can be measured, allowing businesses to modify their image to reflect their consumers' perspectives. Furthermore, product information such as pricing, gadget strength, durability, and appearance are the factors that customers consider when purchasing products, influencing corporate revenue and profit. Moreover, the social network's reputation has increased since decades ago. Social media has become a part of everyday life. Companies have begun to focus on communicating brand personality through digital platforms such as Twitter, one of the most popular platforms where information is posted. Using the data for brand personality is seen as a valuable asset in the business world.

By taking Thai text from Twitter, this study aims to examine how the personalities of various well-known brands in Thailand are perceived through social media. Next, we preprocess the texts by deleting any unnecessary words. Then, using a bag‑of‑words approach and an LDA model for clustering, we tokenize texts and extract features using TF‑IDF. We adjust the LDA model's hyperparameters using grid search. Next, we turn texts into arrays using the word embedding method. To show the customers' opinions about the brands on Twitter, we use a word cloud to visualize the topics. To show the separation between brand vectors and brand personality vectors, we also visualize the word vectors using t‑distributed stochastic neighborhood embedding (t‑SNE), a dimensional reduction technique. Which personality is most similar to the brands can be seen from the word vector visualization. The results of this research are 1. Word cloud visualization of 20 largest Cosine similarity words of each brand personality as follows "Sincerity" (honest, real, cheerful), "Exciting" (exciting, cool, young), "Competence" (reliable, secure, successful), "Sophistication" (upper class, charming), and "Ruggedness" (outdoorsy, tough). 2. Table and visualization of the Euclidean distance between the brand's vector and the brand personality's vector.

2. Research Objective

(1) To investigate how various famous Thai brands' brand personalities are interpreted via social media.

3. Literature Review

Brand Personality

In personality studies, the Big Five model through empirical research has 35 personality variables. Later, 35 personality variables were grouped into 5 personalities and applied in many marketing works of literature, such as Aaker's research (Aaker, 1997). Brand personality talks about the human personality associated with a brand, such as Apple being perceived as a more youthful brand than IBM's. We can see that human and company brands show similar personalities. Nowadays, the most widely used framework of brand personality is Aaker's brand personality. Even though there are better ways to figure out a brand's personality from social media, the Big Five model is still widely used to identify brand personalities.

Computational Detection of Brand Personality

Due to the emergence of social media platforms such as Facebook, Twitter has created a new online platform for various brands to communicate with customers. This various information contains much information generated by the user, which is informative for researchers and marketers. Several attempts have been made to measure brand personalities, such as Latent Dirichlet Allocation (LDA), k-means analysis, which has been applied to marketing analytics. Sun et. al analyzes personal traits from user-generated text using TF-IDF, LDA, and Word2Vec. (Sun et al., 2019) U. Pamuksuz et al. apply hybrid LDA to get the benefits of open vocabulary techniques while also using a closed vocabulary to match topics in the data to a set of criteria often seen in marketing. The method produces a tool that relates to other theoretical marketing constructs and analyzes the dataset comprehensively and combines LDA topic clusters with Word2vec to create a refined cluster of words

that explains the various topics of several brands and uses Word2vec to calculate distance similarities between each refined topic and the posts (Pamuksuz et al., 2020).

Natural Language Processing (NLP)

Data mining in social networks is still intriguing to research. One of the critical channels is Twitter, which is a rich source of interest to many researchers. Due to the popularity of Twitter and the fact that Twitter has an API to extract text from Twitter, there are several ways to extract text from Twitter: Twitter API or Twint library. After we extract Thai text from Twitter, we need to clean the data through preprocessing. S. Poolsukkho and R. Kongkachandra perform text normalization on Thai Twitter messages using the IPA similarity algorithm. They prepare the Twitter message by removing non-content characters and doing word segmentation (Poolsukkho & Kongkachandra, 2018). A mixture of considered data preprocessing of these research provides a better Thai text preprocessing. PyThaiNLP is a Python package library used for text processing and linguistic analysis, similar to NLTK (Natural Language Toolkits). However, PyThaiNLP is better to process Thai language than NLTK. Because the Thai language is a language that is written contiguously, there is no space between words like English. PyThaiNLP's word_tokenize function has multiple algorithms such as Newmm, Longest, Multi_cut, Pyicu, or Deepcut. TF-IDF stands for frequency-inverse document frequency. Word embeddings are word's vector representations that describe semantic similarity by calculating the distance between each word and other words in the vector space. In 2018, J. Howard and S. Ruder introduced Universal Language Model Fine-tuning (ULMFiT) (Howard & Ruder, 2018), a language model pre-trained on Wikipedia texts, followed by word embedding. Thai2fit (the previous version is thai2vec) is a model trained with word2vec on a Wikipedia corpus using ULMFiT. The similarity of two vectors in an inner product space is measured by cosine similarity. The cosine of the angle between two vectors is used to detect whether two vectors are pointing in the same direction. Text analysis, it's frequently used to determine document similarity. Cosine similarity is a popular NLP approach for estimating two embedded word/sentence vectors. Another of the most often used distance metrics is Euclidean Distance. The formula of the Euclidean Distance is the square root of the sum of differences between two different data points.

Topic Model, Optimization and Topic Model Evaluation

Because it is challenging to identify topics manually, which is inefficient and scalable due to the vast amount of data, topic models have been developed for text mining. Latent Dirichlet allocation (LDA) (Blei et al., 2003) is a probabilistic extension of multinomial PCA or latent probabilistic model used in topic modeling. The model parameters are learned during the training process, but hyperparameters are parameters that data scientists need to set before training. Random Search and Grid Search are popular methods for tuning hyperparameters for the model. Grid Search is a technique used to find the most accurate value of model hyperparameters. Coherence measures have been introduced to evaluate the quality of topics in the topic. After that, an intrinsic evaluation method for topic models called Topic coherence was introduced. Topic coherence is a metric to evaluate how good the model is. As shown in these equations, C_v is based on a sliding window, one-set segmentation of the

top words, and an indirect confirmation measure based on normalized pointwise mutual information (NPMI) and cosine similarity.

Visualization

A word cloud, also known as a tag cloud, is a data visualization technique for displaying text data in which the size of each word represents its frequency or significance. A word cloud can be used to emphasize crucial textual data points. For dimensionality reduction technique, PCA works best only with continuous data, but the weakness is highly affected by an outlier in the data. t-distributed stochastic neighborhood embedding (t-SNE) was introduced by L. van der Maaten et al. (Maaten & Hinton, 2008), which is an unsupervised non-linear dimensionality reduction and data visualization technique. In t-SNE, the notion of SNE is still used, but instead of utilizing a normal distribution probability function in low dimensionality space, t-SNE uses a student's t-distribution probability function in low dimensionality space.

4. Research Methodology

Research Design

An overview of our proposed method is detailed below:
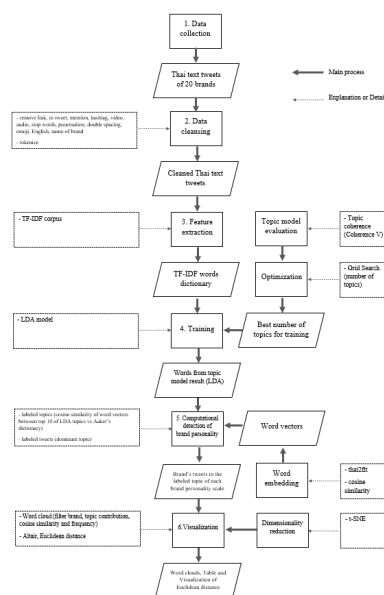
Figure 1 Main processes flow charts.

1. Data Collection

First, we used the Twint library to extract tweets from Twitter. We used only data from Twitter because, On Facebook, the public posts usually are the channeled brand personality that the company communicates rather than perceived brand personality from customers. We used brand names or product names as search terms. The tweets contain usernames, topics, and hashtags and extract information like email or phone numbers. We selected 20 well-known and active brands on Twitter for this study. The criteria for choosing the brand were the famous

worldwide brand and active on Thai Twitter (*Brand Personality: Traits of Top Brands*, n.d.). We also added some famous Thai brands that we want to analyze and some listed companies on the stock exchange. All 20 brands were retrieved, including: Nestle, SCG, Thailife, Honda, Redbull, Lego, Nike, Est, Apple, Google, Microsoft, Samsung, Mercedes‑Benz, Siam Paragon, Central Embassy, Starbucks, Birdy, Vans, Toyota, and Kubota. The total number of tweets in this study was 56,335 tweets.

2. Data Cleansing

In this step, we cleaned the data from the previous step. We removed unnecessary data, then we use PyThaiNLP which is a Python package library to tokenize the data. To achieve this, we used the Deepcut algorithm, since this method yields the most accurate result currently for Thai word tokenization. (Chormai et al., 2019) introduced an accurate and fast neural Thai word segmenter called Attacut. The result showed that the word segmentation quality of Attacut was comparable to Deepcut, faster than Deepcut but Attacut's quality still achieved lower score than Deepcut in the BEST‑2010 dataset.

3. Feature Extraction

We used the Term Frequency-Inverse Document Frequency (TF-IDF) method to generate a more relevant word dictionary. With TF-IDF, we can preserve important words in the documents which appropriate to use as input into the topic model. Marukatat showed experimental results that in classification tasks, word embedding was not better than bag-of-words (Marukatat, 2019). A decision to choose it over bag-of-words could be due to its scalability. Wang et al. proposed a hybrid method for extracting characteristics from documents in a semantic space using a bag‑of‑distances (Wang et al., 2017). The hybrid method, which incorporates both LDA and word2vec, generated associations between documents and themes and includes contextual relationships among words. The authors used the SVM model to compare TF-IDF, word2vec, LDA, and their proposed technique. TF-IDF made the best prediction, with about 2% more accuracy than their recommended technique. Although, TF-IDF method took more than 4 times to run compared to their hybrid method (word2vec and LDA), it is sufficient for our analysis.

4. Training, Optimization, Topic Model Evaluation

During training phase, we applied the Latent Dirichlet Allocation (LDA) model to extract topics from Twitter, since this technique in literatures show effective for extracting topics. Moreover, LDA is a topic model since it is more generalizable than other topic models and can quickly generalize to new texts. We put the corpus and dictionary obtained from the previous step into the LDA model by using the number of topics obtained using Grid Search to find the number of topics with the most appropriate coherence value for the LDA topic model to provide the best result. In this paper, we used Grid Search method to find the number of topics ranging from 2-150 topics to optimize the LDA topic model with the most appropriate Topic Coherence score (C_v) for minimizing duplicate words in each topic. P. Liashchynskyi et al. (Liashchynskyi & Liashchynskyi, 2019) compared Grid search, Random search, and Genetic algorithm in neural architecture search (NAS). The research results showed that Grid Search completely searched a given subset of the hyperparameter space and will find the best result. There are many types of Topic Coherence, such as C_a, C_Uci, C_UMass, C_npmi, C_p, and C_v.

Because a study by M. Röder et al. (Röder et al., n.d.) carefully and empirically investigated the number of topic coherence measures and their correlation with existing human topic ranking data, that why we used C_v topic coherence to evaluate the quality of the topic modeling in this study.

5. Computational Detection of Brand Personality
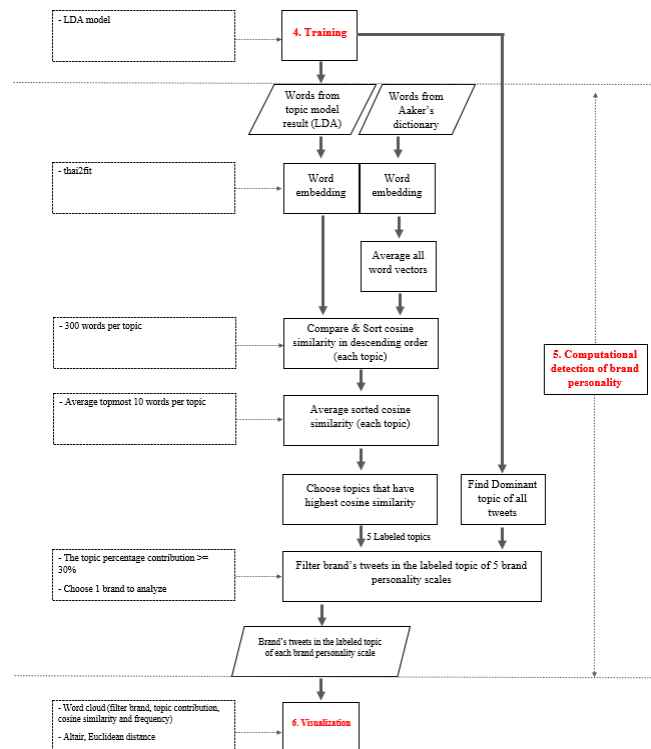
Figure 2 Computational detection of brand personality flow charts.

After getting the word for each topic from topic modeling, we loaded thai2fit model. The numerical value of the vector will be used to find the distance between Thai words, this information will be stored in a dictionary. Next, we got a dictionary of Thai word vectors to compare the difference in the meaning of each word using cosine similarity. After we got word vectors dictionary of thai2fit, we translated the traits (vocabularies) in Aaker's dictionary from English to Thai. After that, we vectorized each word from Aaker's dictionary across five scales (Sincerity, Excitement, Competence, Sophistication, and Ruggedness) by using the word embedding technique, matching each trait(word) in Aaker's dictionary with the words in thai2fit. As a result, we obtained word vectors in Aaker's dictionary with 300 dimensions and 2 dimensions by using t-SNE to reduce the dimension of word vectors. Once we know the word vectors of each scale in Aaker's dictionary, we then came up with the mean of the word vectors of the 5 brand personality scales. By finding the mean of all the words in each brand personality scale, we obtained the word vectors of each brand personality scale and stored in a dictionary. We compared words from LDA topic model with word vectors for each brand personality scale to determine which brand personality scale is the most relevant to each topic. By taking the results of the LDA model, we showed 300 words for each topic in LDA model, then extracted all 300 words for each topic to find the word vectors, and

stored the values as a list of the topic's dictionary. After, we knew the word vectors of every word from LDA topic model, we calculated the cosine similarity and average word vectors of each brand personality scale. After calculating, we knew that each word of each topic from the topic model, how similar or different from the average word vectors of each brand personality scale. We sorted the cosine similarity of the words in each topic in descending order to find the 10 words with the greatest cosine similarity. The 10 words were averaged with the cosine similarity to determine which topic was most similar to each brand personality scale. To select which topic has the closest word to the brand personality scale according to Aaker's dictionary, the topic that has the highest mean cosine similarity was chosen to represent the brand personality scale instead of the words. The result of this step is the labeled topic of each brand personality scale. In the next step, we used the initial data frame to label the brand name for each post. Then, we searched for the dominant topic of each tweet to check which topic is the most relevant to the words in each tweet by finding the topic number of each tweet that has the highest percentage contribution in that document. As a result, we knew that each tweet is closest to which topic in the topic model. Then we filtered the tweets in the labeled topic of each brand personality scale and required percentage contribution for each topic. We set the threshold of the percentage contribution at equal to or more than 30%. For those that did not achieve this threshold, we classified them as null tweets. Since Twitter contains tweets that people post but does not represent the brand personality, we used this threshold as a tweet filter to get tweets that reflect more on brand personality. Moreover, we chose a brand that we want to analyze. This step gave us brand's tweets in the labeled topic of each brand personality scale and has the percentage contribution equal to or more than 30%. We did not have a precise measurement tool because there were no datasets with target labels like supervised learning. Moreover, getting people to label the dataset is costly, slow, and impractical. We chose the inference method using well-known brands with clear brand personalities. So, we adapted the method from the "Social media post labeling" method that U. Pamuksuz et al. designed an unsupervised approach to generate labels for the dataset using self-supervision or weak learning (Pamuksuz et al., 2020).

6. Visualization

We then visualized 20 topmost words in each brand personality scale with the word cloud with filtering of frequency and cosine similarity of words between the tokens of each filtered tweet, in the labeled topic of each brand personality scale and the percentage contribution equal or more than 30%. The word cloud showed that the most frequent words people talk to in tweets are closely related to each brand personality scale, which refers to the brand personality of the brand we are analyzing. This information will help companies understand their customers better and be able to adjust their marketing strategies. After the step of Word Cloud visualization, we visualized the words displayed in the word cloud with the Altair library by taking all the words to find the word vectors from the thai2fit model and averaging all the word vectors to calculate the values representing the word vectors of that brand. Then we compared how close it is to the topic of the brand personality scale and visualized it using a dimensional reduction technique (t-SNE). After visualizing word vectors with t-SNE, we measured the distance between the word vectors of the words in the LDA model and the labeled topic of each brand personality scale with Euclidean distance to see each brand is close to which brand personality scale.

Figure 3 Word cloud visualization example

Figure 4 Euclidean distance visualization example
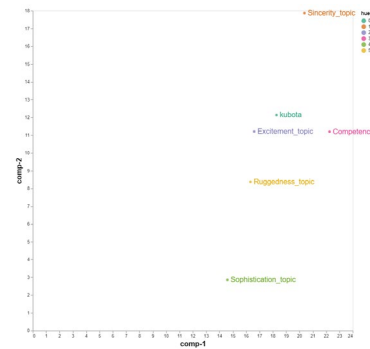
5. Research Findings

Table 1 Euclidean distance of brand vector vs. labeled topic of each brand personality scale (20 brands)

Brands	Brand personality scale				
	Sincerity	Excitement	Competence	Sophistication	Ruggedness
Kubota	6.105523	1.9160862	4.088272	9.984939	4.2394185
Toyota	2.9706585	8.400671	2.7561593	4.3253627	8.146029
SCG	8.051516	18.188938	3.2375586	3.147317	27.60559
Thailife	7.284165	4.0223136	5.554987	5.2290382	6.782056
Honda	4.557973	4.0630236	1.4033735	2.9750452	10.495062
Redbull	8.504719	8.518442	7.2626853	13.554296	11.600972
Lego	5.381639	10.752801	7.336539	16.111786	17.604168
Nike	7.386339	5.7036033	8.111689	15.9370775	10.985399
Est	4.57179	4.853663	2.5598452	7.731011	0.98554087
Apple	12.606115	9.739296	5.2667637	3.2580698	15.827158
Google	5.007628	2.6567798	4.4386806	8.488711	10.762295
Microsoft	4.755896	4.768503	1.9362121	13.293431	22.616844
Samsung	1.9287932	2.1326776	3.1471262	1.6569992	9.672416
Mercedes-Benz	6.3755546	9.996411	4.6804852	4.002038	15.48863
Siam Paragon	7.1483955	6.3623147	5.36513	7.5165024	6.5087233
Central Embassy	7.5335283	7.2724543	1.5141988	8.02701	8.785549
Starbucks	3.636551	5.803985	4.073367	8.290834	6.075315
Birdy	5.492055	0.93160844	4.596706	2.225417	4.051628
Nestle	17.073315	2.3643632	13.225078	14.452099	6.3001666
Vans	16.515102	8.263271	6.057005	14.62782	22.141447

The table above shows the Euclidean distance between the brand vectors and the labeled topic of each brand personality scale. The brands with the highest score (shortest Euclidean distance) on the Sincerity scale are Lego and Starbucks. Exciting brands are Kubota, Thailife, Nike, Google, Birdy, and Nestle. Competent brands

are Toyota, Honda, Redbull, Microsoft, Siam Paragon, Central Embassy, Vans. Sophisticated brands are SCG, Apple, Samsung, Mercedes-Benz. Rugged brand is Est. Some brands have the highest score very close to other scales, such as Toyota (Sincerity and Competence) and SCG (Competence and Sophistication), which means these brands have multiple personalities.

6. Discussion

In this paper, we first describe the meaning of brand personality, which is very important to a company. A brand's personality can characterize a company and its products. It also represents the sentiment of the target audience toward the brand. Nowadays, it is a challenge for companies to determine, control, and manipulate their brand personality to gain an advantage over their competitors. The brand personality that the company communicates to its customers stimulates the customer's loyalty and purchasing desire. Many companies in Thailand want to measure whether the customer understands the company's brand personality and conforms to the brand personality that the company wants to convey. A way is to investigate social media, where customers express their feelings honestly, so we have introduced a proposed model that will help the company analyze the customer's brand perception on Twitter. We found that the models can categorize each brand into a different brand personality based on Aaker's brand personality scale. The automated brand personality detection tool implemented U. Pamuksuz et al. that allows users to input brands and output the brand personality scores (Pamuksuz et al., 2020) can predict English tweets, while our proposed model was implemented to predict the brand personality scores from Thai tweets.

There are several limitations to this work. First, our research is limited to brand analysis on Twitter. Our strategy is not ideal for inactive brands on Twitter or those with a small number of tweets. Second, we used data from various brands across a variety of industries. If there are more tweets, many social media platforms, and multiple companies, clustering may be more effective in various scenarios and may assist in determining brand personality. Third, this work relies only on Thai text on Twitter. In the future, we might also think about using English text, emoji, and images instead of just text to figure out the real context.

7. Suggestion

In future work, we can improve the work as follows:

(1) Using an immense amount of tweets (larger dataset), several social media platforms, and several brands may be better in various contexts and may improve brand personality detection.

(2) Considering English texts, emojis, and images to identify real context instead of relying only on texts will improve the models.

8. Reference

Blei, D. M., Ng, A. Y., & Michael I. Jordan. (2003). Latent Dirichlet Allocation. *Journal of Machine Learning Research, 3*, 993–1022.

Brand Personality: Traits of Top Brands. (n.d.). Retrieved December 29, 2021, from https://www.ebaqdesign.com/blog/brand-personality#volvo

Chormai, P., Prasertsom, P., & Rutherford, A. T. (2019). *AttaCut: A Fast and Accurate Neural Thai Word Segmenter*. https://arxiv.org/abs/1911.07056v1

Howard, J., & Ruder, S. (2018). Universal Language Model Fine-tuning for Text Classification. ACL 2018 - 56th Annual Meeting of the Association for Computational Linguistics, *Proceedings of the Conference (Long Papers), 1*, 328–339. https://arxiv.org/abs/1801.06146v5

Liashchynskyi, P., & Liashchynskyi, P. (2019). *Grid Search, Random Search, Genetic Algorithm: A Big Comparison for NAS*. https://arxiv.org/abs/1912.06059v1

Maaten, L. van der, & Hinton, G. (2008). Visualizing Data using t-SNE. *Journal of Machine Learning Research, 9*, 2579–2605.

Marukatat, R. (2019). A Comparative Study of Using Bag-of-Words and Word-Embedding Attributes in the Spoiler Classification of English and Thai Text. *Studies in Computational Intelligence, 847*, 81–93. https://doi.org/10.1007/978-3-030-25217-5_7

Pamuksuz, U., Yun, J. T., & Humphreys, A. (2020). *A Brand-New Look at You: Predicting Brand Personality in Social Media Networks with Machine Learning The Social Media Macroscope View project Deep Learning in Healthcare View project*. https://doi.org/10.13140/RG.2.2.15339.49444

Poolsukkho, S., & Kongkachandra, R. (2018). Text Normalization on Thai Twitter Messages using IPA Similarity Algorithm. *2018 International Joint Symposium on Artificial Intelligence and Natural Language Processing, ISAI-NLP 2018 - Proceedings*. https://doi.org/10.1109/ISAI-NLP.2018.8692908

Röder, M., Both, A., & Hinneburg, A. (n.d.). Exploring the Space of Topic Coherence Measures. *Proceedings of the Eighth ACM International Conference on Web Search and Data Mining*. https://doi.org/10.1145/2684822

Sun, G., Guo, A., Ma, J., & Wei, J. (2019). Personal trait analysis using Word2vec based on user-generated text. *Proceedings - 2019 IEEE SmartWorld, Ubiquitous Intelligence and Computing, Advanced and Trusted Computing, Scalable Computing and Communications, Internet of People and Smart City Innovation, SmartWorld/UIC/ATC/SCALCOM/IOP/SCI 2019*, 1131–1137. https://doi.org/10.1109/SMARTWORLD-UIC-ATC-SCALCOM-IOP-SCI.2019.00213

Wang, Z., Ma, L., & Zhang, Y. (2017). A hybrid document feature extraction method using latent dirichlet allocation and Word2Vec. *Proceedings - 2016 IEEE 1st International Conference on Data Science in Cyberspace, DSC 2016*, 98–103. https://doi.org/10.1109/DSC.2016.110

FERRIC CHLORIDE CROSS-LINKED EPOXIDIZED NATURAL RUBBER

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ABSTRACT

The curing of epoxidized natural rubber with 25 mole% (ENR-25) was performed by using metal ions namely ferric chloride, $FeCl_3$. The main aim of this work was to investigate the influence of $FeCl_3$ on coordination reaction with epoxidized natural rubber. Therefore, cure characteristics and mechanical properties of the rubber compounds were investigated. It was found that the ENR‑25 compounds were linkages with $FeCl_3$ with good modulus and tensile strength. That is, cross-linking reaction in the ENR-25 via coordination linkages between the opened rings epoxirane groups in ENR molecules and ferric ions (Fe^{3+}). It was found that the ENR-25 with over 5 mmol $FeCl_3$ exhibited higher modulus and tensile strength. Furthermore, the crosslink density increased with increasing $FeCl_3$ concentrations. This confirms the cross-linking reaction of ENR and $FeCl_3$.

Keywords: Epoxidized natural rubber, Ferric chloride, Cross-linking, Coordination reaction.

1. Introduction

The metal ions have been used as a special type additive to tailor properties of rubber. That is, some divalent transition metal ions (i.e., Mn^{2+}, Cu^{2+} and Fe^{2+}) have been found to accelerate the oxidative degradation of solid rubber by fragmentation of poly‑isoprene chains (Ripple *et al*., 2002). Also, the chemically modified NR in form of epoxidized natural rubber (ENR) enhances some NR properties such as weathering, oil resistances, gas permeation and high polarity (Baker *et al*., 1985). Recently, the self‑healable ENR has been prepared by reacting with mixed metals ions namely ferric chloride and diamine crosslinking agents (Mandal *et al*., 2021). It was found that some physical properties of the metal ion crosslinked samples are comparable with the conventional sulfur crosslinked samples (Mandal *et al*., 2021). Also, it was found that some types of metal ions could react with ENR molecules via the reactive epoxirane rings, leading to crosslinking reaction of ENR

molecules and hence permanent crosslinked network structures (Zhang *et al.*, 2018). The main aim of the present work was to vulcanize the epoxidized natural rubber 25 mole% (ENR-25) by metal ions namely ferric chloride (FeCl$_3$) by mixing ENR-25 and FeCl$_3$ at high temperature using the conventional mechanical mixing tools. Various properties, including cure characteristics, mechanical properties and crosslink densities were investigated.

2. Experimental

2.1. Materials

The structure of the epoxidized natural rubber is shown in Figure 1. Materials used in this work and their sources are listed in Table 1.
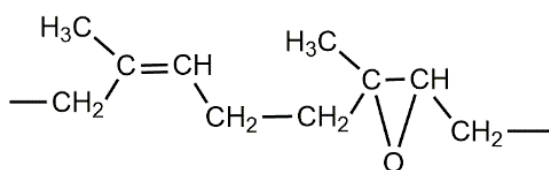
Figure 1. The structure of epoxidized natural rubber

Table 1. Characteristics and sources of materials used.

Chemicals	Sources
Epoxidized natural rubber with 25 mol% epoxide (ENR-25)	Muangmai Guthrie Co. Co., Ltd., (Surat Thani, Thailand)
Ferric chloride (FeCl$_3$)	Sigma-aldrich, (St. Louis, USA)

2.2 Preparation of ENR-FeCl$_3$ compounds

ENR-25 was first dried in a hot air oven at 60°C for about 24 h and then mixed with different concentrations of ferric chloride at i.e., 1, 3, 5, 7 and 10 mmol in an internal mixer (Brabender Plasticorder) with a measuring mixer type 50 EHT (Duisburg, Germany) at 60°C and a rotor speed of 60 rpm. In the mixing process, ENR was masticated for about 1 min before incorporating of ferric chloride with continued mixing until reaching a total mixing time of 5 min, as compounding formulation and mixing schedule shown in Table 2. The rubber compound was dumped from the mixing chamber and sheeted out by passing through the 1 mm nip of an open two-rolls mill model YFCR 600, Yong Fong machinery Co., Ltd (Samut Sakorn, Thailand) at ambient temperature. The rubber compound was then conditioned in a desiccator at room temperature for about 24 h. Cure characteristic was eventually investigated by moving die rheometer, MDR 2000, Alpha-technologies, (Ohio, USA) at 160°C. Finally, the vulcanized rubber sheets were prepared by compression molding using PR1D-W400L450PM molding machine, Charon Tut Co, Ltd (Bangkok, Thailand) at 160°C and the respective cure time based on the rheometer test.

Table 2. Compounding formulations and mixing schedule of ENR with FeCl$_3$

Ingredients	Quantities (phr)	Time mixing (min)
ENR-25	100 phr	1
FeCl$_3$	0, 1, 3, 5, 7 and 10 mmol	4

*Controlled batches are prepared: 50 g ENR-25 and various FeCl$_3$ loading at 1, 3, 5, 7 and 10 mmol (i.e., 0.1622, 0.4866, 0.8110, 1.1354 and 1.622g respectively)

2.3 Cure Characterization

Cure characteristics of various rubber compounds were investigated by moving die rheometer, MDR 2000, Alpha Technologies, (Ohio, USA) with a fixed frequency of 1.67 Hz and strain amplitude of 1° arc at 160°C. The scorch time (t_{s1}), cure time (t_{c90}), minimum torque (M_L), maximum torque (M_H), and torque difference (M_H-M_L), were determined from the curing curves.

2.4 Mechanical properties

The tensile test specimens were mechanically die cut from the rubber vulcanizate sheets to form a dumb-bell shape, according to ISO 527 (type 5A). The samples were then clamped with the sample holder of the tensile testing machine, Zwick GmbH & Co., KG (Ulm, Germany) at room temperature. They were then elongated with a crosshead speed of 200 mm/min, according to ISO 527.

2.5 Crosslink Density

Swelling measurements were carried out to determine the crosslink density of the rectangular 10 x 10 x 2 mm^3 rubber specimens. The samples were weighed before immersing into toluene at room temperature for seven days. The swollen rubber samples were then removed and excess liquid on the specimen surfaces was removed by blotting with filter paper. After that, the specimens were dried in a vacuum oven at 40°C for 24 h. Finally, the original weight was compared with the final weight before and after immersion into toluene. The crosslink density of the rubber vulcanizates was eventually determined according to Flory–Rehner relation (Flory and Rehner., 1943):

$$V = \frac{-\ln(1-\emptyset p) + \emptyset p + X \cdot \emptyset_p^2}{V_L \cdot (\emptyset_p^{1/3} - \frac{\emptyset p}{2})} \tag{1}$$

Where $\emptyset p$ is the volume fraction of rubber in the swollen network, V_L refers to the molar volume of toluene, and X is the Flory–Huggins interaction parameter of toluene and NR. A value of $X = 0.39$ Flory and Rehner., 1943)

3. Result and Discussion

3.1 Curing characteristics

Figure 2 shows the mixing torque-time curves or curing curves of the ENR-25 compounded with various concentrations of FeCl$_3$ at 1, 3, 5, 7 and 10 mmol compared with the neat ENR-25. It is clearly seen that the neat

ENR‑25 had no response of mixing torque‑time relation. This indicates absent of the crosslinking reaction between ENR molecules. However, dramatically increasing torque is obvious when FeCl$_3$ concentration is higher than 5 mmol. That is, the mixing torque‑time curves increased with concentrations of FeCl$_3$, and the marching curing curves are seen. This is attributed to chemical reaction between oxirane rings in ENR molecules and Fe^{3+} to form rubber network structures via coordination -O-Fe-O- linkages.
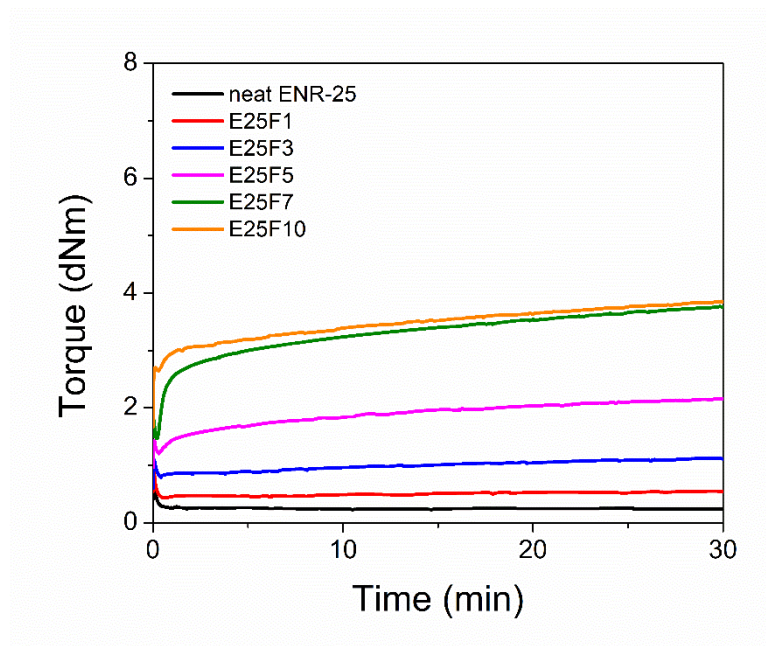
Figure 2. Cure curves of neat ENR-25 and ENR-25 compounded with various concentrations of FeCl$_3$ at 1, 3, 5, 7 and 10 mmol (i.e., E25F1, E25F3, E25F5, E25F7 and E25F10, respectively)

3.2 Mechanical properties

Figure 3 shows stress‑strain curves of the ENR‑25 compounded with various concentrations of FeCl$_3$ compared to the neat ENR‑25. It is seen that ENR compounded with FeCl$_3$ exhibited significantly increased in the initial and Young's moduli (i.e., slope of the initial curves) with increasing concentrations of FeCl$_3$. Also, the toughness as indicated by the area underneath of the stress‑strain curve also increased with increasing concentrations of FeCl$_3$. This is attributed to increasing level of crosslinking reaction and hence the linkages between oxirane rings in ENR molecules and FeCl$_3$ to form more rubbery network. On the other hand, the elongation at break decreased with increasing the FeCl$_3$ contents.
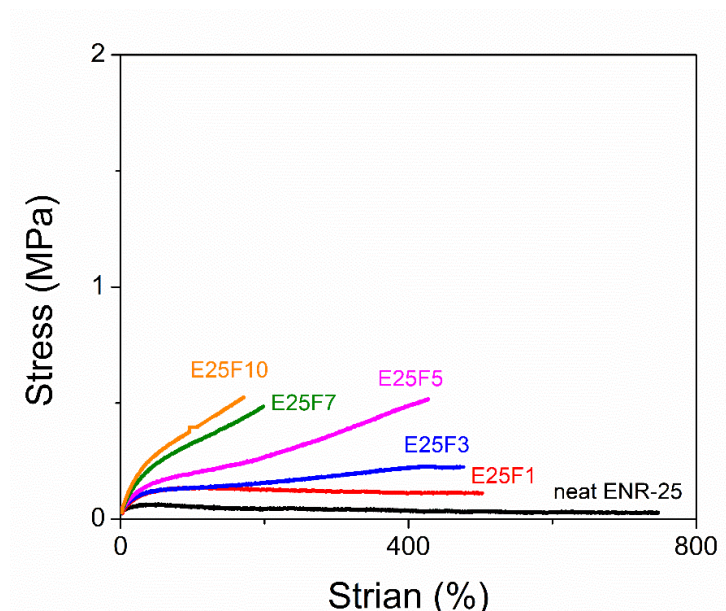
Figure 3. Stress-strain curves of neat ENR-25 and ENR compounded with various concentrations of $FeCl_3$ at 1, 3, 5, 7 and 10 mmol (i.e., E25F1, E25F3, E25F5, E25F7 and E25F10, respectively).

3.3 Crosslink density

Figure 4 shows the crosslink densities of ENR-25 compounded with various concentrations of $FeCl_3$ at 1, 3, 5, 7 and 10 mmol. It is clearly seen that the crosslink densities increased with increasing $FeCl_3$ contents due to the higher new formed coordination cross-links between Fe^{3+} and oxygen in the oxirane rings in ENR molecules. This indicates higher level of chemical crosslinks between ENR molecules and hence higher contents of -O-Fe-O linkage in ENR networks. This result correlates with magnitude of torque in Figure 2.
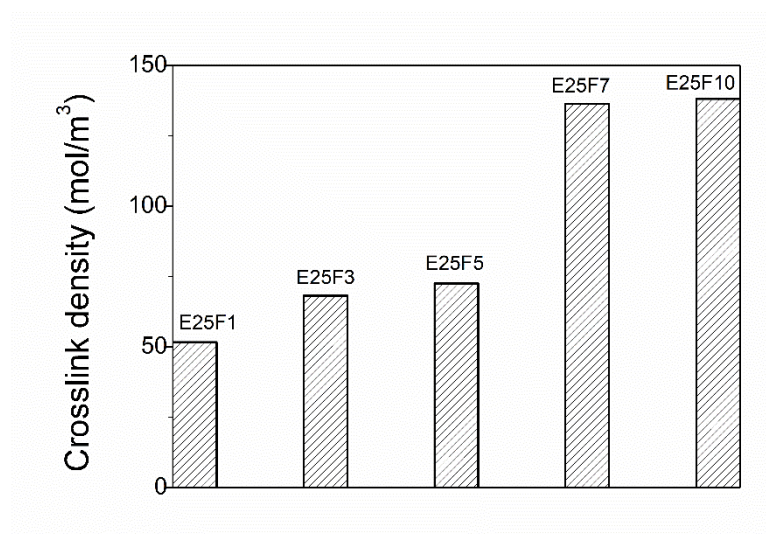
Figure 4. Crosslink density of ENR-25 compounded with various concentrations of $FeCl_3$ at 1, 3, 5, 7 and 10 mmol (i.e., E25F1, E25F3, E25F5, E25F7 and E25F10, respectively).

4. Conclusions

ENR‑25 was successfully vulcanized with $FeCl_3$ by a crosslinking reaction between opened ring products of an oxirane ring in ENR and Fe^{3+} to create metal—oxygen coordination (–O-Fe-O-) cross-links. It was found that the ENR‑25 compounds with $FeCl_3$ showed good tensile properties with increased curing torque, as the $FeCl_3$ concentration increased. This is attributed to chemical reaction between oxirane rings in ENR molecules and Fe^{3+} ion to form rubbery network.

5. Acknowledgments

6. Reference

Baker, C., Gelling, I. and Samsuri, A. (1986) Epoxidised Natural Rubber. *Journal of Natural Rubber Research*, *1*, 135-144.

Flory, P. J. and Rehner, J. (1943). Statistical Mechanics of Cross‑Linked Polymer Networks II. Swelling. *The Journal of Chemical Physics*, *11*(11), 521–526.

Mandal, S., Simon, F., Banerjee, S. S., Tunnicliffe, L. B., Nakason, C., Das, C. and Das, A. (2021). Controlled Release of Metal Ion Cross-Linkers and Development of Self-Healable Epoxidized Natural Rubber. *ACS Applied Polymer Materials*, *3*(2), 1190–1202.

Rippel, M. M., Paula Leite, C. A. and Galembeck, F. (2002). Elemental Mapping in Natural Rubber Latex Films by Electron Energy Loss Spectroscopy Associated with Transmission Electron Microscopy. *Analytical Chemistry*, *74*(11), 2541–2546.

Zhang, X., Liu, J., Zhang, Z., Wu, S., Tang, Z., Guo, B. and Zhang, L. (2018). Toughening Elastomers Using a Mussel‑Inspired Multiphase Design. *ACS Applied Materials & Interfaces*, *10*(28), 23485–23489.

STUDY OF THE BAMBOO (BAMBUSA BEECHEYANA) MECHANICAL PROPERTIES AS AFFECTED BY VARIATIONS IN GAUGE LENGTH AND DENSITY

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ABSTRACT

The natural fiber from bamboo is a very popular material for creating composites because it is a natural long fiber and an orthotropic material. Bamboo contains cellulose, hemicellulose, and lignin [1,6]. Each layer of which has distinct mechanical properties due to variations in the density of the cellulose fibers in different locations of the bamboo as well as the height of the bamboo itself [6]. Where, the outer layer of bamboo has the highest density, followed by the middle layer and the inner layer, which also have the lowest density. The above problems led to variances in the mechanical properties test results, differences in the mechanical properties may also be caused by variations in the bamboo test specimen's length [8]. Based on the aforementioned issues this research objective is to study the impact of bamboo mechanical properties from variations in density and gauge length.

The tensile test is used to evaluate the ultimate strength and young's modulus of the bamboo fiber strip. The specimens have different densities and also different lengths. Which, the specimen's length will be divided into 3-gauge lengths and its density is in the range of 0.3 to 1.0 (g/cm^3). Each specimen's length and density were measured to examine the effects on the mechanical characteristics.

According to the results of a study, the density of the bamboo fiber affects Young's modulus and ultimate strength. Most Bamboo Fiber Strip (BFS) densities fell around 0.5 and 0.7 (g/cm^3) when segmenting the

young's modulus of BFS utilizing the density range criterion. To study the mechanical properties, the test specimen length was divided into three data sets: a BFS Gauge length of 50 mm (BFS50), a BFS Gauge length of 100 mm (BFS100), and a BFS Gauge length of 200 mm (BFS200). The ultimate strength levels from the BFS50, BFS100, and BFS200 tests, respectively, did not differ substantially when the test results were analyzed using SPSS.

The results of the tests show that density affects the mechanical properties of bamboo. It was found that the higher the density, the greater the mechanical properties. The outer surface has the highest density of bamboo. They were not significantly different in the study of the effect of bamboo mechanical properties on variations in gauge length.

Keywords: Bamboo Fiber, Bamboo Composite, Mechanical Properties of Bamboo, Surface Modification

1. Introduction

Natural composite materials have received widespread attention from researchers, especially bamboo fiber composite. Bamboo is a plant that can be found commonly in Thailand and is also inexpensive. Moreover, bamboo fibers have excellent mechanical properties in comparison to other natural fibers. [5] Bamboo is an anisotropic, inhomogeneous material. The density and mechanical properties of the same bamboo trunk vary. As a result, the mechanical properties of bamboo in each test varied significantly, as shown in Fig. 1 [8]. Gao, X., *et al.* (2022) discovered that the variable length of the bamboo test specimen affects the variability of the mechanical properties as well [8].
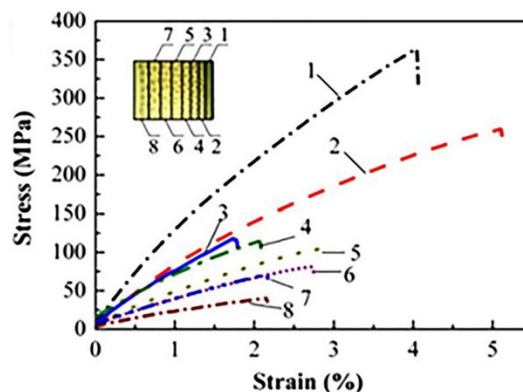
Fig. 1. Typical tensile stress-strain curves of bamboo slices [8].

In this research, the mechanical properties of bamboo (*Bambusa beecheyana*) were evaluated by the tensile test method. To prepare the specimen, The gauge length and density of all specimens are measured before testing, to study the effect of gauge length and density on the mechanical properties of bamboo. The deformation study of the bamboo specimen was then performed.

2. Research Objective

(1) study the effect of density on the mechanical properties of bamboo (*Bambusa beecheyana*)

(2) study the effect of gauge length on the mechanical properties of bamboo (*Bambusa beecheyana*)

3. Literature Review

The main component of bamboo is a cellulose fiber, hemicellulose, and lignin [1]. An important component of bamboo, cellulose fiber, provides strength and stiffness value for the molding of composite materials. The appropriate material for cellulose fiber reinforcement is, for the most part, a polymer matrix. However, both material bamboo fiber and polymer materials have difficulty with adhesions. Therefore, Bamboo fiber is the hydrophilic properties of water while polymer material has hydrophobic properties [2]. For this reason, before forming natural composite material from these materials, it is necessary to surface modification process for better adhesion of the two materials [4]. The selection of bamboo for composite material forming is also a top priority since bamboo is an orthotropic material. The factors affecting to mechanical properties of bamboo fiber such as age, the height of the internode, layer, spicy, moisture, length, and density, in consequence, the mechanical properties of bamboo fiber are highly Varian. The suitable bamboo age for composite material forming is 3 years or more, which is fully grown and high density.

Differences in the height of the internode and the layer affect bamboo density. Each spicy bamboo has different mechanical properties. Therefore, this research chooses the same spicy for mechanical testing. Moreover, moisture also affects mechanical properties, according to [7] research the less moisture the more excellent mechanical property. Many research mentioned that many factors affect mechanical properties usually related to density. In addition, the bamboo clump or internode bamboo also has a different density, the density of bamboo fiber is the more strength it will be.

4. Research Methodology
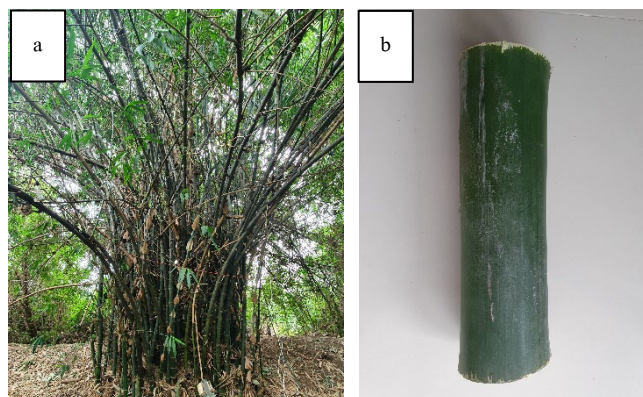
Fig. 2a. *Bambusa beecheyana* b. Internode without node of Bamboo

4.1 Raw material

The *Bambusa beecheyana* grown in Thailand was selected for the raw material presented in Fig.2a. In this research, the specimens were taken from a single bamboo, and 4 contiguous internodes without nodes to avoid the impact of unstable mechanical properties around the node. Lastly, the bamboo was cut into pieces and dried in the sunlight for 4 hours then they were stored at room temperature to prepare for the forming bamboo fiber strip (BFS).

Fig. 3a. Cross-section area of internode bamboo b. A different layer of bamboo anatomy

4.2 Bamboo Preparation

Referring to [3, 6] research explains that the difference in bamboo height, internode, the layer of the outer layer, or inner layer affects density. In this research, the specimens were taken from a single bamboo, 4 contiguous internodes without nodes then cut to the bamboo fiber strip (BFS) from all layers of the internode presented in Fig. 3b. The specimens were divided into 3 conditions by the length consisting of Bamboo Fiber Strip Gauge Length 50 (BFS50), Bamboo Fiber Strip Gauge Length 100 (BFS100), and Bamboo Fiber Strip Gauge Length 200 (BFS200) ostensible in table 1, Fig.3.

Table 1 Dimension of Bamboo Fiber Strip Specimen

Condition	Gauge length	Width	Thickness
Bamboo fiber strip Gauge length 50 mm (BFS50)	50±0.37 (mm)	5±0.21 (mm)	0.5±0.08 (mm)
Bamboo fiber strip Gauge length 100 mm (BFS100)	100±0.62 (mm)	5±0.51 (mm)	0.5±0.06 (mm)
Bamboo fiber strip Gauge length 200 mm (BFS200)	200±0.62 (mm)	5±0.19 (mm)	0.5±0.03 (mm)
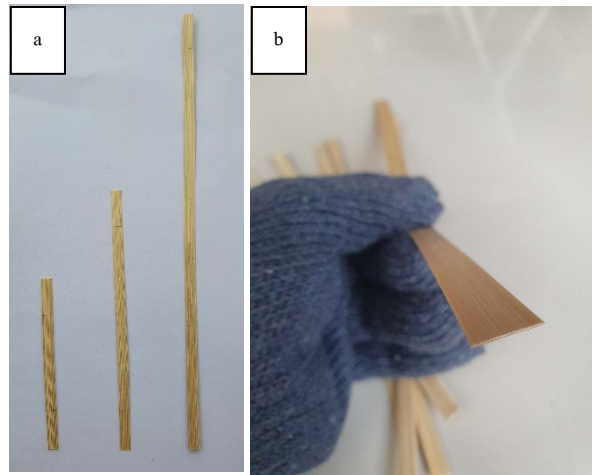
Fig. 4a. Bamboo Fiber Strip 3 Gauge length b. Bamboo Fiber Strip Surface

4.3 Specimen Preparation

Resize the bamboo fiber strip (BFS) length, width, and thickness by using a knife. Measure the size of entire specimens with Mitutoyo digital caliper and measure the weight with a digital scale Model SHIMADZU ATX224. The measure of the size and weight method used these data to calculate the density by applying equation 1, and the specimens were stored at room temperature throughout the research process. After that, the specimen grip tab is attached using the wooden material to prevent the specimen from being damaged during testing by the tensile test machine model Instron as shown in the grip tab length measures approximately 15 mm. according to ASTM D 3039.

$$D = \frac{m}{v}$$
<div align="right">equation.1</div>

4.4 Tensile test

The tensile test of three conditions was performed referring to ASTM D 3039 at a crosshead speed of 0.5 mm/min. The strain was measured using the extension value from the tester machine, which is the Instron model testing machine.

5. Research Findings

5.1 Density

Fig. 3b depicts the density measurements of the specimens in 8 bamboo layers. The specimen density was found to be between 0.37 and 0.93 (g/cm^3). The density of the cellulose fibers in the outer layer was found to be denser than the inner layer as the number of layers in the bamboo pulp increased. Moreover, the tensile result also corroborates that the density of bamboo affects mechanical properties. Fig. 5. shows the relation between Young's modulus and density, the more density, the more Young's modulus increases.
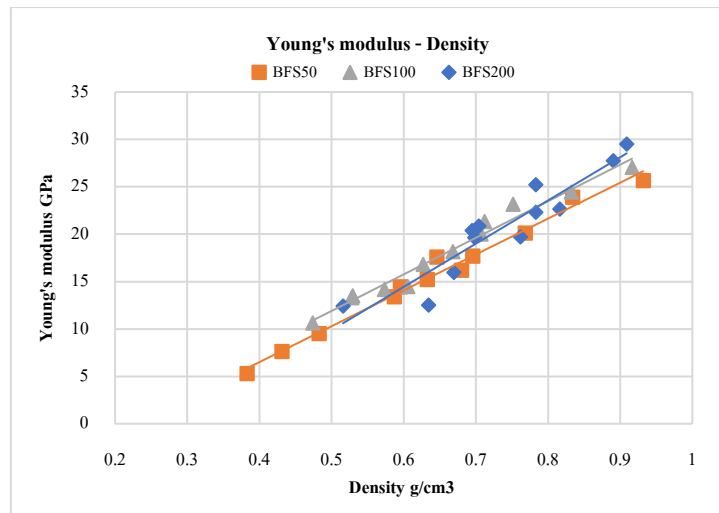
Fig. 5. Relation between Young's modulus and density

The segmentation of young's modulus data that variable by density was divided into 3 groups consisting of the density between 0.3-0.5 g/cm^3 (GD1), 0.5-0.7 g/cm^3 (GD2), and 0.7-0.9 g/cm^3 (GD3) showed in Fig. 6. The specimens overall 36 pieces showed the result as follow. Firstly, the GD1 has 4 specimens that showed Young's modulus between 5.29-10.62 (GPa). Secondly, The GD2 has 17 specimens that showed Young's modulus between 12.42-20.37 (GPa). Lastly, The GD3 has 15 specimens that showed Young's modulus between 19.715-29.52 (GPa).
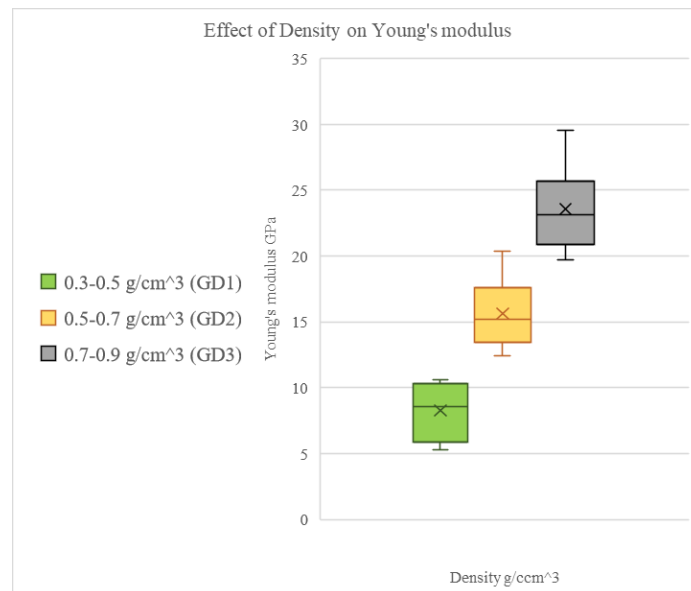
Fig. 6. young's modulus data that variable by density divided into 3 groups

Therefore, the ultimate tensile stress is affected by density as well, which is the same trend as Young's modulus. The more increasing density the more increases ultimate strength as shown. In Fig. 7.
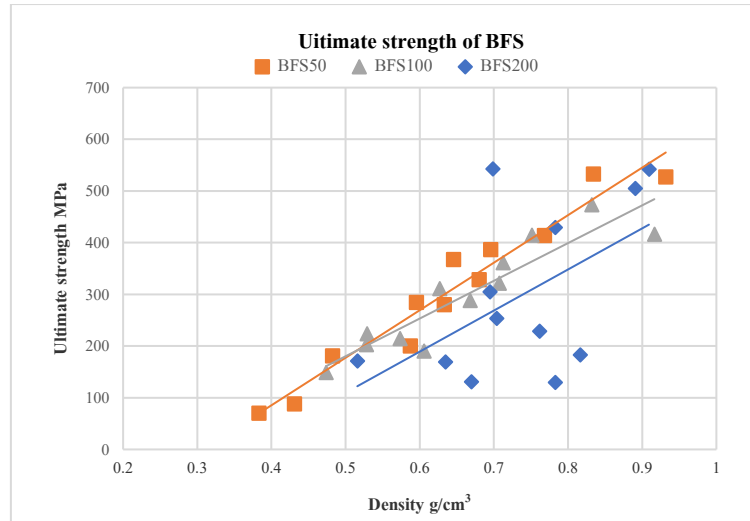
Fig. 7. The relation between Ultimate strength and density

Impact of varying gauge length

Fig. 8. shows that after varying the gauge length from 50 mm, 100 mm, and 200 mm, respectively, the ultimate strength values were not significantly different, the ultimate strength of the BFS50 average was 305.1 ± 151.87 MPa, and the BFS100 ultimate strength average was 297.2 ± 103.87 MPa and the BFS200 ultimate strength average was 299.1 ± 161.97 MPa. The Data were statistically analyzed using the SPSS program. Therefore, the variance was analyzed by Duncan's Multiple Range Test at a 95% confidence level (p<0.05).
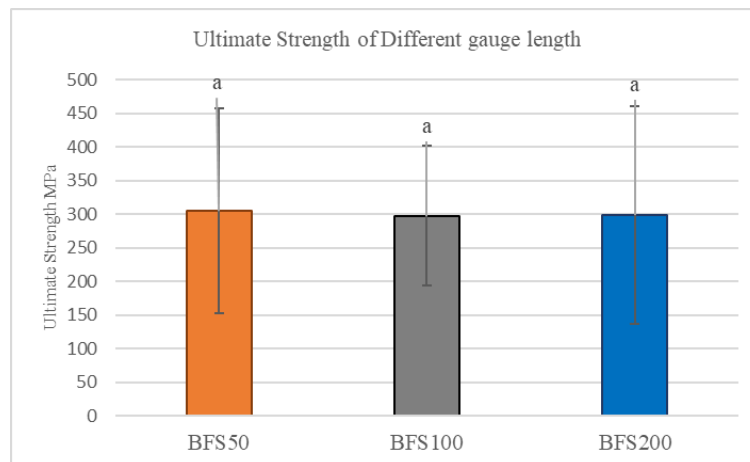
Fig. 8. The Ultimate strength data were statistically analyzed using the SPSS program. Therefore,

the variance was analyzed by Duncan's Multiple Range Test at a 95% confidence level (p<0.05).

6. Discussion

(1). From the 4 contiguous internodes of bamboo without nodes to cut into test specimens by cutting every layer, it was found that each specimen had a different density as a result of the fiber density in each layer. The outermost layer has the highest cellulose fiber density and the middle layer has less fiber density than the outermost layer. The innermost layer has the least fiber density. Another thing is that the four internodes also have an unequal density in bamboo, as though in the research [3]. For this reason, every test specimen density is unequal values in the range of 0.37 – 0.93 (g/cm^3)

(2). The effect of density on mechanical properties, by arranging the ascending specimen density values test, it was found that the higher the density value, the higher Young's modulus value of the test specimen. Therefore, the relations between the density value and Young's modulus value of the test specimen are shown in the form of a graph as shown in Fig. 5, This is because Density is a direct variance to the fiber density in the bamboo layer at different locations, as well as the different Density values in different internodes.

The Density range of the specimens was divided into 3 groups consisting of GD1, GD2, and respectively. It was found that most of the bamboo specimens had a Density in the GD2 group which is 0.5-0.7 (g/cm^3). From this test result, it was revealed that when using the density value to select specimens, the variance of the mechanical property could be reduced. For example, specifying the Density range of the test specimen is a certain range. or narrow the Density range of the test specimens. The Ultimate Strength and Young's modulus from above have a similar relationship with density. In other words, the ultimate strength increases with increasing density.

(3). Impact of the varying gauge length, using the SPSS program, the ultimate strength values of 36 test specimens, including the BFS50, BFS100, and BFS200, were examined. The variance was examined using Duncan's Multiple Range Test at a 95% confidence level (p 0.05). The outcome shows that there was no appreciable difference in the ultimate strength value by gauge length modifications in this study.

7. Suggestion

(1) The outermost position in the bamboo trunk should be chosen for analysis of bamboo mechanical properties because it has the best density and mechanical properties.

(2) They were not significantly different in the study of the effect of bamboo mechanical properties on Gauge length 4 condition variation. With the foregoing in reason, it is suggested that the study of such effects increase the frequency of testing to order to obtain accurate test results.

8. Acknowledgement

9. References

1. Abdul Khalil, H. P. S., IA Review." *Materials & Design* 42 (2012): 353-68.
   https://doi.org/10.1016/j.matdes.2012.06.015.

2. Adel Salih, Abeer, Rozli Zulkifli, a. U. H. Bhat, M. Jawaid, A. Zaidon, D. Hermawan, and Y. S. Hadi.
   "Bamboo Fibre Reinforced Biocomposites: nd Che Husna Azhari. "Tensile Properties and
   Microstructure of Single-Cellulosic Bamboo Fiber Strips after Alkali Treatment." *Fibers 8*(5), (2020).
   https://doi.org/10.3390/fib8050026.

3. Cheng, L., C. Hui, G. V. P. Reddy, Y. L. Ding, and P. J. Shi. "Internode Morphometrics and Allometry of
   Tonkin Cane Pseudosasa Amabilis." *Ecol Evol* 7, no. 22 (Nov 2017): 9651-60.
   https://doi.org/10.1002/ece3.3483. https://www.ncbi.nlm.nih.gov/pubmed/29187997.

4. Manalo, Allan C., Evans Wani, Noor Azwa Zukarnain, Warna Karunasena, and Kin-tak Lau. "Effects of
   Alkali Treatment and Elevated Temperature on the Mechanical Properties of Bamboo Fibre–Polyester
   Composites." *Composites Part B: Engineering* 80 (2015): 73-83.
   https://doi.org/10.1016/j.compositesb.2015.05.033.

5. Pozo Morales, A., A. Guemes, A. Fernandez-Lopez, V. Carcelen Valero, and S. De La Rosa Llano.
   "Bamboo-Polylactic Acid (Pla) Composite Material for Structural Applications." *Materials (Basel)*
   10, no. 11 (Nov 9 2017). https://doi.org/10.3390/ma10111286.
   https://www.ncbi.nlm.nih.gov/pubmed/29120398.

6. Wang, Fuli, and Zhuoping Shao. "Study on the Variation Law of Bamboo Fibers' Tensile Properties and the
   Organization Structure on the Radial Direction of Bamboo Stem." *Industrial Crops and Products* 152
   (2020). https://doi.org/10.1016/j.indcrop.2020.112521.

7. Wang, Hankun, Wanju Li, Dan Ren, Zixuan Yu, and Yan Yu. "A Two-Variable Model for Predicting the
   Effects of Moisture Content and Density on Compressive Strength Parallel to the Grain for Moso
   Bamboo." *Journal of Wood Science* 60, no. 5 (2014): 362-66. https://doi.org/10.1007/s10086-014-
   1419-x.

8. Gao, X., Zhu, D., Fan, S., Rahman, M. Z., Guo, S., & Chen, F. (2022). Structural and mechanical properties
   of the bamboo fiber bundle and fiber/bundle reinforced composites: a review. *Journal of Materials
   Research and Technology, 19*, 1162-1190. doi:10.1016/j.jmrt.2022.05.077

COMMUNITY-BASED TOURISM AND COVID-19:

TOWARD TRANSFORMATIVE TOURISM WELLBEING STRATEGIES

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ABSTRACT

Transformative tourism was a way to review and manage tourism development for future since the COVID-19 pandemic widely impacted on people and communities to close down their businesses in hospitality and tourism industry. This qualitative research with multiple case studies was purposed to explain the construction process for transformative community-based tourism and wellbeing strategies after COVID-19 along the Andaman Coastal area of Thailand. The data were collected by reviews of secondary documents from related organizations, in-depth interviews, and a focus group discussion during January-March 2022. There were 25 key representatives: five community leaders or related people in the community-based tourism management; and 20 members of the Tourism Development Committee at Andaman Sea cluster. The research data were inspected for correction by triangulation, and were then analyzed by content analysis. The research results revealed that transformative strategies were conducted using 3R and 1E pattern. R1 = Recruitment was a step to seek for the subcommittee members to propose the strategies focusing on people and communities who served as service providers and customers. R2 = Re-budget/Re-fund was a step to recreate budget plans in order to direct and focus of the government's policies. R3 = Re-plan process contained two sections: reviews of structure-based plans and strategies, and reviews of action plans and strategies. E1 = Evaluation was the last step to evaluate strategies using determined goals and seek indicators and the construction process of strategies. The COVID-19 pandemic impacted the necessity of the construction process for the community-based tourism strategy adaptation in order to current changes.

Keywords: Community-Based Tourism, COVID-19, Transformative Strategies, Wellbeing, Andaman Coastal Area of Thailand

1. Introduction

Community-based tourism is one of tourism development ways, which is unique and different from mass tourism (Potjana Suansri & Responsible Ecological Social Tour, 2003). Community-based tourism is aimed at making people in local communities to have appropriate opportunities and benefits from their managed tourism, and these benefits widely happen to all community members (Curcija et al., 2019; Goodwin & Santilli, 2009; Lee, 2013; Mayaka et al., 2019; Potjana Suansri & Responsible Ecological Social Tour, 2003).

Community-based tourism in both developed and developing countries have been increased continually (Goodwin & Santilli, 2009). This tourism has widely been accepted to be development and improvement ways for economic status of local communities such as countryside communities, fishing communities in small islands and folk community of Aborigine in Australia (Lee & Jan, 2019), Kampong Kiudang Village Consultative Council (MPK Kiudang) in Brunei, Bali CoBTA - Bali Community Based Tourism Association in Indonesia, Taphin Village in Sa Pa. Vietnam (Ministry of Tourism and Sports, 2017).

In Thailand, tourism development has been focused on local tourism in tourist provinces or clusters, especially in five provinces connecting to the Andaman Sea, where contain capital of important marine and natural resources and could be determined to be community models of tourism development for other communities; therefore, incomes from mass tourism could be distributed to local communities (Jutima & Kuliga, 2019). In addition, it is important to transform foreigners' attitudes that tourism in Thailand has always been focused on natural resources, the sun, sand, the sea, and sex for decades (Sharafuddin, 2015) into tourism based on enhancement of local communities and income distribution from mass tourism to people in local areas where there has still been a small number of tourists.

However, during 2019-2020, the COVID-19 pandemic was first broken out in Wuhan, Hubei, China and spread to every province in China within 30 days until it was spread throughout the world. One of factors affecting the pandemic was people movement for tourism and business trips (Shi & Liu, 2020); hence, this pandemic changed tourism industry and other industries in several continents in the world. It also impacted on closedown of many businesses and services (Batra, 2021; Higgins-Desbiolles, 2020).

For these reasons, the campaigns of Transformative Tourism and Tourist Wellbeing were established by the Tourism Development Committee, Andaman Tourism Cluster. The tourism patterns and management (Pung et al., 2020) were operated according to the COVID-19 pandemic which was considered a chance to review strategies and tourism development system for the better future. Therefore, this article was aimed at explaining the construction process for transformative community-based tourism and wellbeing strategies after the COVID-19 pandemic along the Andaman coastal area of Thailand, which were necessary for adaptation and strategy determination suitably relevant and prompt to changes.

2. Research Objectives

To explain the construction process for transformative community-based tourism and wellbeing strategies after the COVID-19 pandemic along the Andaman coastal area of Thailand.

3. Related Literature Review

Community-Based Tourism (CBT)

Community-based tourism means to travel and consider natural resources, environment, society, and cultural sustainability. This tourism is managed and operated by a community for community, considered as community-based innovation and based on an idea of villagers as resources owners and tourism stakeholders. This community-based tourism is also a tool to strengthen people organization for their natural resources and culture management. A community can take part in development determination and gain benefits from the tourism. In addition, objectives of the tourism and awareness of resources in a community and a local way of life are established and explained to visitors. Suansri & Responsible Ecological Social Tour (2003); and Brorström (2020) mentioned that there are ten of success principles for transformative community-based tourism and wellbeing strategies: 1) a community as an owner, 2) villagers participate in decision and determination, 3) support for being proud of themselves, 4) life quality enhancement, 5) environmental sustainability, 6) local identity and culture conservation, 7) learning among people in diverse cultures, 8) respect for diverse cultures and human-being honor, 9) fair benefits for local people, and 10) income distribution to community services.

4. Research Methods

4.1 Research design

This qualitative research contained multiple case studies to investigate and analyze construction process. The research data were collected through online face-to-face in-depth interviews and online focus group discussions between January and March, in 2022. This research was certified for ethics in social and human research, with reference no. EC 001/65 on the 5th of January 2022, by the Public Policy Institute, Prince of Songkla University, Thailand.

Study Area

The study was conducted in five provinces— Phangnga, Phuket, Krabi, Trang, and Satun provinces—of the Andaman Tourism Cluster, Southern Thailand, according to the ministry law for tourism development cluster determination issued in the Royal Thai Government Gazette Vol. 132 Part 22a on 27th March 2015.

4.2 Key Informants

The key informants in this study were divided into two groups according to the concept by Mayers (2005): 1) primary stakeholders, and 2) secondary stakeholders. These samples were selected by purposive sampling, with the following characteristics.

Group 1 contained primary stakeholders who directly related to community-based tourism for both benefits and losses, namely people and community-based tour agencies in five selected communities which were awarded with the certification of the Community-Based Tourism Standard by Designated Area for Sustainable Tourism Administration (Public Organization). To collect the data, online face-to-face in-depth interviews with one person of each community (totally five people) were conducted.

Group 2 included secondary stakeholders who were organizations related to the announcement of the Tourism Development Committee, Andaman Tourism Cluster according to Article 19 of the National Tourism Policy Act (2008) issued on 19th August 2015. For this group, the data were gathered by online focus group discussions with 20 samples.

Before the data collection, both groups of samples were explained the research instructions and they were willing to attend in this research.

4.3 Research instruments

The instruments used in the research included the researchers, a set of questions for online face-to-face in-depth interviews, and online focus group discussions. The main question was about patterns and process for community-based tourism strategy operation which was suitable for Andaman Sea Cluster (Phuket, Krabi, Phang-nga, Trang, and Satun provinces). In addition, opinions and suggestions about the strategy determination of the community-based tourism and prevention measurements of unexpected changes were welcomed. However, during the data collection periods, records of videos and voices were asked for permission from the key informants.

4.4 Data collection

The steps of the data collection were as follows.

1. Online face-to-face in-depth interviews with each community leader or related people in the community-based tourism management were conducted for no more than one hour during each interview, the data were journaled, together with voice and video records.

2. The online focus group discussions with the Tourism Development Committee, Andaman Tourism Cluster was conducted once for 2-3 hours (n = 20). During the discussion, the data were written to notes, together with voice and video records.

The data collected terminated when the data is saturated (Saunders et al., 2018).

4.5 Data analysis

Methodological triangulation was used to verify the data collected from multiple data sources such as: the online face-to-face in-depth interviews, the online focus group discussions and document reviews. This process allowed the same data to be viewed from various perspectives, which clarified the meaning of the data in the larger context. In addition, the researchers conducted member check (Guba & Lincoln, 1989) Then the data were analyzed by content analysis.

5. Results

Construction process for community-based tourism toward transformative tourism and wellbeing strategies after COVID-19 included 3R and 1E pattern: R1 = Recruitment, R2 = Re-budget plan/Re-fund R3 = Re-Plan Process, and 1E = Evaluation with wellbeing strategies (see Figure 1) as the following details.

R1: Recruitment was a step to recruit people in the communities before the beginning of the construction process to develop strategies of community-based tourism. In fact, this step was run and responsible by a government office, not directly responsible people.

For this reason, the step of the recruitment for people operating tourism strategies needed to be emphasized on people and communities who could serve as service providers and service customers. The recruitment in this research was divided into three parts: (1) people or communities, (2) private organizations, and (3) government organizations as the following details.

A group of people and communities meant entrepreneur representatives who did businesses of community-based tourism and related jobs, including small groups of local fishing, weaving, local orchids or local plants. In addition, people joining the construction process for tourism strategies were required to have characteristics of critical thinking, negotiation, and three to five years of previous experiences in community-based tourism.

A group of government organizations contained five governors in each province, the Directors of Satun and Phuket Natural Resources and Environment Offices, one representative from the Phang-nga Culture Office, two representatives from Trang and Krabi Tourism and Sports Offices, five Presidents of each Provincial Administrative Organizations, five Presidents of each Provincial Chambers of Commerce, and five representatives from each Provincial Tourism Councils.

A group of private organizations was composed of representatives from Tourism Associations and Community-based Tourism Associations in each province.

After the recruitment, the selected representatives were appointed to serve as subcommittee members who could propose the strategy draft before it was proposed to the main committee members. For this subcommittee team, one governor was approved to be the chairman of the team, and the Director of Phuket Tourism and Sports Office was appointed to be a secretary.

R2: Re-budget plan /Re-fund was a step to propose a budget of community-based tourism strategy development, which was necessary to consider three components:

1. A budget plan should be relevant to directions and focuses of government policies.

2. A budget plan should respond to vision or development cooperation between government, private, and people parties.

3. Cooperation to mutually create a budget plan should be integrated among related organizations such as cooperation between a government organization or a Tourism and Sports office and a private organization in a community

R3: Re-Plan was a step to review former plans and strategies and recreate new strategies to be in line with current situations. However, consideration and development focus depended on 1) consistency of the local plan and the upper level plans, and 2) importance of situations with positive and negative effects.

Moreover, the re-plan step could be separated into two sections: structure-based plans and strategies and action plans and strategies. These sections are described below.

1. In terms of structure-based process of plans and strategies, the committee of Andaman Sea Tourism Development Cluster comprised of two teams: 1) the main committee, and 2) the subcommittee. The subcommittee were required to draft and propose plans and strategies to the main committee in order for certifying before these plans and strategies were submitted to the National Tourism Policy Committee for approval and announcement in the Royal Thai Government Gazette.

2. The action plans and strategies were started from the following process:

1) At first, it was important to review the previous plans and upper-level strategy plans of 20-year National Strategy (level 1), the National Reform program, the National Economic and Social Development Plan, and the Government Policies, including plans of each specific fields approved by the government and ordered by the Prime Minister (level 2), and the Tourism Development Plan for Andaman Sea Development Cluster (level 3).

2) Additional opinions of tourism objectives and goals from people and tourists were accepted.

3) The data from item (1) and (2) were analyzed by SWOT Analysis—Strength (S), Weakness (W), Threats (T), and Opportunity (O)—to find out potential and social capital of the areas. The SWOT-analyzed data were then matched in pair to seek for correlation by TOW Metrix Analysis: SO, WT, ST, and WO. In terms of incomplete data for analysis, opinions were asked again from private and people parties.

4) Five-year goals, vision, and missions were mutually determined, and goal seek and indicators for changes were identified.

5) Future forecasts were conducted in order to determine the strategies of the development.

6) The strategy reviews were operated by sending e-mails to five Tourism and Sports offices to consider stakeholders in each province. The responses were then sent back to the secretary for collection and consideration by the subcommittee again.

7) The community-based tourism strategies for Andaman Sea Cluster were proposed to the main committee, the subcommittee of Andaman Sea Tourism Development Cluster, and the committee of the National Tourism Policy for approval and announcement in the Royal Thai Government Gazette. Importantly, these plans were focused on and prioritized in safety, followed by the development of personnel skills and upskills of performers.

1Evaluation was conducted from the following issues:

1) First, the evaluation was conducted by determined goals and seek indicators of 1) incomes in terms of income growth rate and current economic growth rate, and 2) a number of tourists. After the COVID-19 pandemic, safety was added as one indicator such as participation and standard certification for tourist destinations according to the measurements by the Health Ministry.

2) The evaluation was also conducted from the construction process of strategies, monitored by the subcommittee and the main committee of Tourism Development in Andaman Cluster, namely the components of the strategy reports, 90-day operation duration of the strategy proposals, the determination of attendee numbers including groups and organizations, cooperation of related organizations to determine the strategies.
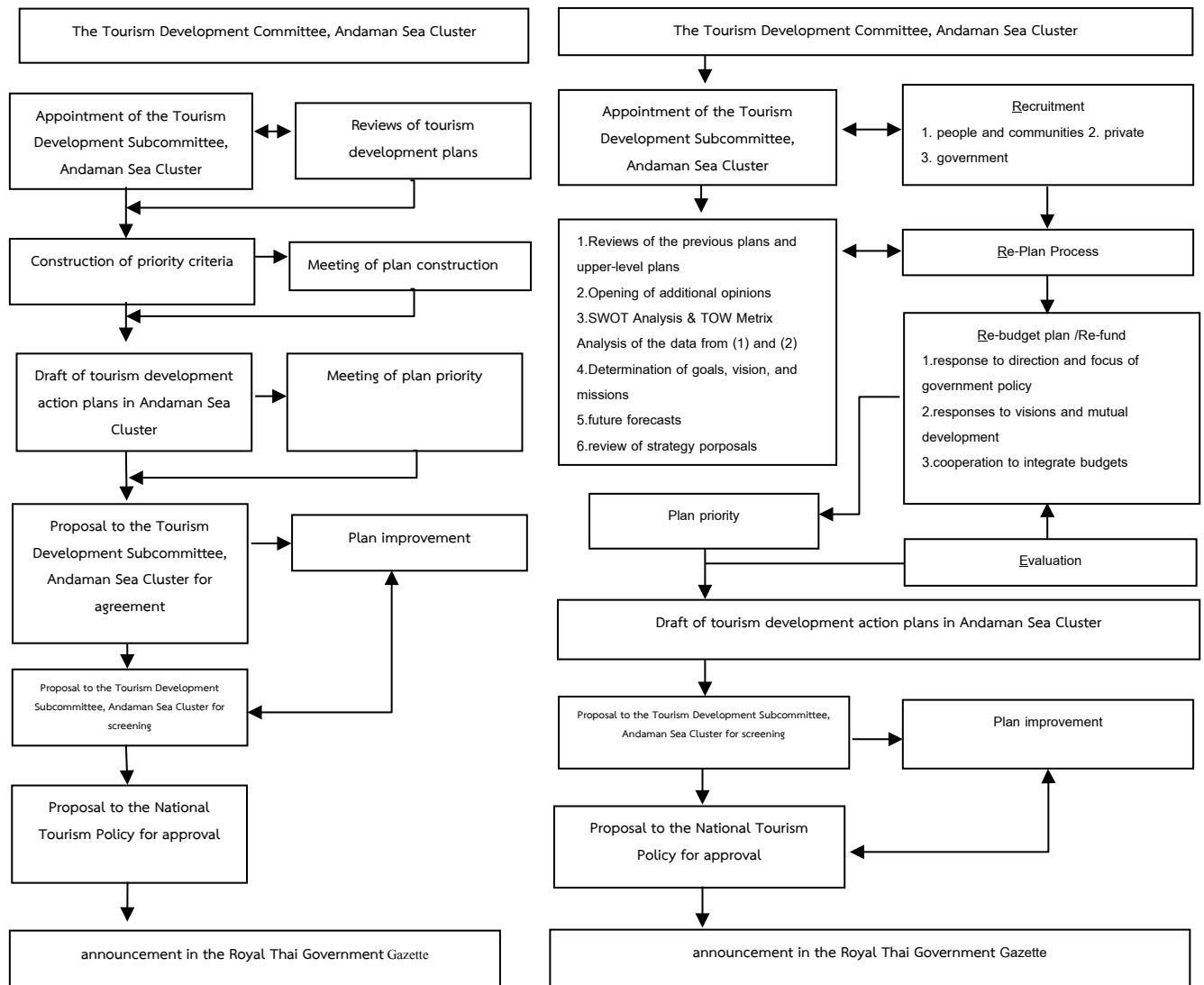
(a) Construction before Transformative Strategies   (b) Construction after Transformative Strategies

Figure 1 construction process for Transformative strategies

6. Discussion

The COVID-19 pandemic impacted on the necessity of the community-based tourism strategy adaptation in order to relevant to the current changes. In this study the pattern of 3R-1E—R1 = Recruitment, R2 = Re-budget/Re-fund, R3 = Re-plan, and E1 = Evaluation—was applied. It was related to a study by Ginter (2018 cited in Schneider, 2020) investigating the strategic pattern of health organizations. The Ginter's model contained three steps: 1) strategic thinking, 2) strategic planning, and 3) strategic momentum. To make these strategies successful, it was important to understand and analyze external changes affecting the strategies as well as realize organization requirements in order to adapt to situation changes suitably. During each step, wide aspects of environment, observation, and reviews of previous and current situations, and future forecasts should be included. However, leadership was considered important to strategy directions; therefore, strategic thinking was

needed for leadership in terms of not only status or positions but also personality and action. R1 = Recruitment and strategic thinking were thus considered in the first priorities.

In addition, the strategy development by the government was also necessary for playing a role in cooperation and connection among stakeholders, and organizations related to mass and community-based tourism (Zhu & Yasami, 2022). For this reason, the re-plan process for strategies should be applied to determine vision and operation which was responsible for society and limited ecosystems between entrepreneurs and tourists under Community-Centred Tourism Framework. This framework was used to consider rights and benefits of communities, people in communities, and holistic health (Higgins-Desbiolles, 2020). In fact, communities needed to adjust to happening social, economic, political, environmental, and biophysical situations holistically (Bennett et al., 2016). Moreover, it was important to determine and mutually consider tourist characteristics, tourist management strategies, marketing transportation, and balance between consumption needs and global productivity at communal, national, and regional levels (Weatherdon et al., 2016).

7. Recommendations

7.1 Suggestions for result implementation

The construction process for Transformative community-based tourism and wellbeing strategies was studied to explain the process of changing strategies after the COVID-19 pandemic. This process was not fixed, and it could be flexible according to each suitable context.

7.2 Suggestions for further research

1) The study results could be used to conduct action research and participatory action research in order to design strategies.

2) Factors of sustainable strategy development and adjustment to disasters or pandemics could be further studied.

8. Acknowledgement

9. References

Batra, A. (2021). Hospitality and Tourism Industry Post-COVID-19: A Silver Lining in the Dark Cloud. *ABAC ODI JOURNAL Vision. Action. Outcome*, *8*(1), 54–61. https://doi.org/10.14456/abacodijournal.2021.4

Bennett, N. J., Kadfak, A., & Dearden, P. (2016). Community-based scenario planning: A process for vulnerability analysis and adaptation planning to social–ecological change in coastal communities. *Environment, Development and Sustainability*, *18*(6), 1771–1799. https://doi.org/10.1007/s10668-015-9707-1

Brorström, S. (2020). The strategy process as a result of learning, questioning, and performing in a city organization. *International Public Management Journal*, *23*(5), 611–630. https://doi.org/10.1080/10967494.2019.1606127

Curcija, M., Breakey, N., & Driml, S. (2019). Development of a conflict management model as a tool for improved project outcomes in community-based tourism. *Tourism Management*, *70*, 341–354. https://doi.org/10.1016/j.tourman.2018.08.016

Goodwin, H., & Santilli, R. (2009). *Community-Based Tourism: A success?* ICRT Occasional Paper 11, 1-37.

Guba, E. G., & Lincoln, Y. S. (1989). *Fourth Generation Evaluation*. Newbury Park, CA: Sage.

Higgins-Desbiolles, F. (2020). Socialising tourism for social and ecological justice after COVID-19. *Tourism Geographies*, *0*(0), 1–14. https://doi.org/10.1080/14616688.2020.1757748

Jarzabkowski, P., Balogun, J., & Seidl, D. (2007). Strategizing: The challenges of a practice perspective. *Human Relations*, *60*(1), 5–27. https://doi.org/10.1177/0018726707075703

Lee, T. H. (2013). Influence analysis of community resident support for sustainable tourism development. *Tourism Management*, *34*, 37–46. https://doi.org/10.1016/j.tourman.2012.03.007

Lee, T. H., & Jan, F.-H. (2019). Can community-based tourism contribute to sustainable development? Evidence from residents' perceptions of the sustainability. *Tourism Management*, *70*, 368–380. https://doi.org/10.1016/j.tourman.2018.09.003

Mayaka, M., Croy, W. G., & Wolfram Cox, J. (2019). A dimensional approach to community-based tourism: Recognising and differentiating form and context. *Annals of Tourism Research*, *74*, 177–190. https://doi.org/10.1016/j.annals.2018.12.002

Ministry of Tourism and Sports (2017). Tourism Economic Report. No. 7 January-March 2017 Bangkok: Office of the Permanent Secretary for Tourism and Sports.

Potjana Suansri & Responsible Ecological Social Tour. (2003). *Community based tourism handbook*. Responsible Ecological Social Tour-REST).

Pung, J. M., Gnoth, J., & Del Chiappa, G. (2020). Tourist transformation: Towards a conceptual model. *Annals of Tourism Research*, *81*, 102885. https://doi.org/10.1016/j.annals.2020.102885

Saunders, B., Sim, J., Kingstone, T., Baker, S., Waterfield, J., Bartlam, B., Burroughs, H., & Jinks, C. (2018). Saturation in qualitative research: Exploring its conceptualization and operationalization. *Quality & Quantity*, *52*(4), 1893–1907. https://doi.org/10.1007/s11135-017-0574-8

Schneider, L. N. (2020). Strategic management as adaptation to changes in the ecosystems of public hospitals in Israel. *Israel Journal of Health Policy Research*, *9*(1), 65. https://doi.org/10.1186/s13584-020-00424-y

Sharafuddin, M. A. (2015). Types of Tourism in Thailand. *E-Review of Tourism Research (ERTR)*, *12*(3/4), 210–219.

Shi, Q., & Liu, T. (2020). Should internal migrants be held accountable for spreading COVID-19? *Environment and Planning A: Economy and Space*, 0308518X20916764. https://doi.org/10.1177/0308518X20916764

Weatherdon, L. V., Magnan, A. K., Rogers, A. D., Sumaila, U. R., & Cheung, W. W. L. (2016). Observed and Projected Impacts of Climate Change on Marine Fisheries, Aquaculture, Coastal Tourism, and Human Health: An Update. *Frontiers in Marine Science*, *3*. https://doi.org/10.3389/fmars.2016.00048

Zhu, H., & Yasami, M. (2022). Sustainable Tourism Recovery amid the COVID-19 Pandemic. The Case Study of the Phuket Sandbox Scheme. *Journal of Environmental Management and Tourism*, *13*(2), 477–485. https://doi.org/10.14505/jemt.v13.2(58).17

A HYBRID SOLAR-WASTE POWER PLANT OF LUANGPRABANG

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ABSTRACT

This research presents a hybrid solar-waste power generation system. The waste management problem in Luangprabang district of Lao people's democratic republic (Lao PDR) is focused based on a waste-to-energy (WtE) technology. The amount of municipal waste of Luangprabang is approximately 19,546.52 Ton in 2021. A combustible waste of 33.52% is used to be fuel (refuse derived fuel type 1, RDF-1) in combustion process of an incinerator of 21 Ton/day. The solar radiation of Luangprabang shows a lowest value of 15.43 MJ/($m^2 \cdot$day) in October and a highest value of 18.09 MJ/($m^2 \cdot$day) in March. A supply heat from the combined solar-waste system of 2,527 kW is used to drive an organic Rankine cycle (ORC) of 184.19 kW_e. The hybrid solar-waste system efficiency is approximately 6.62% from a net power of 135.80 kW_e. A total investment cost of 1,221,871 USD is mainly affected to a levelized energy cost (LEC) of 0.202 USD/kWh. The environmental impact in terms of carbon dioxide emission for a life span of 20 years is 1,427 Ton CO_2. The result implies that a carbon dioxide emission per functional unit (1 kWh) is approximately 0.138 kg CO_2/kWh.

Keywords: Hybrid Renewable Energy, Incinerator, Solar Water Heating System, Levelized Electricity Cost, Carbon Dioxide Emission

1. Introduction

Luangprabang district of Lao people's democratic republic (Lao PDR) is one of the cities under a united nations educational, scientific, and cultural organization (UNESCO) world heritage city since 1995 (Asian Notes, 2022). This city has advantage of a natural tourist, archaeological site, and cultural city. The tourists of approximately 755,019 in 2018 (JICA, 2021) directly effects to tourism business in Luangprabang. Tourism policy is the firstly priority in the province's economic and social development. (Zawan et al., 2017), and (Phonsongkham & Thitiluck, 2020) studied municipal solid waste (MSW) in Luangprabang. The averages MSW volume was found approximately 70 Ton/d (Development and administration of Luang Prabang, 2022). Thus, in this study, a new energy technology will be focused to solve the MSW problem in Luangprabang.

From the literature works, (Kaewmueang & Chaiyat, 2020) studied the thermal performance of small incinerator at a combustion rate of 1 Ton/d. The results showed that the R‑236ea and R‑245ca refrigerants were the maximum power efficiencies of 7.58% and 11.70%, respectively. (Chaiyat & Kiatsiriroat, 2015) reported a power generation system by organic Rankine cycle (ORC) combination with an absorption chiller. The enhance efficiency by using the cold water from the absorption chiller and cooling tower decreased the refrigerant temperature at condenser. The ORC efficiency could be increased 2%. (Sung & Kim, 2017) applied a low-water heat source of ORC system to be a high‑steam heat source of ORC system. Steam at a temperature of 143.5°C and pressure of 302 kPa was used to test the ORC system. The testing results found that steam heat source showed without any major system changes. (Wang et al., 2019) used a thermal mathematical model to select the appropriate active substance for the ORC effectively. In addition, (Sirisamphanwong et al., 2012) reported solar energy technology from the flat-plate and vacuum-tube collectors to produce thermal energy at a high temperature level. (Chumnumwat et al., 2018) studied the costs of evacuated tube and compound parabolic concentrator solar collectors, which were higher than that of the flat plate solar collector of 153.22 USD/m^2. (Yongchalearn & Malahom, 2011) presented efficiency of a solar water heating system using flat plate solar panels, which was higher than that of a heat pipe solar collector under the low temperature conditions. In addition, environmental investigation is a hot issue at the present time. (Kantiya et al., 2018) studied the environmental impact based on carbon footprint and economic cost. Greenhouse gas emission was 36,546,216 kg CO_2-eq under a factory lifetime of 30 years. The greenhouse gas emissions per functional unit was 0.58 kg CO_2‑eq/Piece. The economic cost of product was 0.05 USD/Piece. (Chusuwan et al., 2020) reported tourism industry of the Phra Mahathat Woramahawihan temple, Nakhon Si Thammarat province. Greenhouse gases from MSW to waste disposal site was focused. Open dumping was a main impact of 98% in the carbon footprint perspective.

From the above research mentioned, a novel waste‑to‑energy (WtE) should be investigated to solve the waste deposal in Luangprabang, Lao PDR. This district does not have the waste deposal technology. All MSWs is transported into the Landfill Site Ban Lak Ped, Luangprabang. The energy, economic, and environmental assessments are reported on an optimal WtE system under the proportional, volume, and real waste situation of Luangprabang. A hybrid technology of solar and waste renewable energies is selected to produce power from the ORC system. A mathematical model simulation is used to evaluate the thermal performance, economics cost, and environmental impact.

2. System Description

A systematic of hybrid solar-waste power plant presents in Figure 1. Water in a storage tank is supplied to a solar collector by a hot water pump at the points 1s-2s. Hot water is generated from the solar collector at the point 3s. Then, solar heat is kept in the water tank to accumulate heat combined with combustion heat from the waste energy. On the other hand, combustion heat at the point 1w-2w from waste incinerator at a temperature of approximately 1,300 °C is transferred to water through a heating tube of incinerator at the point 1HW‑2HW. A hot air blower and a spray pump are designed for exhaust treatment. An incineration pump transports heat from

the waste incinerator to the storage tank at point 3HW. Hot water in the storage tank is controlled by a setting temperature point of 95 °C. When, hot water temperature is higher than the setting temperature point, heat from the solar‑waste heating system is pumped from the storage tank at the points 4s‑5s by a useful pump to the ORC system. Hot water temperature at the point 6s reduces temperature level, and returns to receiving heat again at the storage tank. Heat exchanger is used as a boiler of the ORC system. R‑245fa is selected as the ORC refrigerant. Heat from the hybrid renewable energy boils refrigerant in the boiler at the point 3. Then, vapor at a pressure higher than 10 bar gauge flows into an expander under an isentropic efficiency for generating power at a generator. A lubricant oil is used to reduce friction in the expander at the point 2O. The mixed R‑245fa and oil fluid at the point 4 distinguishes in an oil and vapor separator at the points of 1O and 5, respectively. Vapor at a low pressure of approximately 2 bar gauge changes to be liquid phase in a condenser by using a cooling tower at the point 1c‑2c. R-245fa in liquid phase at the point 1 is pumped to transfer heat again at the boiler. The new heat‑to‑power cycle is restarted.
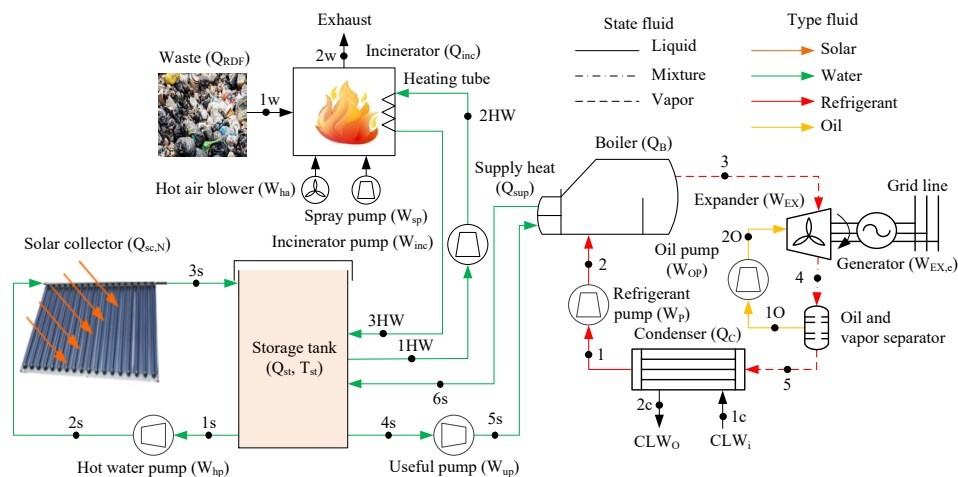
Figure 1: A schematic diagram of the hybrid solar‑waste power plant

3. Methodology

3.1 Thermal performance of the novel solar‑waste technology is performed. The solar thermal system is analyzed by using the solar radiation and location (longitude and latitude) of Luangprabang. In addition, this energy system is integrated by the WtE system for supporting the heat‑to‑power process. The amount and proportion of combustible waste of Luangprabang from the survey data are used to optimization the novel solar‑waste system.

3.2 Simulation technique is selected to investigate the novel system efficiency. The operating conditions for simulation the combined solar‑waste processes are described in Table 1. In addition, the mathematical model and correlation diagram depict in Figure 2.

Table 1 The operating conditions for simulation.

Condition	Value	Unit	Reference
Longitude angle (L_{loc})	102.154	°	Janjai,S. (2006)
Latitude angle (ϕ)	19.861	°	Janjai,S. (2006)
Heat removes factor ($F_R(\tau\alpha)$)	0.642	-	Schroder. (2022)
Heat loss factor ($F_R U_L$)	0.885	W/(m²·K)	Schroder. (2022)
Heat transfer of storage tank (UA_{st})	3.000	W/K	Chaiyat & Kiatsiriroat. (2014)
Area of solar collector (A_{sc})	4.800	m²/Unit	Schroder. (2022)
Efficiency isentropic expander ($\eta_{S,EX}$)	80	%	Yatsuntea & Chaiyat. (2019)
Efficiency isentropic turbine ($\eta_{S,tur}$)	69.20	%	Yatsuntea & Chaiyat. (2019)
Efficiency generator (η_G)	76.61	%	Chaiyat, N. (2021)
Efficiency isentropic pump ($\eta_{S,P}$)	90.44	%	Chaiyat, N. (2021)
Efficiency machine pump ($\eta_{machine,P}$)	65	%	Chaiyat, N. (2016)
Temperature inlet system ($T_{5s,i}$)	95	°C	Yatsuntea & Chaiyat. (2019)
Temperature cooling inlet condenser ($T_{CLW,i}$)	25	°C	DEP. (2011)
Difference temperature water and refrigerant ($\Delta T_{CW\text{-}ref}$)	3	°C	Yatsuntea & Chaiyat. (2019)
Difference temp water inlet and outlet ($\Delta T_{4s,6s}$)	10	°C	Yatsuntea & Chaiyat. (2019)
Superheating (SH)	9.2	°C	Yatsuntea, (2019); Chaiyat,(2019)
Subcooling (SC)	1.5	°C	Chaiyat, N. (2019)
Efficiency incinerator (η_{inc})	31.66	%	Yatsunthea & Chaiyat. (2020)
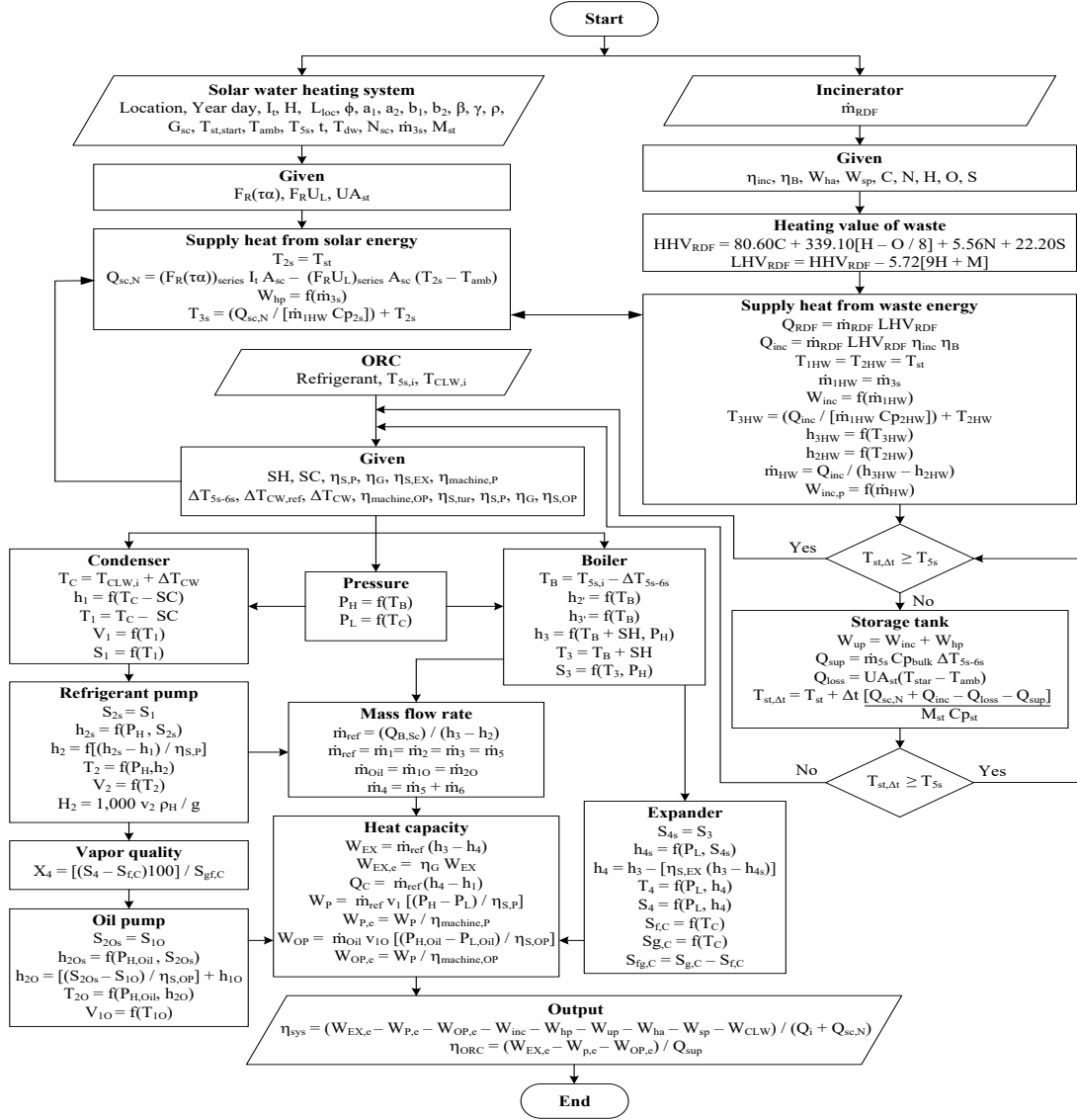
Figure 2: A mathematical model of the novel solar-waste system.

3.3 The economic result in terms of a levelized electricity cost (LEC) is used to focus the output energy and investment cost. The factors of discount rate (r), bank interest rates (i_{Real}), inflation rate ($i_{Inflation}$), investment cost (Inv), deterioration factor (DF), net output energy (E_{net}) are considered the LEC value as presented in Equations 1-2 (Chaiyat, 2021),

$$LEC = [\, Inv + \sum_{t=1}^{n} \frac{PEC}{(1+r)^{t}} \,] \,/\, [\, \sum_{t=1}^{n} \frac{E_{net} t_{OP}}{(1+DF)^{(t-1)}} \,], \tag{1}$$

$$r = ([1 + i_{Real}][1 + i_{Inflation}]) - 1. \tag{2}$$

3.4. The environmental assessment in terms of carbon dioxide (CO_2) emission evaluates under a standard of ISO4040. A life cycle assessment (LCA) method is conducted from four steps of goal and scope definition, inventory analysis, impact assessment, and interpretation, as shown in Figure 3.
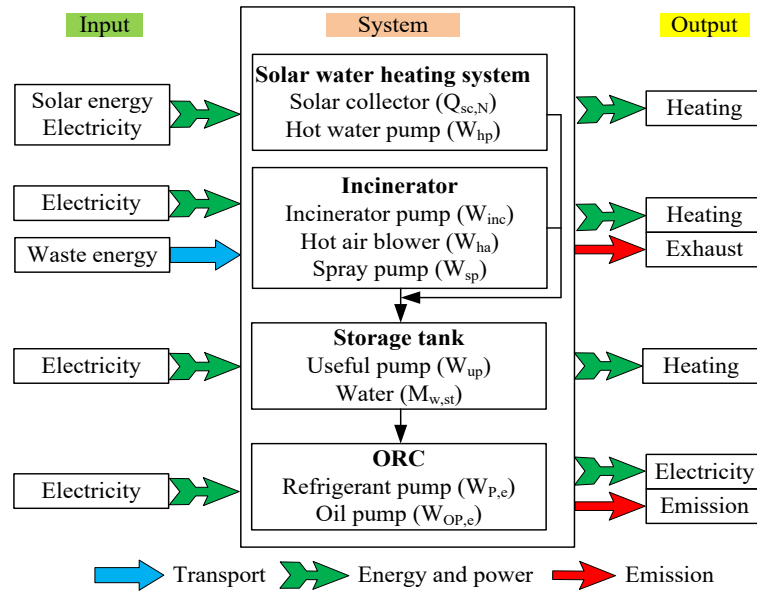
Figure 3: The environmental assessment.

Inventory analysis of the ORC combined with incinerator and solar thermal energy is used to evaluate carbon dioxide emission. A life span of 20 years and a functional unit of 1 kWh are considered for the gate-to-gate boundary condition. Equation 3 (Birol, 2017) shows correlation between activity data (AD), low heating value (LHV), carbon content (CC), and carbon oxidation factor (COF) to predict carbon dioxide emission from combustion process, after throughs the exhaust stack as follows:

$$CO_2 = [(AD)(LHV)(CC)(COF)]. \tag{3}$$

4. Results and discussion

4.1. The hybrid solar-waste system

The amount of municipal waste in Luangprabang is 19,546.52 Ton in 2021. The average values are 1.855.36 Ton/month and 61.85 Ton/day. The survey results on the Landfill Site Ban Lak Ped, Luangprabang reveal the proportion of waste, which consist of the combustible waste 33.52%, organic waste 46.87%, recycle waste 6.72%, and hazardous waste 7.56%, as shown in Figure 4. In this study, the combustible waste is used to be fuel (refuse derived fuel type 1, RDF-1) in combustion process of an incinerator volume of approximately 21 Ton/day.

Luangprabang is located at 19.861 °N and 102.154 °E. The solar radiation in the Luangprabang shows a low value of 15.43 MJ/(m^2·day) in October and a high value of 18.09 MJ/(m^2·day) in March. The yearly solar radiation is 15.28 MJ/(m^2·day) (Janjai, 2006). The monthly solar radiation, as shown in Figure 5, is an independent variable of a solar water heating system simulation program (NIST, 2022). An evacuate tube solar collector at an absorb area of 4.8 m^2 uses to transfer solar heat into hot water.
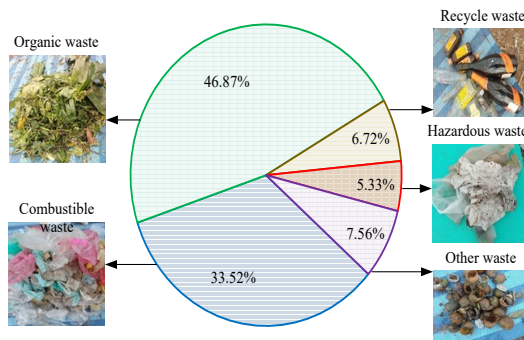
Figure 4: The waste proportion of Luangprabang.
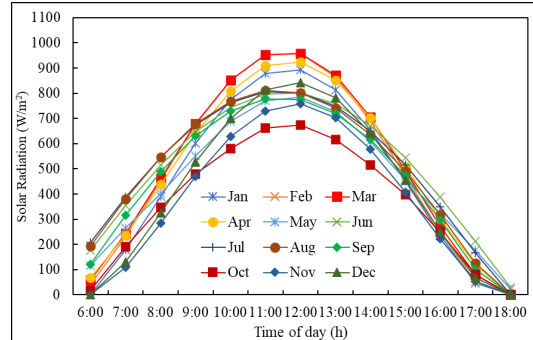
Figure 5: The monthly solar radiation of Luangprabang.

4.2. System efficiency

From the mathematical simulation, a storage tank volume (V_{st}) of 22,000 L is the optimization value for the combined solar-waste system. A combustible waste (M_{RDF}) of 20.73 Ton/day or 2.59 Ton/h at a high heating value (HHV$_{RDF}$) of 11.88 MJ/kg and a low heating value (LHV$_{RDF}$) of 11.14 MJ/kg is fuel for a commercial incinerator capacity of 21 Ton/day. An RDF-1 combustion heat (Q_{RDF}) of approximately 2,056 kW transfers though the heating pipe for generate hot water at a heat rate (Q_{inc}) of 2,538 kW. A start water temperature (T_{st}) of 30 °C and a useful water temperature (T_{5s}) of 105 °C are the set points of water temperature in the storage tank. An average ambient temperature (T_{amb}) of 25 °C (DEP, 2011) is directly driven a heat loss (Q_{loss}) of 10.84 kW. A solar heat ($Q_{sc,N}$) of approximately 82.76 kW is boosted from a solar collector parallel connection (N_{sc}) of 50 units (Chaiyat, N., 2016). The combined solar-waste system can supply a heat (Q_{sup}) of 2,527 kW for an ORC system ($W_{EX,e}$) of 184.19 kW$_e$ and a commercial ORC capacity of 200 kW$_e$ (gross power) at a continuously operating time of 8 h/d.

Hot water temperature (T_{3HW}) from the incinerator is decreased to be approximately 93 °C, when solid waste is hourly fed to combustion chamber, as shown in Figure 6. Thus, solar water heating system is used to parallel heat for generate a higher temperature heat (T_{5s}) of 95 °C, as shown in Figure 7.
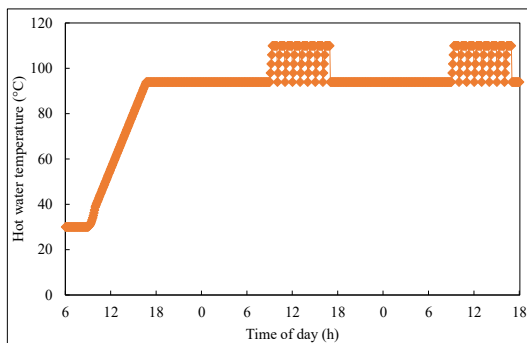
Figure 6: Hot water temperature from the incinerator.
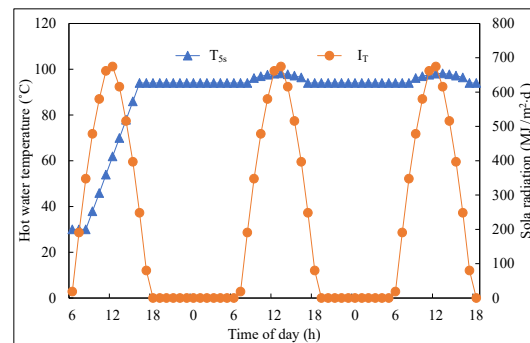
Figure 7: Thermal performance of the hybrid system.

The ORC system operates continuously between 9.00-16.00 at an average cycle efficiency (η_{ORC}) of 8.24% and a net power ($W_{ORC,net}$) of 168.02 kW$_e$. On the other hand, the hybrid solar-waste system efficiency

(η_{sys}) of 6.62%, a net power $(W_{sys,net})$ of 135.80 kW$_e$, and a power generation (E_{sys}) of 1,086.52 kWh/day, as presented in Figure. 8
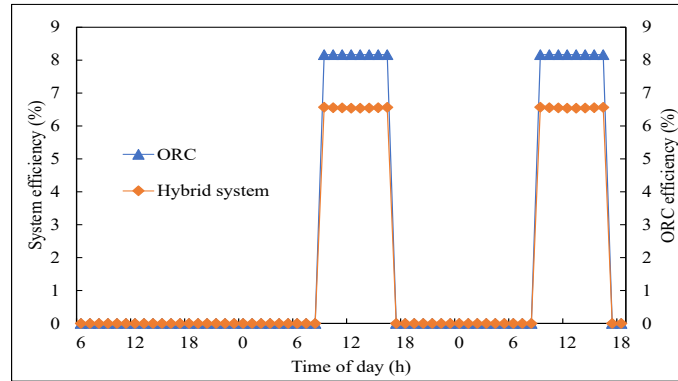
Figure 8: The hybrid system and ORC efficiencies.

4.3. Economic results

A total investment cost of 1,221,871 USD is found from incinerator, ORC, building, solar water heating system, storage tank, and fluid pumps. A maintenance cost of 61,094 USD/y is assumed from an investment cost rate of 5%. A real interest rate and an inflation rate are used to calculate a discount rate of 10.66%. The hybrid solar‑waste system can generate a net power of 511,602 kWh/y at the operating time of 8 h/y and lifespan of 20 y, as specified in Table 2. The LEC value is 0.202 USD/kWh, as shown in Table 2.

Table 2 The economic results.

Property	Value	Unit	References
Capacity cost of incinerator and building (Z_{inc})	724,234	USD	Chaiyat, N. (2021)
Capacity cost of ORC and piping (Z_{ORC})	437,500	USD	Chaiyat, N. (2021)
Capacity cost of solar collector and piping (Z_{Sc})	33,225	USD	Chaiyat, N. (2021)
Capacity cost of storage tank (Z_{tank})	19,305	USD	Eurolux, (2022)
Capacity cost of all pumps (Z_P)	7,607	USD	KTW, (2022)
Total investment cost (Inv)	1,221,871	USD	Calculation
Maintenance at 5% of investment cost ($\dot{Z}_{OM}$)	61,094	USD/y	Chaiyat, N. (2021)
Real interest rate (i_{Real})	6.65	%	BCEL, (2022)
Inflation rate ($i_{Inflation}$)	3.76	%	Worlddata, (2022)
Life span (t)	20	y	Chaiyat, N. (2021)
Discount rate (r)	10.66	%	Calculation
Annual output energy generation (W_{EX},e)	511,602	kWh/y	Calculation
Levelized electricity cost (LEC)	0.202	USD/kWh	Calculation

4.4 Environmental impact

Carbon dioxide equivalent estimates from testing data as shown in Table 4. A carbon dioxide of 58% is used to calculate an overall carbon dioxide emission of 41,611 Ton CO_2 form combustion process. A treatment

process can reduce carbon dioxide emission to be 1,427 kg CO_2. A carbon dioxide emission per functional unit (1 kWh) is approximately 0.138 kg CO_2/kWh, as displayed in Table 5. In addition, this carbon dioxide equivalent is lower than other WtE results of (Ozge Kaplan et al., 2009) 0.4 kg CO_2/kWh, (Alyssa et al., 2021) 0.775 kg CO_2/kWh, and (Department of industrial works, 2022) 0.5468 kg CO_2/kWh. Carbon dioxide emission of this study focuses on the gate-to-gate boundary condition. Thus, this result is lower than the cradle-to-grave boundary condition of other works.

Table 4 Testing data of RDF-1.

Property	Value		Unit
	As received basis	**Moisture free basis**	
Carbon (C)	58.00	61.47	%
Nitrogen (N)	0.73	0.77	%
Oxygen (O)	25.35	21.54	%
Hydrogen (H)	9.33	9.23	%
Sulfur (S)	0.14	0.15	%
Ash	6.45	6.84	%

Table 5 The environmental impact results.

Property	Value	Unit	Reference
Low heating value (LHV)	0.011	GJ/kg	Calculation
Carbon content (CC)	25	kg/GJ	Birol, F. (2017)
Carbon oxidation factor (COF)	1	-	Birol, F. (2017)
Activity data (AD)	151,314	Ton	Calculation
Carbon dioxide from combustion process (CO_2)	41,611	Ton CO_2	Calculation
Carbon dioxide from treatment process (CO_2)	1,427	Ton CO_2	Calculation
Power output per life span (E_{ORC})	10.31	10^6 kWh	Calculation
Carbon dioxide emission per 1 kWh (CO_2/E_{ORC})	0.138	kg CO_2/kWh	Calculation

5. Conclusions

From the above study results, it can be concluded as follows:

- The amount of municipal waste of Luangprabang is 19,546.52 Ton in 2021. The combustible waste of 33.52% is used to be fuel (RDF-1) in combustion process for the incinerator volume of 21 Ton/day.

- The solar radiation of Luangprabang shows a lowest value of 15.43 MJ/(m^2·day) in October and a highest value of 18.09 MJ/(m^2·day) in March.

- The combined solar-waste system can supply a heat of 2,527 kW for the ORC system of 184.19 kW$_e$.

- The ORC system operates continuously 8 h/d at the hybrid solar-waste system efficiency of 6.62%, the net power of 135.80 kW$_e$, and the power generation of 1,086.52 kWh/day

- Total investment cost of 1,221,871 USD directly effects to the levelized energy cost of 0.202 USD/kWh.

- The carbon dioxide emission per life span of 1,427 Ton CO_2 reveals the carbon dioxide emission per functional unit (1 kWh) of 0.138 kg CO_2/kWh.

6. Acknowledgments

7. Abbreviations and symbols

Nomenclature

AD	activity data (kg)		M	mass (kg)
C	carbon (kg)		$\dot{m}$	mass for rat (kg/s)
CC	carbon content (kg/GJ)		O	oxygen (kg)
CO_2	carbon dioxide (kg CO_2)		PEC	production electricity cost (USD/y)
COF	carbon oxidation factor (-)		Q	heat capacity (kW)
DF	deterioration factor (%)		r	discount rate (%)
E	energy (kW)		S	sulfur (kg)
h	enthalpy (kJ/kg)		SC	subcooling (°C)
HHV	high heating value (MJ/kg)		SH	superheating (°C)
i	interest rates (%)		SO_2	Sulfur dioxide (kg)
Inv	investment cost (USD)		t	time (h)
LEC	levelized electricity cost (USD/kWh)		W	electrical power (kW)
LHV	low heating value ((MJ/kg)			

Greek

η	efficiency (%)		V	specific volume (m^3/kg)
ρ	density (kg/m^3)		Δ	difference

Abbreviation

ORC	organic Rankine cycle		RDF	refuse derived fuel

Subscript

amb	ambient		CLW	cooling water
B	boiler		dw	different temperature of supplied hotwater
C	condenser		EX	expander

e	electricity	P	pump
H	high	ref	refrigerant
ha	hot air pump	SC	solar collector
Hp	hot water pump	sd	solar radiation
HW	hot water	sp	splay pump
G	generator	St	storage tank
I	incinerator	tur	turbine
i	input	TM	treatment process of incinerator
L	low	up	useful pump
Op	oil pump		

8. Reference

Asian Notes. (2022). [Online]. Retrieved March 26, 2022, from: http://aseannotes.blogspot.com/2014/08/1_9.html.

Alyssa, R., Timothy, A., & Marie-Odile, P. (2021). Climate change impacts of electricity generated at a Waste-to-Energy facility. *Environmental Science & Technology*, 55, 1436-1445.

Birol, F. (2017). *CO2 Emissions from Fuel Combustion Highlights (2017 edition)*. OECD/IEA, 2017. from: https://euagenda.eu/upload/publications/untitled-110953-ea.pdf

Banque pour le commerce exterieur lao public (BCEL). (2022). [Online]. Retrieved Aug 5, 2022, from: https://www.bcel.com.la/bcel/interest.html?fid=loan-interest

Chaiyat, N., & Kiatsiriroat, T. (2015). Analysis of combined cooling heating and power generation from organic Rankine cycle and absorption system. *Energy*. *91*, 363-370.

Chaiyat, N., & Kiatsiriroat, T. (2014). Simulation and experimental study of solar-Absorption heat transformer integrating with two-stage high-temperature vapor compression heat pump. *Case studies in thermal engineering*, 4, 166-174.

Chaiyat, N. (2021). *Thermal renewable energy technology*. (5th ed.). School of Renewable Energy, Maejo University.

Chaiyat, N. (2016). *Mathematical simulation of solar water heating systems (Version 3). Maejo University*. Copyright number 351042.

Chaiyat, N. (2019). *Thermal renewable energy technology*. (2nd ed.). School of Renewable Energy, Maejo University.

Chusuwan, S., Jawjit, S., & Jawjit, W. (2020). Carbon Footprint Assessment of Solid Waste Management Occurring from Cultural Tourism Sites: Case Study Phramahathat Woramahawihan Temple. *The Public Health Journal of Burapha University*, *15*(2), 1-12.

Chumnumwat, S., Leechai, N., & Khrueaphue, T. (2018). A feasibility study of solar collector for preheating feed water of wood-fired boiler system. *RMUTI JOURNAL Science and Technology*, *12*(1), 12-26.

Development and administration of Luang Prabang. (2022). *Municipal solid waste of statistics in Luangprabang*.

Department of export promotion (DEP), Ministry of commerce. (2011). *Trading and investment of the Lao people's democratic republic.* ISBN : 978-974-9915-87-5, Thailand.

Department of industrial works, ministry of industry. (2022). *The average CO_2 emission of generating electricity from combustion fuels*. [Online]. Retrieved Sep 12, 2022, from: https://greenindustry.diw.go.th/webgi/wp-content/uploads/2022/01/5_11.pdf

Eurolux GmbH & Co. KG. Germany. (2022). [Online]. Retrieved Aug 29, 2022, From: https://eurolux-ag.com/en/categories/3491-storage-tank-25000-liter.html

Janjai,S. (2006). *Assessment of Solar Energy Potentials for Lao People's Democratic Republic*. Silpakorn University.

Japan International Cooperation Agency (2021). *Data Collection Survey on Waste Management Sector in The Lao People's Democratic Republic Final Report*. EX Research Institute Ltd.

Kaewmueang, C., & Chaiyat, N. (2020). Thermal Performance of Small Incinerator for Combined Heat and Power by Organic Rankine Cycle. *Industrial Technology Lampang Rajabhat University Journal*, *13*(1), 12-25.

Kantiya, W., Chaiyat, N., Chanataworn, J., Sedpho, S., & Lertjaturanon, W. (2018). Carbon Footprint Assessment and Economic Costing of Quartz Crystal Unit. *National Conference on Informatics, Agriculture, Management, Business Administration, Engineering, Science and Technology*, *3*, 455-464.

Krieng thai watana (KTW) group. (2022). Pums and water system index : C.

NIST (National Institute of Standards and Technology). Refprop Version 10. *Thermodynamic Properties of refrigerants and refrigerant mixtures software*. America. Customer number 40754, Maejo University.

Ozge Kaplan, P., Decarolis, J., & Thorneloe, S. (2009). Is it better to burn or bury waste for clean electricity generation?. *Environmental Science & Technology*, *43*, 1711–1717.

Phonsongkham, P., & Thitiluck, S. (2020). Tourism Development of Laos: A Case study of Luang Prabang. *National conference Rangsit University*. 802-815.

Sung, T., & Kim, K.C. (2017). An organic Rankine cycle for two different heat sources: steam and hot water. *Energy Procedia*, *129*, 883-890.

Sirisamphanwong, C., Ngoenmeesri, R., Ketjoy, N., & Cham S.W. (2012). Determination of annual energy yield of solar collector. *Naresuan University Journal*, *20*(1), 16-23.

Schroder. (2022). *A CPC evacuated tube solar thermal collectors*. [Online]. Retrieved May 11, 2022, from: http://andyschroder.com/SolarEnergyResearch/

Wang, X., Levy, E.K., Pan, C., Romero, C.E., Banerjee, A., Rubio-Maya, C., and Pan, L. (2019). Working fluid selection for organic Rankine cycle power generation using hot produced supercritical CO_2 from a geothermal reservoir. *Applied Thermal Engineering*, *149*, 1287-1304.

Worlddata.info. (2022). [Online]. Retrieved Aug 5, 2022, from: https://www.worlddata.info/asia/laos/inflation-rates.php

Yongchalearn, V., & Malahom, T. (2011). Comparison of the performance of hot water system using flat plate and heat pipe solar collector. *Energy Research Journal*, *8*(1), 64-72.

Yatsuntea, T., Munsin, R., & Chaiyat, N. (2019). Selection working fluid of an Organic Rankine Cycle for low-temperature heat source. *Proceeding book 7th Asian academic society international conference 2019*, 621-630.

Yatsunthea, T., & Chaiyat, N. (2020). A very small power plant – Municipal waste of the organic Rankine cycle and incinerator from medical and municipal wastes. *Thermal Science and Engineering Progress*, *18*, 1 August 2020, 100555.

Zawan, N., Saiyaopon, K., & Mundee, B. (2017). Tourism Economy from The World Heritage of Luangprabang, Lao People's Democratic Republic. *Journal of Humanities Sciences Surin Rajabhat University*, *19*(2), 81-96.

THE EFFECTIVENESS OF 5% DRAGON'S BLOOD (*CROTON LECHLERI*) FOR FACIAL WRINKLE REDUCTION

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ABSTRACT

Dragon's blood is a dark red resin produced by some plant species belonging to the gernera Daemonorops, Dracaena, Croton and Pterocarpus.*Croton lechleri* contains high level of polyphenol called proanthocyanidines, which means higher anti-oxidant and anti-aging properties. Three main constituents of dragon's blood (*Croton lechleri*) are proanthocyanidines, taspine, flavonoids. It counteracts the action of free radicals and protects oxidative stress damage to the cells. It also inhibits elastase and collagenase activity and promote elastin activity and collagen leading to delay skin aging process. Therefore, it can treat wrinkles and fine lines, maintain elasticity of the skin. At the same time, it prevents skin cancer, hyperpigmentation , wrinkle formation induced by photo damage.The purpose of this study aimed to determine 5% dragon's blood (*Croton lechleri*) extract serum for face wrinkle reduction. This research was an experimental study with 17 volunteers.The study population was healthy male and female between the age of 30-50 years old. They needed to apply 5% dragon blood (*Croton lechleri*) extract serum on both sides of face twice a day for 12 weeks. Follow up appointments were at 4th,8th,12thweeks. Wrinkle assessment was done by VISIA® Complexion Analysis System, Cutometer MPA® 580. To measure the improvement, photographs taken with VISIA® Complexion Analysis System were evaluated by 3 dermatologists.The participants were assessed by physician and questionnaires to detect any adverse effects and participants' satisfaction. This research can be used as a reference data for future researchers and studies.

Keywords: Dragon's Blood, Anti-Aging, Wrinkles, Red Resin

1. Introduction

Aging is a must ongoing process of life. Everyone must go through aging process as time passed. Skin being the largest external organ and the most visible area of the body, is aging day by day due to various factors such as hormones, stress, unhealthy food, lack of enough sleep, ultraviolet radiation and even environmental

pollution. These factors can cause aging of the skin such as sagging, wrinkles, dark spots, decreased skin moisture, lack of skin radiance and age related disorders, importantly skin cancer.

Wrinkles are one of the most common cutaneous manifestations of aging signs and known as rhytide, a fold, ridge or crease in the skin. The wrinkles are mainly caused by intrinsic, natural aging and extrinsic aging, in which photoaging or chronic sun exposure is the primary source.

Skin rejuvenation therapies include many kinds of treatments, for example, injecting botulinum toxins, chemical peels, face lifts by using machine or threads, filling in the wrinkles, microdermabrasion, laser skin renewal, neuromodulators for aging skin and basically daily used of skin care products for anti-aging. Among all treatment methods available, the safest and easiest treatment option is topical medication.

To combat aging and treat wrinkles, antioxidants play an important role by decreasing oxidative stress. Dragon's blood (*Croton lechleri*) extract is one of the anti-aging ingredients from nature. Dragon's blood has powerful anti-oxidant and anti-inflammatory properties.

2. Research Objective

(1) General Objectives

To study the efficacy of 5% dragon blood (*Croton lechleri*) extract serum in facial wrinkles reduction.

(2) Specific Objectives

Primary outcome

To study the efficacy of 5% dragon blood (*Croton lechleri*) extract serum in facial wrinkle reduction, assessed by VISIA complexion analysis system, Cutometer MPA 580

Secondary outcomes

1. To observe the side effects of 5% dragon blood (*Croton lechleri*) extract serum.

2. To evaluate the patients' satisfactory score of 5% Dragon's blood (*Croton lechleri*) extract serum.

3. Literature Review

Croton lechleri is a medium-sized tree (10-20 meters or 30-60 feet) native to the Amazonian region of the South American countries of Bolivia, Brazil, Columbia, Ecuador, and Peru. It most commonly grows in the northwest lowland Amazonian Forest area in disturbed soil and along rivers and streams. Both the bark and the red latex that seeps from wounds made in the trunk are used medicinally.

Major constituents are Proanthocyanidins (Polyphenolic bioflavonoids)Taspine (alkaloid with anti-inflammatory and cicatrizing action), lignans, pigments and flavonoids.

Proanthocyanidins are the main chemical constituent of Dragon's Blood, >90% of its dry weight. Scientific studies have shown that the antioxidant power of proanthocyanidins is 20 times greater than vitamin E and 5 times greater than vitamin C. Proanthocyanidins are known to facilitate wound healing Taspine has alkaloid with anti-inflammatory and cicatrizing action. Taspine stimulates fibroblast migration, accelerating the wound healing process.

3.1 Theory, Concept and Related Research

Biological action of Dragon's Blood (*Croton lechleri*)

Dragon's Blood is a powerful anti-oxidant which counteracts the action of the free radicals. In vitro tests confirms that it is more efficient than Vitamin E and different forms of Vitamin C used at cosmetic formulations. (McDaniel et al., 2018)

It promotes collagen synthesis and has anti-inflammatory properties. Proanthocyanidins can reconstruct the links between collagen fibers, joining collagen together and inhibiting the action of the enzymes that destroy the collagen. Proanthocyanidins bond with collagen, promoting youthful skin, cell health, elasticity, and flexibility.(Namjoyan et al., 2016). Inflammation is a complex chain of event that leads to deep wrinkles, hyper-pigmentation, inelastic tissue and gradually causes tissue damage resulting in collagen and elastin degradation. (Prescott et al., 2017)

Moreover, Dragon's blood improves and accelerates the skin's healing process. This clinical trial suggests Dragon's blood is a potent, available, affordable, and safe healing agent.In addition, Dragon's blood has anti-bacterial properties that help in treating acne by clearing bacteria and infection from the pores. It also reduces inflammation and redness, common in acne-prone skin. (Namjoyan et al., 2016)

3.2 Safety and Toxicity of Dragon's blood (*Croton lechleri*)

As long as you don't have any adverse skin reaction to it, dragon's blood creams, serums and other skincare products are safe for everyday use. However, carrying out a patch test was recommended if using dragon's blood for the first time. Some varieties of dragon's blood tree contain latex and may not be suitable for those with a latex allergy. Some people can be sensitive to dragon's blood, so if in doubt perform a patch test. In one study, it has proved that the dragon's blood gel had none allergy effect to guinea pigs. It is safe to use dragon's blood gel. (HAO et al., 2014)

3.3 Research Hypotheses

The 5% Dragon's blood (*Croton lechleri*) extract serum has good efficacy and satisfactory evaluation in reduction of facial wrinkles.

4. Research Methodology

This clinical experimental study was conducted with 17 healthy male and female volunteers at the age of 30-35 years old. The 5% dragon's blood (*Croton lechleri*) serum was applied on both sides of face twice a day for 12 weeks. The follow-up appointments were at 4th, 8th and 12th week.

The volunteers were thoroughly explained about the research purpose, detailed procedure and anticipated risk and benefits of the study. Participants were requested to fill the form and signed the informed consent. Patch test was done prior to the study. Wrinkles and elasticity of the skin were measured by using VISIA® Complexion Analysis System and Cutometer® MPA 580. To evaluate the improvement, photographs taken with VISIA® Complexion Analysis System were evaluated by 3 dermatologists. The volunteers were assessed by physicians and questionnaires to detect any adverse effects and participants' satisfaction.

4.1 Research Design

Clinical experimental study

4.2 Population and Sample

The 17 healthy male and female of the volunteers aged between 30 to 50 years

4.3 Research Instrument

1) Ingredients of dragon's blood (*Croton lechleri*) extract serum Water, Glycerin, Sodium Hyaluronate, Phenoxythano, Xanthan Gum, Triethylene Glycol, Disodium EDTA.

2) Cutometer MPA® 580

3) VISIA® Complexion Analysis System for Winkle Score

4) Patch test

5) Informed consent form

6) A set of questionnaires to record patients' satisfaction and adverse effects

4.4 Data Collection

The research procedure is carried out at Mae Fah Luang University Hospital, Bangkok. All the information about the volunteers were highly confident. General information and history of the participants were recorded prior to the study.

4.5 Data Analysis

The wrinkle scored from VISIA® Complexion Analysis System were at baseline, 4th, 8th and 12th week.

Skin elasticity and moisture of the skin were measured by using Cutometer MPA 580 at baseline, 4th, 8th and 12th week.

Dermatologists' evaluation and Patient Assessments.

The 3 different dermatologists evaluated the outcome from photos taken with VISIA® using grading scales as follows:

-1 = worse

0 = no changes

1 = 1-25% fair improvement

2 = >25-50% moderate improvement

3 = >50-75% good improvement

4 = >75-100% excellent improvement

Patients' satisfaction is scored as:

Score 0 = No satisfaction

Score 1 = Little satisfaction

Score 2 = Average satisfaction

Score 3 = More satisfaction

Score 4 = Most satisfaction

Record side effects :

1. Pruritus score ranging from 0 to 10

2. Durations (days) of erythema

3. Others

5. Research Findings

According to 17 volunteers 70.6% and 29.4% were female and male respectively. The average age of these volunteers was 32.71±2.97 years old. There was one subjects with an underlying disease. None of them had a history of facial wrinkles treatment. The mean sunlight exposure was 17.06±7.92 minutes/day. Among 17 volunteers, 52.9% , 29.4% and 17.6% were combination ,oily and dry skin types, respectively.

5.1 Cutometer score

5.1.1) 1 cm above the eyebrow within the mid pupillary

Table 5.1 Statistical analysis of Cutometer score at 1 cm above the eyebrow within the mid pupillary on baseline, at 4th, 8th, and 16th of the follow-up week.

Visit	mean±SD	P-value
Baseline (0th week)	0.5549±0.0993	
4th week	0.6426±0.0921	
8th week	0.7328±0.0800	<0.001*
12th week	0.7844±0.0811	

Data were analyzed with Repeated measure ANOVA

* Statistically significant at the 0.05 level

5.1.2) 1 cm below the mid

Table 5.2 Statistical analysis of Cutometer score at 1 cm below the mid on baseline, follow-up 4th, 8th, and 16th week

Visit	mean±SD	P-value
Baseline (0th week)	0.5405±0.0842	
4th week	0.6265±0.0677	
8th week	0.7248±0.0668	<0.001*
12th week	0.7992±0.0672	

Data were analyzed with Repeated measure ANOVA

* Statistically significant at the 0.05 level

According to Table 5.2, the mean cutometer score at 1 cm below the mid on baseline ,4th week, 8th week and 12th week were, 0.5405±0.0842, 0.6265±0.0677, 0.7248±0.0668, 0.7248±0.0668. The mean cutometer score at 1 cm below the mid in each visit statistically significant increased at the level of 0.05 (p<0.001). Therefore, the multiple comparison analysis is shown in Table 5.3.

Table 5.3 Multiple comparison analysis of Cutometer at 1 cm below the mid

	Mean difference (%change)	P-value
Baseline vs 4th week	0.086 (15.91%)	<0.001*
Baseline vs 8th week	0.184 (34.04%)	<0.001*
Baseline vs 12th week	0.259 (47.92%)	<0.001*
4th week vs 8th week	0.098 (15.64%)	<0.001*
4th week vs 12th week	0.173 (27.61%)	<0.001*
8th week vs 12th week	0.074 (10.21%)	<0.001*

Multiple comparison determines by the Bonferroni method

* The mean difference is significant at the 0.05 level

According to the multiple comparisons result from Table 5.3, Cutometer score at 1 cm below the mid on 12th week higher than baseline , 4th week , and 8th week were 0.259, 0.173 and 0.074 respectively, that of 8th week higher than baseline and 4th week were 0.184 and 0.098, that of 4th week higher than baseline was 0.086 statistically significant at the level of 0.05 (p<0.05).

5.1.3) 1 cm below and lateral to the alar of the nose

Table 5.4 Statistical analysis of Cutometer score at 1 cm below and lateral to the alar of the nose on baseline, follow-up 4th, 8th, and 12th week.

Visit	mean±SD	P-value
Baseline (0th week)	0.5573±0.0601	
4th week	0.6236±0.0609	
8th week	0.6997±0.0584	<0.001*
12th week	0.7869±0.0644	

Data were analyzed with Repeated measure ANOVA

* Statistically significant at the 0.05 level

According to Table 5.4, the mean cutometer score at 1 cm below and lateral to the alar of the nose on baseline 4th week, 8th week and 12th week were 0.5573±0.0601, 0.6997±0.0584, 0.7869±0.0644 respectively. The mean cutometer score at 1 cm below and lateral to the alar of the nose in each visit statistically significantly increased at the level of 0.05 (p<0.001). Therefore, the multiple comparison analysis was shown in Table 5.5.

Table 5.5 Multiple comparison analysis of Cutometer at 1 cm below and lateral to the alar of the nose.

	Mean difference (%change)	P-value
Baseline vs 4th week	0.066 (11.84%)	<0.001*
Baseline vs 8th week	0.142 (25.48%)	<0.001*
Baseline vs 12th week	0.230 (41.27%)	<0.001*
4th week vs 8th week	0.076 (12.19%)	<0.001*
4th week vs 12th week	0.163 (26.14%)	<0.001*
8th week vs 12th week	0.087 (12.43%)	<0.001*

Multiple comparison determines by the Bonferroni method

* The mean difference is significant at the 0.05 level

According to the multiple comparisons of result from Table 5.5, Cutometer score at 1 cm below and lateral to the alar of the nose on 12th week higher than baseline, 4th week and 8th week were 0.230, 0.163, 0.087 respectively, that of 8th week higher than baseline and 4th week were 0.142 and 0.076, that of 4th week higher than baseline was 0.066 statistically significant at the level of 0.05 ($p<0.05$).

5.2 Wrinkle evaluation
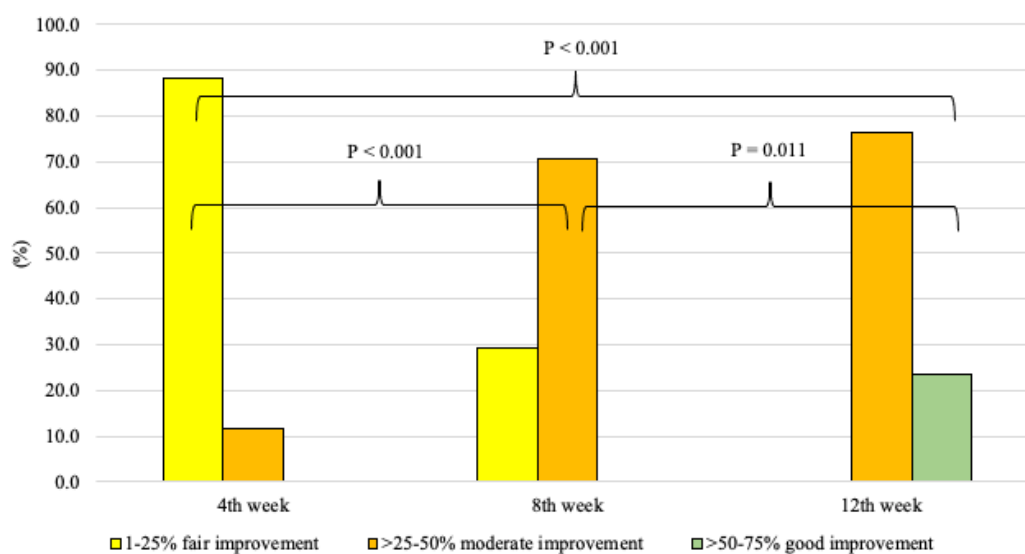
Figure 5.1 Bar graph showing wrinkle evaluation by 3 dermatologists.

According to Figure 5.1, most wrinkle evaluations by dermatologists on 4th week were fair improvement (88.2%) and moderate improvement (11.8%), 8th week were fair improvement (29.4%) and moderate improvement (70.6%), and 12th week were moderate improvement (76.5%) and good improvement (23.5%). The improvement of wrinkle evaluation in each visit difference statistically significant at the level of 0.05 ($p<0.001$).

Therefore, the multiple comparison analysis of result found that the improvement of wrinkle on 12th week higher than 4th and 8th week and on 8th week higher than 4th week was statistically significant at the level of 0.05 (p<0.05).

5.3 Patients' satisfactory score on 12th week
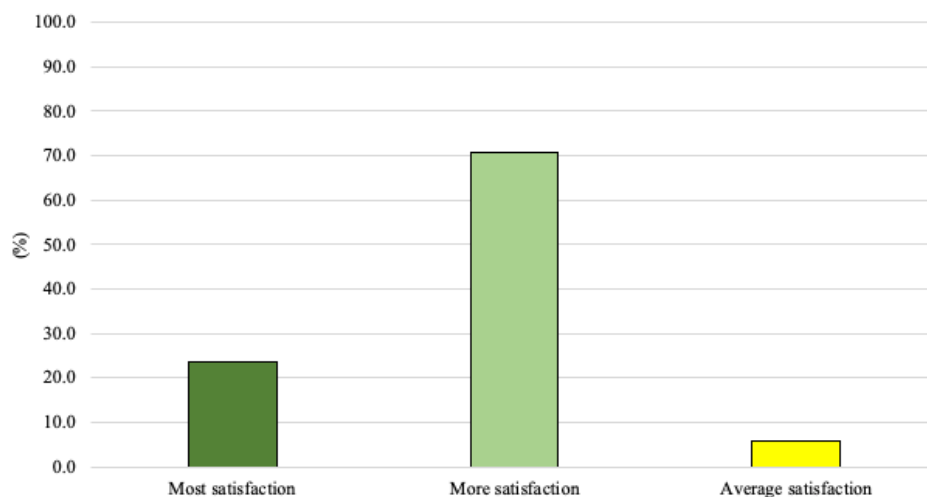
Figure 5.2 Bar graph showing patients' satisfactory score on 12th week.

According to Figure 5.2, The majority of the subjects rated more satisfaction (70.6%), most satisfaction (23.5%), and average satisfaction (5.9%), respectively.

6. Discussion

Hence, the 5% Dragon's blood (*Croton lechleri*) serum was tested and evaluated for facial wrinkles reduction on 17 healthy volunteers. According to the statistical analysis, the results of mean wrinkle evaluation score with VISIA was statistically significantly increased (p<0.001).

When comparing the mean change from each visit, statistically significant change was observed during 4th - 8th week, 4th -12th week (p<0.001). The results revealed that the improvement was increased in each follow-up. For the elasticity of the skin, cutometer was measured at three areas: 1 cm above the eyebrow within the mid pupillary, 1 cm below the mid pupillary, 1cm below and lateral to the alar of the nose.The mean cutometer score was dramatically increased at the level of 0.05. (p < 0.001). Mean change of cutometer score at 1 cm above the eyebrow within the mid pupillary was compared for different visit and skin elasticity was improved significantly in each visit. According to statistical analysis of cutometer score at 1 cm below the mid , the data indicated that mean cutometer score was significantly increased at the level of 0.05.(p<0.001).

The mean cutometer score at 1 cm below and lateral to the alar of the nose in each visit statistically difference was also observed.

Referring to this study, the elasticity was significantly increased. This may be due to the inhibition of the action of the enzymes that destroy the collagen and preventing the destruction of collagen and elastin which are the main factors in aging. Proanthocyanidins in dragon's blood bond with collagen, promoting youthful skin,

cell health, elasticity, and flexibility. In this way, dragon's blood can be used to treat fine lines and wrinkles and increase the elasticity of the skin. Therefore, this study is correlated with the previous study on face wrinkle reduction and maintaining skin elasticity. (Namjoyan et al., 2016)

7. Conclusion

Regarding to this study, the outcome of the mean change of cutometer scores at 1 cm above the eyebrow within the mid pupillary,1 cm below the mid,1 cm below and lateral to the alar of the nose were dramatically climbed in different visits. Thus, 5% dragon's blood (*Croton lechleri*) could reduce facial wrinkles and improve elasticity of the skin. Improvement was also statistically increased in follow-up visits. This study of 5% dragon's blood (*Croton lechleri*) serum also achieved high participants' satisfactory score and any adverse effect was not detected. To conclude, 5% dragon's blood (*Croton lechleri*) serum is effective for facial wrinkles reduction and safe for topical application. For this reason, it can be used as an alternative anti-aging treatment for facial wrinkles reduction.

8. References

Afanas'ev, I. (2010). Signaling and Damaging Functions of Free Radicals in Aging-Free Radical Theory, Hormesis, and TOR. *Aging and Disease*, *1*(2), 15.

Eassa, H. A., Eltokhy, M. A., Fayyaz, H. A., Khalifa, M. K. A., Shawky, S., Helal, N. A., Eassa, H. A., Youssef, S. F., Latz, I. K., & Nounou, M. I. (n.d.). Current Topical Strategies for Skin-Aging and Inflammaging Treatment: Science versus Fiction. *JOURNAL OF COSMETIC SCIENCE*, 31.

Eassa, H. A., Eltokhy, M. A., Fayyaz, H. A., Khalifa, M. K. A., Shawky, S., Helal, N. A., Eassa, H. A., Youssef, S. F., Latz, I. K., & Nounou, M. I. (n.d.). Current Topical Strategies for Skin-Aging and Inflammaging Treatment: Science versus Fiction. *Journal of Cosmetic Science*, *31*.

Gupta, D., Bleakley, B., & Gupta, R. K. (2008). Dragon's blood: Botany, chemistry and therapeutic uses. *Journal of Ethnopharmacology*, *115*(3), 361–380. https://doi.org/10.1016/j.jep.2007.10.018

HAO Yan-bing1, ZHANG Qi1, ZHAO Rong-hua2, YU Xiao-ling3, ZHANG Rong-ping1*. Study on Toxicology of The Dragon's Blood Gel[J]. *Natural Product Research and Development, 2014, 26*(Suppl1): 117-120.

McDaniel, D., Farris, P., & Valacchi, G. (2018). Atmospheric skin aging-Contributors and inhibitors. *Journal of Cosmetic Dermatology*, *17*(2), 124–137. https://doi.org/10.1111/jocd.12518

Namjoyan, F., Kiashi, F., Moosavi, Z. B., Saffari, F., & Makhmalzadeh, B. S. (2016). Efficacy of Dragon's blood cream on wound healing: A randomized, double-blind, placebo-controlled clinical trial. *Journal of Traditional and Complementary Medicine*, *6*(1), 37–40. https://doi.org/10.1016/j.jtcme.2014.11.029

Prescott, S. L., Larcombe, D.-L., Logan, A. C., West, C., Burks, W., Caraballo, L., Levin, M., Etten, E. V., Horwitz, P., Kozyrskyj, A., & Campbell, D. E. (2017). The skin microbiome: Impact of modern environments on skin ecology, barrier integrity, and systemic immune programming. *World Allergy Organization Journal*, *10*, 29. https://doi.org/10.1186/s40413-017-0160-5

THE EFFICACY OF 5% SHIKIMIC ACID SERUM FROM STAR ANISE SEED EXTRACT FOR FACIAL SKIN WHITENING

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ABSTRACT

Hyperpigmentation caused by the key enzyme tyrosinase and it is a copper-containing, membrane-bound glycoprotein. Shikimic acid serum from star anise seed extract has anti-tyrosinase activity. Tyrosinase is the rate-limiting enzyme in melanin biosynthesis. Tyrosinase catalyzed the first two steps in mammalian melanogenesis; (1) transformation of the hydroxyl action of tyrosine to Dopa (3,4-dihydroxyphenylalaninine) and (2) the oxidation of Dopa to Dopaquinone. We examined the facial skin whitening of 5% Shikimic acid serum from star anise seed extract in a clinical trial experimental study. 5 male and 15 female volunteers with Fitzpatrick type III-IV of aged between 30-55 years old were recruited for the trial and were compared average mean change from the baseline to 4th week, 8th week , 12th week after using of 5% Shikimic acid serum from star anise seed extract for facial whitening effect by using Mexameter. In this study, the reduction of mean melanin index score of total face that applied 5% Shikimic acid serum from star anise seed extract at baseline from 296.00 ± 63.93(baseline) to 293.60 ± 64.16(4th week), 289.70 ± 63.58 (8th week), and 284.30 ± 64.62(12th week). The mean melanin index score in each visit statistically significant decreased at the level of 0.05 ($p<0.001$). When comparing the mean change from each visit, statistical different was observed during 4th and 8th week and 12th week ($p < 0.001$). The data indicated the increased the improvement in each follow-up.

Keywords: Shikimic Acid Serum, *Illicium Verum*, Star Anise Seed Extract: Facial Whitening Agent, Skin Hyperpigmentation Disorders, Mexameter Score

1. Introduction

Nowadays, bright skin plays the major role as a certain standard of beauty. Light complexion and flawless skin are the most universally desired beauty feature. Human skin color depends on the genetic factors. Extrinsic factors such as constant exposure to ultraviolet radiation, poor diet, hormones, and general lack of skin

care routine also effect on skin color. Hyperpigmentation is caused by the key enzyme tyrosinase and it is a copper-containing monooxygenase.

Recent study showed that the Shikimic acid from star anise seed extract is the potent tyrosinase-inhibitor and efficient compound to be used as active ingredient for skin whitening. It contains eight compounds in the shikimic acid pathway which have the significant whitening capability. This research studied cellular tyrosinase activity assay by measuring the oxidation rate of DOPA

The research approved that the Shikimic acid from star anise seed extract is the potent tyrosinase-inhibitor and efficient compound to be used as active ingredient for skin whitening. Hence, this study has investigated the anti tyrosinase activity of Shikimic acid serum from star anise seed extract on inhibition of melanin biosynthesis as an alternative skin whitening. (S. Y. Lee et al., 2016b)

2. Research Objective

General Objective

To study the efficacy of 5% Shikimic acid serum from star anise seed extract for facial whitening

Specific Objectives

1. Primary Objective

To compare average mean change from the baseline to 4th week, 8th week , 12th week after using of 5% Shikimic acid serum from star anise seed extract for facial whitening effect by using Mexameter

2. Secondary Objectives

1. To observe the adverse effect of 5% Shikimic acid serum from star anise seed extract .

2. To observe the participants' satisfactory score of 5% Shikimic acid serum from star anise seed extract

3. Literature Review

3.1 Theory, Concept and Related Research

Skin whitening is a cosmetic treatment where chemical materials or traditional herbal formulations are used to lighten skin by reducing the concentration of melanin. The key enzyme in melanin synthesis is tyrosinase. Shikimic acid serum from star anise seed extract has anti-tyrosinase activity. Tyrosinase, a copper-contains oxidase, is the rate-limiting enzyme in melanin biosynthesis. Tyrosinase catalyzed the first two steps in mammalian melanogenesis; (1) transformation of the hydroxyl action of tyrosine to Dopa (3,4-dihydroxyphenylalaninine) and (2) the oxidation of Dopa to Dopaquinone. Therefore, this serum can block melanin biosynthesis and can create skin whitening effect. The shikimic acid has been approved for an excellent performance as a whitener with strong free radical scavenging ability. Shikimic acid showed low cell toxicity along with good inhibitory effects on the pigmentation of zebrafish. The whitening effect of shikimic acid is most likely due to its inhibitory potential on tyrosinase activity.

Star anise (*Illicium Verum*)

General Information

Star anise is a natural ingredient derived from *Illicium Verum* Fruit (Chinese star anise) and can be found from dozens of plants(Choi et al., 2019). The fruit has a star shape, and its seed are light brown and ovoid in shape. Star anise seed possesses antimicrobial, antiviral and antioxidant properties (Wang et al., 2011).

Shikimic acid from star anise seed extract have been used for various medical purposes. Although it can be used as starting product for antiviral drug to fight annual influenza epidemics, It has also anti-bacterial effect, anti-inflammatory effect, anti-fungal activity , anti-dandruff action and hair-growth stimulating effect. (Batory & Rotsztejn, 2021) In addition to, it can be used as an exfoliating agent, strong sebum normalization agent and moisturizing agent.(S.Y. Lee et al., 2016a) .Moreover, it can reduce the amount of pigment created in the process of melanogenesis due to its tyrosinase inhibitory properties. (Wang et al., 2011) It also acts by exfoliating the epidermis, removing the pigment form the stratum corneum. (Batory & Rotsztejn, 2021)

Figure 1. Star anise seed (Illusium Verum)

Chemical constituents of Illicium Verum

The shikimic acid Star anise seed comprises high amount of alkaloids, essential oil, and tannins containing f cis- and trans-anethole (85% to 90%), shikimic acid , limone, α-teripinel and farnesol. Some of nitrogenous and 14 hydrocarbon components along with 22 oxygenated hydrocarbon derivatives are ρ-allylanisole, anisylacetone, anisaldehyde, ρ-cumicaldehyde, ρ-allylpen, palmitic acid, linoleic acid (1-4 methoxyphenyl)-prop-2-one and feniculin. (Wang et al., 2011)

Whitening effect

Both natural and synthetic shikimic acid can display inhibitory activity against tyrosinase and effectively inhibit the formation of melanin. The shikimic acid metabolic pathway responses for biosynthesis of aromatic compounds in various groups of microorganisms, plants, and parasites. Eight compounds in the shikimic acid pathway have the whitening capability. They are benzoic acid, p-coumaric acid, vanillic acid, syringic acid, quinic acid, shikimic acid, orcinol monohydrate, and phenyl pyruvic acid. (S. Y. Lee et al., 2016a)

Previously, Shikimic acid as reported to have an excellent performance as a whiter with strong free radical scavenging ability. Hence, it may be considered as an excellent candidate for the use in a skin whitening cosmetic additive.

3.2 Research Framework

The research framework of this study was shown in Figure
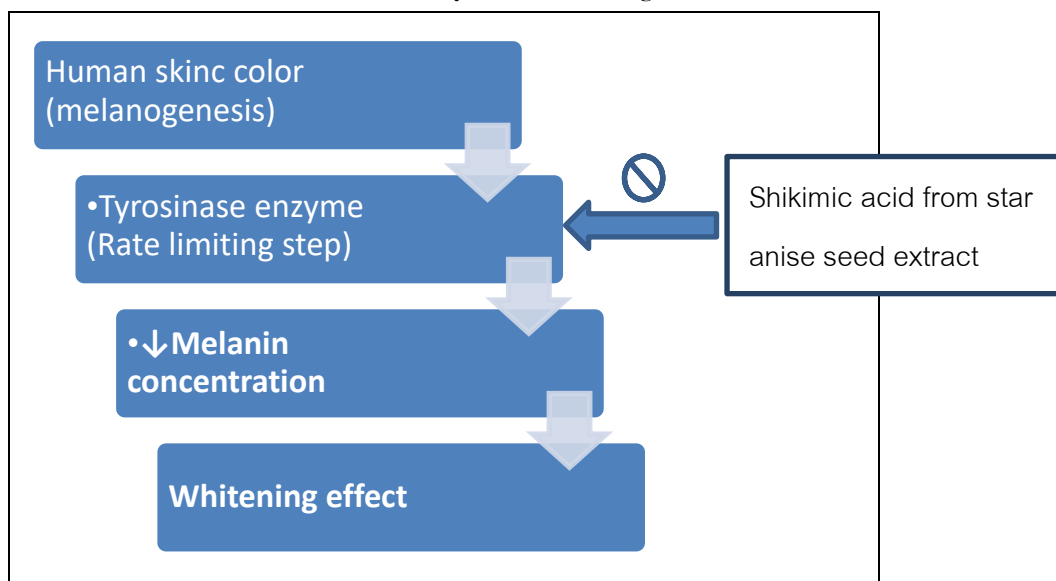
Figure 2. Research Framework

3.3 Research Hypotheses

The 5% Shikimic acid serum is effective for facial whitening

4. Research Methodology

4.1 Research Design

Clinical trial Experimental Study

4.2 Population and Sample

The 20 volunteers of both genders with Fitzpatrick skin type III-VI of aged between 30-55 years old who came to get treatment for facial skin whitening at Mae Fah Luang Hospital, Bangkok. Were investigated.

4.3 Research Instrument

Skin whitening efficacy measurement was assessed by measuring mean melanin index by Mexameter®MX18 and comparing the photography VISIA® analysis.

4.4 Data Collection

According to the inclusion criteria, volunteers were selected and proceeded to the ethical protocols. Each of volunteer's history was recorded

Patch test was carried out by applying 5% shikimic acid serum on volunteer's arms under water-proof patch test and then left in the place for 24hours.

The photographs of each participant by using VISIA® complexion analysis system at baseline, 4th,8th, and 12th week respectively. The evaluation were determised by using dermatologist scored mean melanin index of each participant by using Mexameter ® MX 18 and then calculated into mean melanin index at the baseline, 4th, 8th, 12th week ,respectively.

4.5 Data Analysis

There were 5 male and 15 female volunteers. The mean age of the subjects was 32.1 ± 4.18 ranging from 26-41 years. There were 4officers, 7 students, 9 employers. All of the volunteers had history of cosmetic products usage but no history for whitening treatment recently. Mean time exposure to sunlight (between 10am to 4pm) was 128 ± 68.17 minutes, ranging from 60 to 240 minutes. Most of the volunteers had Fitzpatrick skin type 3 (n=13). There were 5 people of skin type 4 and 2 people of skin type 5. All the volunteers had no underlying disease even though one has allergy to seafood. Additionally, 7 volunteers took supplements while other 13 did not take any medicines. All the volunteers exposed to the sun light which is an aggravating factor of melanin synthesis.

5. Research Findings

Mean Melanin index results of Face that applied with 5% Shikimic acid serum from star anise extract evaluated by Mexameter.

Table 4 Statistical analysis of melanin index score that applied 5% Shikimic acid serum at baseline,

4th , 8th and 12th week   (n=20)

Mean Mealnin Index	Mean	Standard Deviation
Baseline	296.00	63.93
4th week	293.60	64.16
8th week	289.70	63.58
12th week	284.30	64.62
P-value	0.01*	
P-value	0.01*	

P-value determine by Repeated measure ANOVA

* Statistically significant at the 0.05 level
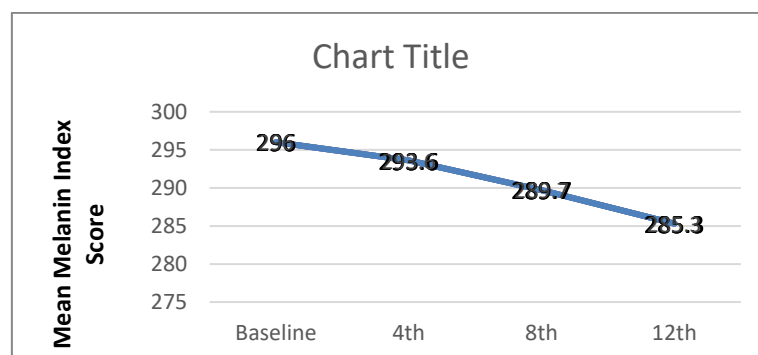
Figure 2 showing melanin index scores at baseline, follow-up visits

4th, 8th, and 12th week after last treatment session

According to the statistical analysis results, the reduction of mean melanin index score of total face that applied 5% Shikimic acid serum from star anise seed extract at baseline from 296.00±63.93(baseline) to 293.60±64.16(4th week), 289.70±63.58 (8th week), and 284.30±64.62(12th week). The mean melanin index score in each visit statistically significant decreased at the level of 0.05 (p<0.001).

Multiple comparison of Melanin Index Scores at baseline, follow-up visits 4th, 8th and 12th week after last treatment sessions

Time	Pair Comparison	Mean difference	P-value
Baseline	4th Week	2.45±3.68	0.0039
	8th Week	6.35±3.57	<0.0001
	12th Week	11.75±4.89	<0.0001
4th Week	Baseline	-2.45±3.68	0.0039
	8th Week	3.90±4.92	<0.0001
	12th Week	9.30±6.46	<0.0001
8th Week	Baseline	-6.25±3.57	<0.0001
	4th Week	-3.9±4.92	<0.0001
	12th Week	5.4±3.19	<0.0001
12th Week	Baseline	-11.75±4.89	<0.0001
	4th Week	-9.3±6.46	<0.0001
	8th Week	-5.4±3.19	<0.0001

Multiple comparison determines by the paired t test method

* The mean difference is significant at the 0.05 level

Repeated measure ANOVA

Variables	d.f.	F	P-value
Mean melanin index score	3	49.95	<0.0001

According to multiple comparison result from Figure, the reduction of mean melanin index score at baseline was lower than follow up 4th week(2.45) and 8th week (6.35)and 12th week (11.75) statistically significant at the level of 0.05 (p<0.05). Moreover, the mexameter score follow up 8th week and 12th week is significantly different (p=<0.0001)

Patient Satisfaction Score

The satisfactory scores between 5% Shikimic acid serum were evaluated at 4th , 8th , 12th week respectively. Scored satisfaction scales by 3 dermatologists using global satisfactory score ranges form -1 to +4; -1 =Worse, 0= No Change, +1= Fair Improvement (1-25%), +2 = Moderate improvement (26-50%), +3 =Good Improvement (51-75%). +4 = Excellent improvement (76-100%)

Statistical analysis of patient satisfaction score on follow-up 4th, 8th, and 12th week
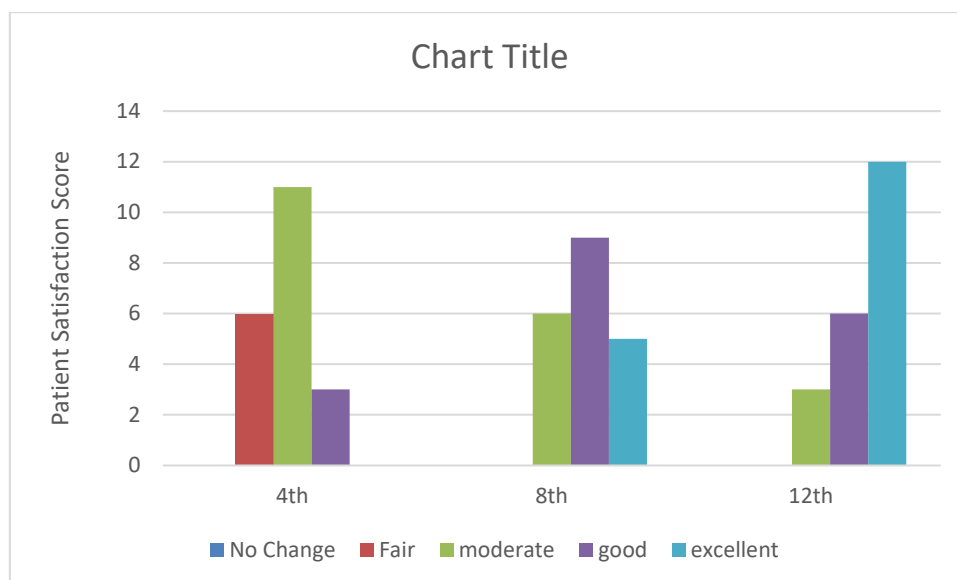
Figure 4 Bar Graph exhibiting patient satisfaction score of 5% Shikimic acid serum

on follow-up 4th, 8th, and 12th week

Participants rated the satisfactory score on 12th week. Regarding to the collected data, majority of the volunteers (n=11, 55%) rated excellent satisfaction 6 volunteers (30%) rated good satisfaction and 3 volunteers (20%) rated moderate satisfaction.

Adverse Effects

In all participants, no adverse effect was detected throughout the treatment with 5% Shikimic acid serum from star anise seed extract

6. Discussion

Hence, 5% shikimic acid serum from star anise seed extract for facial whitening was used to treat 20 volunteers with Fitzpatrick type III-IV

Improvement was determined according to melanin index score by mexameter. The results of mean melanin index score with VISIA was increased statistically significant ($p<0.001$). When comparing the mean change from each visit, statistical different was observed during 4th and 8th week and 12th week ($p < 0.001$). The data indicated the increased the improvement in each follow-up.

At 12th week, the 11 , 6 and 3 volunteers were observed as excellent, good and moderate improvement respectively. Concerning the side effects, no erythema , no rash or no serious skin disorders were observed during the treatment. Due to its efficacy and safety for skin whitening , the longer treatment period should be further investigated.

7. Suggestion

Shikimic acid serum from star anise seed extract may have benefits in other aesthetic conditions and purposes. This research may contribute as a database for further researches on efficacy and safety of shikimic acid serum in clinical conditions such as acne and skin infections

8. Acknowledgement

The duration of study may have some limitations as the study period was only 12 weeks. Longer study period may result in more distinct results and outcomes

9. References

Batory, M., & Rotsztejn, H. (2021). Shikimic acid in the light of current knowledge. *Journal of Cosmetic Dermatology*, jocd.14136. https://doi.org/10.1111/jocd.14136

Choi, M., Choi, S.-J., Jang, S., Choi, H.-I., Kang, B.-M., Hwang, S. T., & Kwon, O. (2019). Shikimic acid, a mannose bioisostere, promotes hair growth with the induction of anagen hair cycle. *Scientific Reports*, *9*(1), 17008. https://doi.org/10.1038/s41598-019-53612-5

Gillbro, J. M., & Olsson, M. J. (2011). The melanogenesis and mechanisms of skin-lightening agents - existing and new approaches: Melanogenesis and skin-lightening agents. *International Journal of Cosmetic Science*, *33*(3), 210–221. https://doi.org/10.1111/j.1468-2494.2010.00616.x

Lee, E. J., Shaikh, S., Ahmad, K., Ahmad, S. S., Lim, J. H., Park, S., Yang, H. J., Cho, W.-K., Park, S.-J., Lee, Y.-H., Park, S.-Y., Ma, J.-Y., & Choi, I. (2021). Isolation and Characterization of Compounds from Glycyrrhiza uralensis as Therapeutic Agents for the Muscle Disorders. *International Journal of Molecular Sciences*, *22*(2), 876. https://doi.org/10.3390/ijms22020876

Lee, S. Y., Baek, N., & Nam, T. (2016b). Natural, semisynthetic and synthetic tyrosinase inhibitors. *Journal of Enzyme Inhibition and Medicinal Chemistry*, *31*(1), 1–13. https://doi.org/10.3109/14756366.2015.1004058

Parvez, S., Kang, M., Chung, H.-S., & Bae, H. (2007). Naturally occurring tyrosinase inhibitors: Mechanism and applications in skin health, cosmetics and agriculture industries. *Phytotherapy Research*, *21*(9), 805–816. https://doi.org/10.1002/ptr.2184

Parvez, S., Kang, M., Chung, H.-S., Cho, C., Hong, M.-C., Shin, M.-K., & Bae, H. (2006). Survey and mechanism of skin depigmenting and lightening agents. *Phytotherapy Research*, *20*(11), 921–934. https://doi.org/10.1002/ptr.1954

Rusu, A., Tanase, C., Pascu, G.-A., & Todoran, N. (2020). Recent Advances Regarding the Therapeutic Potential of Adapalene. *Pharmaceuticals*, *13*(9), 217. https://doi.org/10.3390/ph13090217

Sanvisens, N., Bañó, M. C., Huang, M., & Puig, S. (2011). Regulation of Ribonucleotide Reductase in Response to Iron Deficiency. *Molecular Cell*, *44*(5), 759–769. https://doi.org/10.1016/j.molcel.2011.09.021

Skin whitening capability of shikimic acid pathway compound—PubMed. (n.d.). Retrieved October 6, 2021, from https://pubmed.ncbi.nlm.nih.gov/27049279

Wang, G.-W., Hu, W.-T., Huang, B.-K., & Qin, L.-P. (2011). Illicium verum: A review on its botany, traditional use, chemistry and pharmacology. *Journal of Ethnopharmacology*, *136*(1), 10–20. https://doi.org/10.1016/j.jep.2011.04.051

EFFECT OF ULTRASONIC ASSISTED EXTRACTION CONDITIONS ON PHYTHOCHEMICAL CONTENT AND ANTIOXIDANT ACTIVITY OF KAO KUM DOI-SAKET (*Oryza sativa* L. indica)

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ABSTRACT

Kao kum Doi-Saket is the local name of purple rice comprising with a high anthocyanin which has an outstanding in antioxidant activity. The aim of this study is to investigate the suitable condition of extraction using ultrasonic assisted extraction (UAE) on biochemical compound (total anthocyanin content, antioxidant activity and total flavonoid content). The normal power control mode of 40 kHz of frequency and 150 W of ultrasonic power was used in UAE process. The experiment of UAE condition was designed by varying the extraction temperature of 30, 50 and 70°C and extraction time of 20, 40 and 60 minutes and the ratio of purple rice to water was of 1 kg : 2 liters of extraction solvent which was used as the control variable. The total anthocyanin, antioxidant activity and total flavonoid content were observed using pH differential method, DPPH radical scavenging assay and aluminium chloride colorimetric assay, respectively. The result showed that temperature and time extraction using UAE affected the biochemical compound of purple rice extract. The high temperature and time resulted in an increase in anthocyanin content and antioxidant activity, however the flavonoid content trended to decrease when using too high temperature. The suitable extraction condition of purple rice was of 50 minutes of extraction time and 60°C of extraction temperature, which provided the optimum result of total anthocyanin content, antioxidant activity (the percentage of DPPH inhibition) and total flavonoid content at 5.71±0.43 mg/l and 88.32±1.83% and 29.43±0.02 mg quercetin equivalents/g extract respectively.

Keywords: Purple Rice, Anthocyanin, Ultrasonic Assisted Extraction, Pulse Electric Field Extraction

1. Introduction

Thailand is one of the world major rice exporter. Even though, white rice is the major crop, recently, purple rice exporting demand has been increasing in various international markets. The demand may due to the rice's health benefits. Purple rice or Kaw kum (a local name) (*Oryza sativa* L.) is mostly grown in North and Northeast of Thailand. Purple rice contains various phytochemicals mainly anthocyanins which possess several health benefits including enhancement of immune system from purple rice can be decreased oxidative stress, prevent cardiovascular diseases, diabetes and anticancer (Pusadee and others, 2018). The study by Ichikawa and others (2001) reported that the antioxidant activity of purple rice is two times higher than that of blueberries which may due to different anthocyanins. The components of anthocyanin in purple rice are cyanidin-3-glucoside, peonidin-3-glucoside, malvidin, pelargonidin-3,5-diglucoside and cyanidin-3,5-diglucoside (Rerkasem and others, 2015). Beneficial effect of anthocyanins on human health has been reported in several studies (Tena and Martim, 2020; Navas and others, 2012; Enaru and others, 2021). The chemical structures of anthocyanins have influence on their properties and the base structure of anthocyanins is shown in Figure 1. A flavylium cation acts as an acid, and it gives anthocyanins a high chemical reactivity, moreover, various factors such as temperature, pH, and solvent also play role in anthocyanins' structures and properties.

Name	R_1	R_2	R_3
Delphinidin	OH	OH	H
Petunidin	OH	OCH_3	H
Malvidin	OCH_3	OCH_3	H
Cyanidin	OH	H	H
Peonidin	OCH_3	H	H
Pelargonidin	H	H	H
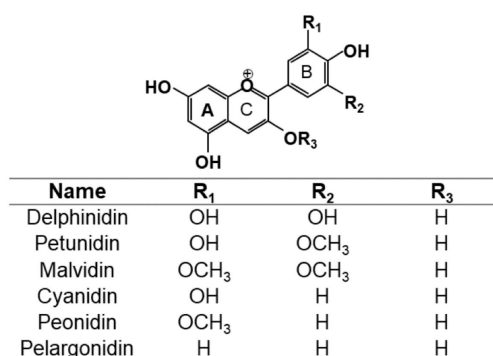
Figure 1 Structure of Anthocyanins R_3 = Sugar and Anthocyanidins R_3 = H (Tena and others, 2020)

As an agricultural product, the price of purple rice in the retail market is 3 USD/ kg however the price of anthocyanin extract is 10 times higher. Therefore, extraction of anthocyanin is a process that can add value to the agricultural product. There are several extraction methods that have been used for anthocyanin extraction. Conventional extraction methods such as maceration, infusion, heat-assisted extraction (HAE), percolation and filtration, Soxhlet extraction which mainly consist of solvent and/or heat where non-conventional techniques which are more environmental-friendly and industrial-focus for example, ultrasound-assisted extraction (UAE), microwave-assisted extraction (MAE), supercritical fluid extraction (SFE), high-pressure liquid extraction (HPLE), pulsed electric fields (PEFE), high voltage electrical discharge (HVED), and enzyme assisted extraction (EAE) have been developed to improve the extraction efficiency and yield. In this study, ultrasound-assisted extraction was chosen because of its safety, economical-friendly and availability.

The principle of the UAE technique is the cell wall destruction by the cavitation phenomenon in the tissue of the sample caused by an ultrasound force (Morata and others, 2021). The ultrasound travels through the liquid as waves created by compression and rarefaction, forming cavitation bubbles with the liquid. Bubble sizes get larger after a few cycles of compression and rarefaction, until they reach a critical size. Then, the bubbles burst, releasing a substantial amount of energy in the form of pressure and heat, destroying the cell walls and enhancing the anthocyanins transportation from the plant cell walls to the solvent (Figure 2).
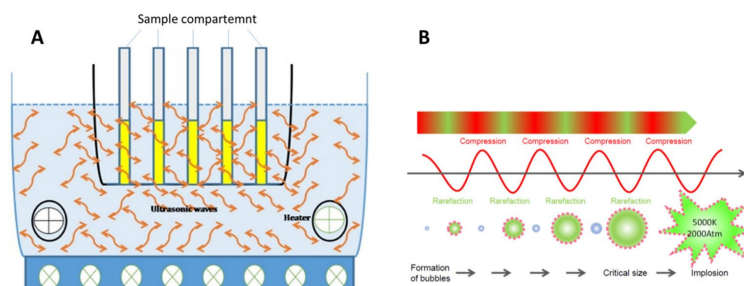
Figure 2 The Effect of Ultrasound on Cell Wall

While using non-conventional methods for anthocyanins extraction, several parameters including temperature, pH, extraction duration and solvent may affect yield and extraction efficiency as mentioned earlier. On that account, the study mainly investigated the effect of temperature and extraction duration of total flavonoid content, anthocyanins content and antioxidant activity of Thai purple rice by ultrasound-assisted extraction.

1.2 Research Objective

(1) The aim of this study is to study the effect of ultrasonic assisted extraction (UAE) on biochemical compound (total anthocyanin content, antioxidant activity and total flavonoid content) and investigate the suitable condition of extraction using ultrasonic assisted extraction (UAE).

1.3 Literature Review

1.3.1 Theory, Concept and Related Research

The study of extraction on anthocyanins, flavonoids and phenolics from black rice with various condition of UAE (extraction temperature, i.e., 10-50°C, extraction time, i.e., 20-80 minutes) and the ratio between solid and solvent (1:15-1:45). This experiment was designed by a Box–Behnken design. The regression models showed that the extraction temperature at 34.7°C with 80 minutes of extraction time and the ratio of the solid-solvent at 1:30 provided the optimum result of anthocyanins, flavonoids, phenolics and % DPPH inhibition (116.58 mg/100g, 51.26 mg/100g, 520.17 mg/100g and 46.50%, respectively). The experiment also found that the increasing in temperature (at 50°C of extraction temperature) influenced the highest extraction yield of anthocyanins. However, the surpassed of the temperature may be reduced anthocyanins. (Pedro and others, 2016).

Pariyarath and others (2018) studied the extraction of black glutinous rice in UAE extraction process on anthocyanins and antioxidant activity. The study was designed by a Box – Behnken design and

extraction conditions were optimized by response surface methodology (RSM). The independent variable of this study was declared such as ethanol concentration (40, 55 and 70%), amplitude (30, 65 and 100%) and extraction time (5, 10 and 15 minutes). The optimum point of this study was found at 70% of ethanol concentration, 65% of amplitude and 5 minutes of extraction time. The highest anthocyanin content, total phenolic and antioxidant were presented as 50.33 mg cyn-3-glucosidase/gram fresh weight ml, 36.17 mg GAE/g, 80.14% for DPPH and 239.94mg AAE/g.

Li and others (2020) studied the total anthocyanin content from the by-product of mulberry extracted by ultrasonic UAE process. The ratio of extraction experiment was set as 1 gram of solid sample to 10, 15, 20, 25 and 30 ml of water solvent, extraction temperature at 30, 35, 40, 45 and 50°C and extraction time at 30, 40, 50, 60 and 70 minutes. The total anthocyanin content was studied to achieve the optimum result by Box–Behnken design. The result was found that the maximum of total anthocyanin content was reached at 6.040 mg/g action via the ratio of solid sample-solvent at 1:20, extraction time at 58 minutes and extraction temperature at 45°C. Furthermore, the effect of temperature on total anthocyanin content of the by-product of mulberry can be described as follows the higher temperature of extraction contributed more total anthocyanin content because the temperature destructed the cell wall of the plant and also increased the enzymatic hydrolysis rate.

Martins Madalão and others (2021) researched on anthocyanins and phenolic compound from juçara palm (*Euterpe edulis* Martius) using UAE technique in various conditions. The frequency and extraction time of ultrasonic was fixed as 25 kHz and 15 minutes, respectively. The different extraction temperature (25, 32, 39, 46 and 53°C) and different ultrasonic power (0, 360 and 900 W) were studied as the independent variables. The experiment determined that the extraction process should be operated at 360 W of ultrasonic power, 25°C of extraction temperature and 25 kHz of frequency to achieve excellent result of anthocyanins, phenolic content and antioxidant activity (298.86 ±27.68 mg cyanidin-3-glucoside/100 g, 1226.39 ±21.08 mg GAE/100 g on a wet basis, 16.06 ± 1.38 (ABTS) μmol Trolox/g and 53.02 ± 1.36 (DPPH) % FRS, respectively.

Le and others (2019) studied of applying ultrasonic-assisted extraction (UAE) on the extraction of anthocyanin from karanda fruit (*Carissa carandas* L.). The experiment consisted of five different parameters which were ethanal concentration (0, 25, 50, 75 and 100%), ratio of solid-solvent (1:2, 1:3, 1:4 and 1:5), extraction temperature (30, 40, 50, 60, 70 and 80°C), extraction time (15, 30, 45, 60 and 90 minutes) and fruit type (unripe red color, moderately ripe purplish red color, ripe purple color and perfectly ripe dark purple color). The maximum result of anthocyanin was obtained at 50% of ethanal concentration, 1:3 ratio of solid-solvent, 50°C of extraction temperature, 45 minutes of extraction time and black-purple color type of the fruit (272.2 mg/l, or 9.33 mg anthocyanin per gram of dry materials).

1.3.2 Research Framework
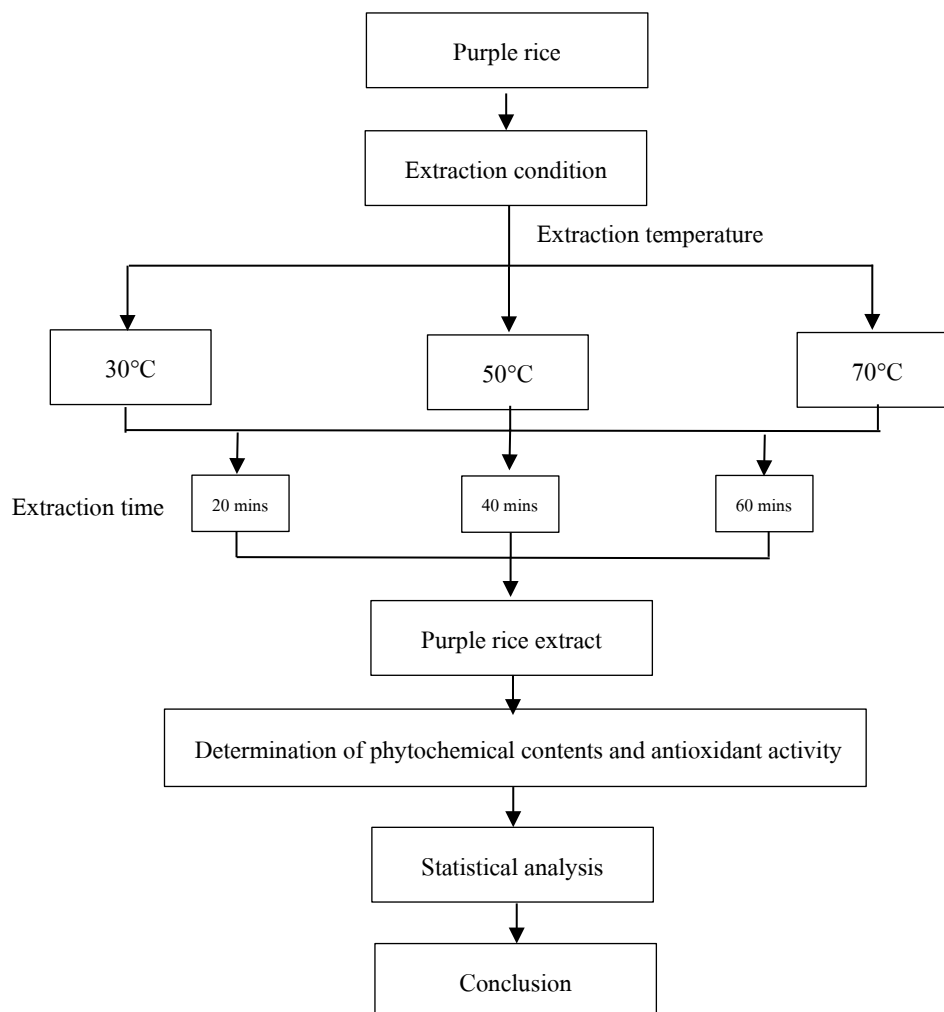
Figure 3 Research Framework

1.4 Research Hypotheses

(1) Ultrasonic technique improved an efficiency of the extraction process of purple rice

(2) Time and temperature affected total anthocyanin, flavonoid content and antioxidant activity of purple rice extract using UAE

2. Research Methodology

2.1 Ultrasonic-assisted extraction (UAE) experiment

The purple rice was extracted using ultrasonic-assisted extraction (UAE) (Model GT Sonic-D6, China). The normal power control mode at 40 kHz of frequency and 150 W of ultrasonic power were used in this study. The ratio of purple rice (1 kg) to water (2 liters) of extraction solvent was used as a control variable. There were three levels of extraction temperature which were 30, 50 and 70°C and three levels of extraction time (20, 40 and 60 minutes). The purple rice sample was filled in a 100 mL beaker and then the extraction solvent (water) was

added. Then the extraction process using UAE was run. After that, the beaker was removed from the ultrasonic bath at the interval of extraction time to determine total anthocyanin content, antioxidant activity and total flavonoid content.

2.2 Determination of total anthocyanin content

The purple rice extract from UAE process was prepared for analyzing the amount of total anthocyanin content by filtering using white cloth membrane. The total anthocyanin content was determined using pH differential spectroscopic method (Tonutare and Moor, 2014). Purple rice extract was diluted 10 times with distilled water and centrifuge at 3,000 rpm for 15 minutes (Hettich zentrifugen, EBA 20). Then, the supernatant solution 500 µl of sample was added with 4.5 ml of pH 1.0 potassium chloride buffer and pH 4.5 sodium acetate buffer, respectively. The mixture sample was measured using UV–Vis spectrophotometer at 510 and 700 nm (Spectrum Instruments, SP-UV 200 spectrophotometer) after incubated for 30 minutes in the absence of light and room temperature. The total anthocyanin content was calculated using the following equation:

$$\text{Total anthocyanin content} = \frac{(A_{510} - A_{700})pH1.0 - (A_{510} - A_{700})pH4.5 \times MW \times DF \times 1,000}{\varepsilon}$$

Where A_{510} is absorbance value of sample at 510 nm of wavelength, A_{700} is absorbance value of sample at 700 nm of wavelength. MW is the molecular weight of cyanidin-3-glucoside (449.20 g/mol). DF is the dilution factor of the sample (DF = 1) and ε is the molar absorptivity coefficient values (ε = 26900 m/cm).

2.3 Determination of antioxidant activity

The antioxidant activity was determined using DPPH (2, 2-diphenyl-1-picrylhydrazyl) free radical scavenging assay. The sample was prepared by adding 200 µl of purple rice extract and filling with 2 ml of 0.12 mM DPPH solution, then methanol was filled until the solution volume increase up to 4 ml. The control sample was prepared by adding 2 ml of DPPH solution and 2 ml of methanol solution. A solution of 4 ml of methanol was used as a blank. The mixture sample was incubated in the absence of light and room temperature for 30 minutes. The UV–Vis spectrophotometer (spectrum Instruments, SP-UV 200 spectrophotometer) at 517 nm of wavelength was used to measure the light absorbance of the mixture. The percentage of DPPH inhibition was calculated using the following equation (Butsat and Siriamornpun, 2009; Sueaman and others, 2019):

$$\text{Percentage of DPPH inhibition} = [\frac{A_{control} - A_{sample}}{A_{control}}] \times 100$$

2.4 Determination of total flavonoid content

The total flavonoid content was measured using aluminium chloride colorimetric assay that was described by Ordonez and others (2006). The purple rice extract was diluted 10 times with distilled water and centrifuged at 3,000 rpm for 15 minutes and then the supernatant was analyzed. The quercetin standard solution was prepared by dissolving 5 mg of quercetin in 1 ml of methanol, then the quercetin standard solution was diluted to 100-1.25 µg/ml. 2 grams of aluminiun chloride ($AlCl_3$) was dissolved in 100 ml of distilled water to

prepare 2% AlCl$_3$ solution. To determine total flavonoid, the sample solution and the quercetin standard solution was taken for 1 ml of each to mix with 1 ml of 2% AlCl$_3$ solution. Then the mixture of 2% AlCl$_3$ solution with the sample and quercetin standard solutions were incubated for 1 hour at room temperature. After the incubation, the sample solution was measured using UV–Vis spectrophotometer (spectrum Instruments, SP-UV 200 spectrophotometer) at 420 nm. Total flavonoid content was calculated from quercetin standard curve ($Y = \ldots x +\ldots$, $R^2 = 0.99$). The result was illustrated as mg quercetin equivalents/g extract.

2.5 Statistical analysis

All parameters were measured in triplicate and the data was calculated and presented in term of means ± SD. The difference of all parameter among various extraction conditions were statistically analyzed using one-way ANOVA and Turkey's multiple comparison tests. The significance level of 95% or at $p < 0.05$ was used in the statistical analysis.

3. Research Findings

3.1 Effect of various conditions of UAE on total anthocyanin content

The total anthocyanin content of purple rice extract using UAE was studied by varying difference levels of extraction temperature and time which were 30, 50 and 70°C and 20, 40 and 60 minutes. The ratio of purple rice to water was fixed as 1 kg to 2 liters. The phytochemical and antioxidant activity were analyzed. It was found that the extraction temperature and time affected total anthocyanin content. The total anthocyanin content of various conditions of UAE are revealed in Figure 4. The total anthocyanin content of purple rice extract at 30°C of extraction temperature increased with an increasing of time, the total anthocyanin content were 1.49±0.08, 2.82±0.09 and 3.80±0.12 mg/l for 20, 40 and 60 mins, respectively. The total anthocyanin content of purple rice extract from the UAE condition of 50°C of temperature for 20 and 40 minutes, was not significantly different ($p > 0.05$) (3.52±0.09 and 3.62±0.11 mg/l, respectively). However, the highest total anthocyanin content of purple rice extract using 50°C of extraction temperature was found as 5.71±0.43 mg/l when using 60 minutes of extraction time. There was a fluctuating trend of total anthocyanin content of purple rice extract at 70°C of temperature when varying the extraction time. The total anthocyanin content of purple rice extract from 20, 40 and 60 minutes were 43±0.04, 4.94±0.16 and 4.76±0.19 mg/l, respectively. From the result, it can be perceived that the highest total anthocyanin content of purple rice extract was evaluated as 5.71±0.43 mg/l when using the extraction condition of 50°C with 60 minutes. This condition was significantly different to the others condition ($p < 0.05$).
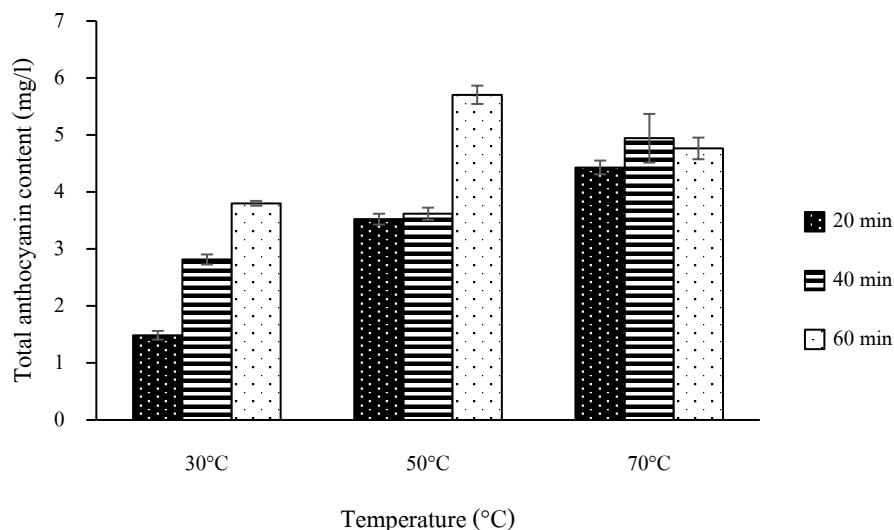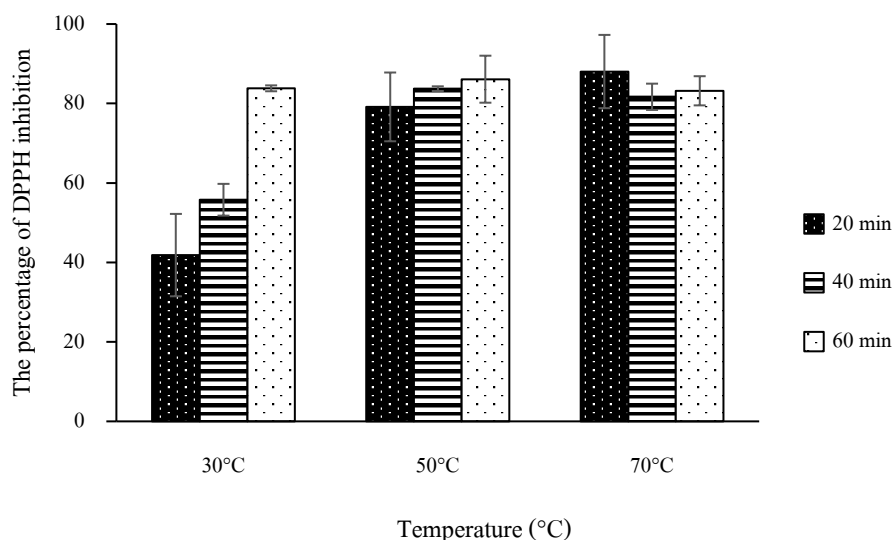
Figure 4 The Comparison of Total Anthocyanin Content of

Purple Rice Extract using Various Extraction Condition

3.2 Effect of various conditions of UAE on antioxidant activity content

The antioxidant activity of purple rice extract was evaluated using DPPH (2, 2-diphenyl-1-picrylhydrazyl) free radical scavenging assay and interpreted as the percentage of DPPH inhibition. From Figure 5, the antioxidant activity of purple rice extract showed that the percentage of DPPH inhibition was influenced by temperature and time of extraction condition. The percentage of DPPH inhibition of purple rice extract at 30°C of extraction temperature increased when the extraction time increased, they were 41.85±10.37, 55.78±865 and 83.82±9.22% for 20, 40 and 60 minutes, respectively. The same trend was also found when using 50°C of temperature, time had influence on the percentage of DPPH inhibition of purple rice extract. The percentage of DPPH inhibition of purple rice extract increased with an increasing of time, however there was no significantly different ($p>0.05$) in the percentage of DPPH inhibition of purple rice extract for all extraction times. The percentage of DPPH inhibition of purple rice extract were 79.14±4.00, 83.73±0.59 and 88.32±1.83% for 20, 40 and 60 minutes, respectively. Nevertheless, there was no trend in the percentage of DPPH inhibition of purple rice extract for the extraction condition of 70°C and had no significantly different ($p>0.05$) of among them. The percentage of DPPH inhibition of purple rice extract were observed as 88.05±0.74, 81.69±5.91 and 83.20±3.67%, for 20, 40 and 60 minutes, respectively. It can be found from the result that the highest of the percentage of DPPH inhibition of purple rice was obtained at 50°C of extraction temperature with 60 minutes of extraction time (88.32±1.83%).

Figure 5 The Comparison of Percentage of DPPH Inhibition of Purple Rice Extract using Various Extraction Condition

3.3 Effect of various conditions of UAE on total flavonoid content

The total flavonoid content of purple rice extract from various extraction condition is presented in Figure 6. The result showed that the total flavonoid content of purple rice extract at 30°C of extraction temperature slightly increased with an increasing time of extraction (20, 40 and 60 minutes) however, it was lower than other conditions (16.62±0.02, 20.67±0.02 and 21.08±0.01 mg quercetin equivalents/g extract, respectively). The purple rice extract at the extraction condition at 50°C of extraction temperature of 20, 40 and 60 minutes of extraction time revealed that the total flavonoid content of purple rice extract increased with an increasing time of extraction which were 24.49±0.01, 28.75±0.02 and 29.43±0.02 mg quercetin equivalents/g extract, respectively. In the other hands, the total flavonoid content of purple rice extract at 70°C of extraction temperature gradually decreased with a time progress. (38.56±0.05, 27.10±0.04 and 21.46±0.0202 mg quercetin equivalents/g extract, respectively). Therefore, the highest total flavonoid content of purple rice extract was obtained at 70°C, 20 minutes which was significantly different ($p < 0.05$) than that of the others condition.
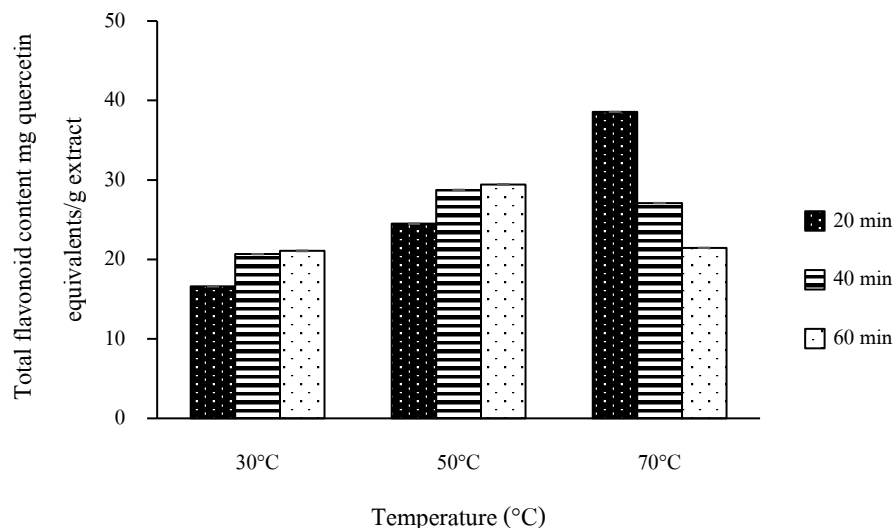
Figure 6 The Comparison of Total Flavonoid Content of Purple Rice Extract using

Various Extraction Condition

3.4 Determination of the optimum UAE extraction condition for purple rice

From the Figure 4, 5 and 6, it was found that using low temperature and time of extraction produced a low total anthocyanin content as well as the percentage of DPPH inhibition and total flavonoid content of purple rice extract. On the other hand, higher extraction temperature and time increased the yield of phytochemical compound and antioxidant activity. However, prolonging extraction temperature and time may decrease the phytochemical compound of the purple rice extract. The reason was because the total anthocyanin content was not toleration to heat which resulted in the percentage of DPPH inhibition and total flavonoid content. From the result of total anthocyanin content, the percentage of DPPH inhibition and total flavonoid content, it was found that at extraction condition of 50°C and60 minutes offered the maximum value of total anthocyanin content and percentage of DPPH inhibition (5.71±0.43 mg/l and 88.32±1.83%, respectively). Whereas, at extraction temperature of 70°C and 20 minutes of extraction time provided the highest total flavonoid content (38.56±0.05 mg quercetin equivalents/g extract). Consequently, the optimum extraction condition for UAE process was observed as the extraction temperature of 50°C with 60 minutes.

4. Discussion

The result showed that ultrasonic assisted extraction (UAE) affected the extraction of purple rice. The process was able to improve the extraction efficiency according to ultrasonic break down the cell wall of the purple rice then anthocyanin and flavonoid were released (Zhu L and others, 2015). In addition, the result also revealed that temperature and time of extraction had influence on the phytochemical contents (anthocyanin and flavonoid) and antioxidant activity (Puértolas and others, 2013). Increasing temperature and time was able to increase the phytochemical contents (anthocyanin and flavonoid) and antioxidant activity. This was because higher temperature assisted the cell wall breaking and longer time resulted in longer extraction period. However,

the anthocyanin, flavonoid and antioxidant activity were sensitive to too high temperature and time (Xu and Pan, 2013), this was observed from the result of the extraction using 70°C. Total anthocyanin and antioxidant decreased with increasing temperature and time in this extraction condition.   A similar result was found in a study of effect of different extraction condition on anthocyanin content from Aronia melanococarpa berry (AMP) by UAE. The result reported that when the extraction temperature and time were greater than 40°C and 50 minutes, anthocyanin content of AMP slowly decreased (Chen and others, 2017). Furthermore, the study of different extraction processes of anthocyanin from a berry also presented that an increasing of temperature and time of extraction affected the total anthocyanin content. The highest total anthocyanin was found as 2.99 mg/ml when using UAE method at 65°C of temperature for 30 minutes (Chesnokova and others, 2021). The research of UAE extraction on anthocyanin of purple sweet potato by Wang and others, 2022 who studied in difference of extraction condition such as extraction temperature (30, 40, 50, 60, and 70°C) and extraction time (10, 20, 30, 40, and 50 minutes). The study illustrated that the optimum extraction condition of anthocyanin of purple sweet potato was obtained at 40°C of extraction temperature and 30 minutes of extraction time (2.07mg/g). However, this study also investigated that the yield of anthocyanin of purple sweet potato decreased when the extraction temperature and extraction time increased. The cause of total anthocyanin content degradation of the plant was explained that the high extraction temperature and long exposure of extraction time affected the anticyclonic decomposition of the plants cell wall structure (Pham and others, 2019).

For the conclusion of this study, it can be concluded that the study showed that extraction time and temperature assisted the extraction efficiency of purple rice extraction using UAE technique. The investigation of this study showed that the long extraction time and high extraction temperature affected the degradation of the total anthocyanin content of purple rice extract. The suitable condition of UAE was obtained as 50°C of temperature with 60 minutes of extraction time extraction and a ratio of purple rice to water was of 1:2 (w/v).

5. Suggestion

(1) One more factor should be added to the experiment then a respond surface methodology would be applied in order to investigate the exactly optimum condition for purple rice extraction.

(2) The result of ultrasonic assisted extraction obtaining from this study could be compared with other extraction process such as microwave or pulse electric field assisted extraction.

6. Acknowledgement

7. References

Butsat, S., and Siriamornpun, S. (2009). Antioxidant capacities and phenolic compounds of the husk, bran and endosperm of Thai rice. *Food Chemistry*. 119, 606-613.

Chen, S., Meng, X., and Wang, Y. (2017). Antioxidant Activity and Optimisation of Ultrasonic-Assisted Extraction by Response Surface Methodology of Anthocyanins from Aronia Melanocarpa Berry. *Nutrition and Food Science Journal, 1*(1), 1-8.

Chesnokova, N.Y., Levochkina, L.V., Prikhod'ko, Y.V., Kuznetsova, A.A., and Chebukin, P.A. (2021). Influence of ultrasound and extraction conditions on the intensity of extraction of anthocyanin pigment from berry raw materials. V International Workshop on Innovations in Agro and Food Technologies (WIAFT-V-2021), 17 -18 June 2021 at Volgograd, Russian Federation, 1-12.

Enaru, B., Dretcanu, G., Pop, T.D., Stanila, A., and Diaconeasa, Z. (2021). Anthocyanins: Factors Affecting Their Stability and Degradation. *Antioxidants*. 10, 1967.

Ichikawa, H., Ichiyanagi, T., Xu, B., Yoshii, Y., Nakajima, M., and Konishi, T. (2001). Antioxidant Activity of Anthocyanin Extract from Purple Black Rice. *Journal of Medicinal Food*, *4*(4), 211-218.

Le, X.T., Huynh, M.T., Pham, T.N., Than, V.T., Toan, T.Q, Bach, L.G., and Trung, N.Q. (2019). Optimization of Total Anthocyanin Content, Stability and Antioxidant Evaluation of the Anthocyanin Extract from Vietnamese Carissa Carandas L. Fruits. *Processes*, *7*, 1-15.

Li, Y., Tao, F., Wang, Y., Cui, K., Cao, J., Cui, C., Nan, L., Li, Y., Yang, J., and Wang, Z. (2020). Process optimization for enzymatic assisted extraction of anthocyanins from the mulberry wine residue. *2nd International Conference on Green Energy and Environment (ICOGEE 2020),* 8 October 2020 at Bangka Belitung Islands, Indonesia, 1-10.

Martins Madalão, M.C., França Lima, E.M., Benincá, D.B., Saraiva, S.H., Carvalho, R.V., and Silva, P.I. (2021). Extraction of bioactive compounds from juçara pulp (Euterpe edulis M.) is affected by ultrasonic power and temperature. *Food Science and Technology* (*Ciência e Agrotecnologia*), *45*, 11.

Morata, A., Escott, C., Loira, I., López, C., Palomero, F., and González, C. (2021). Emerging Non-Thermal Technologies for the Extraction of Grape Anthocyanins. *Antioxidant, 10*, 1863.

Navas, M.J., Jiménez-Moreno, A.M., Martín Bueno, J., Sáez-Plaza, P., and Asuero, A.G. (2012). Analysis and antioxidant capacity of anthocyanin pigments. Part IV: Extraction of anthocyanins. *Critical Reviews in Analytical Chemistry*, *42*(4), 313-342.

Ordonez, A.A.L., Gomez, J.D., Vattuone, M.A., and lsla, M.I. (2006). Antioxidant activities of *Sechium edule* (Jacq.) Swartz extracts. *Food Chemistry*, *97*, 452-458.

Pariyarath, A.M., Anal, A.K., and Sadiq, M.B. (2018). Optimization of Ultrasonic Assisted Extraction (UAE) of Anthocyanins from Black Glutinous Rice and Evaluation of Their Antioxidant Properties. *International Journal of Food Engineering, 4*(4), 288-292.

Pedro, A.C., Granato, D., and Rosso, N.D. (2016). Extraction of anthocyanins and polyphenols from black rice (O*ryza sativa* L.) by modeling and assessing their reversibility and stability. *Food Chemistry*, *191*, 12-20.

Pham, T.N., Lam, T.D., Nguyen, M.T., Le, X.T., Vo, D.V.N., Toan, T.Q., and Vo, T.S. (2019). Effect of various factors on extraction efficiency of total anthocyanins from Butterfly pea (*Clitoria ternatea* L. Flowers) in Southern Vietnam. *2nd International Conference on Mechanical Engineering and Applied Composite Materials.* 7–8 December 2018 at Harbin, China.

Puértolas, E., Cregenzán, O., Luengo, E., Álvarez, I., and Raso, J. (2013). Pulsed-electric-field-assisted extraction of anthocyanins from purple-fleshed potato. *Food Chemistry*, *136*, 1330-1336.

Pusadee, T., Wongtamee, A., Rerkasem, B., Olsen, K.M., and Jamjod, S. (2019). Farmers Drive Genetic Diversity of Thai Purple Rice (Oryza sativa L.) Landraces. *Economic Botany*, *73*, 76-85.

Rerkasem, B., Jumrus, S., Yimyam, N., and Prom-u-thai, C. (2015). Variation of grain nutritional quality among Thai purple rice genotypes grown at two different altitudes. *ScienceAsia*, *41*(6). 377-385.

Sueaman, K., Paksee, S., Arpsuwan, A., Chalongsuppunyoo, R., Sam-ang, P., Jannoey, P., and Pinwattana, K. (2019). Determination of Antioxidant Capacity of Riceberry and Khao Dok Mali 105 Cultivars. *PSRU Journal of Science and Technology, 4*(3), 95-108.

Tena, N., Martin, J., and Asuero, A.G. (2020). State of the Art of Anthocyanins: Antioxidant Activity, Sources, Bioavailability, and Therapeutic Effect in Human Health. *Antioxidants.* 9, 451.

Tonutare, T., Moor, U., and Szajdak, L. (2014). Strawberry Anthocyanin Determination By pH Differential Spectroscopic Method-How To Get True Results?. *Acta Scientiarum Polonorum, 13*(3), 35-47.

Wang, F., Zhang, S., Deng, G., Xu, K., and Liu, J. (2022). Extracting Total Anthocyanin from Purple Sweet Potato Using an Effective Ultrasound-Assisted Compound Enzymatic Extraction Technology. *Molecules*, *27*, 2-15.

Xu, Y., and Pan, S. (2013). Effects of various factors of ultrasonic treatment on the extraction yield of all-trans-lycopene from red grapefruit (*Citrus paradise* Macf.). *Ultrasonics Sonochemistry*, *20*, 1026-1032.

Zhu, L., Dong, F., Wang, J., and Du, Y. (2015). Comparative antioxidant activities of anthocyanins extracted from purple sweet potato by organic solvent ultrasonic-assisted and microwave assisted extraction. *J. Food Science*, *36*, 83-88.

THE STUDY OF ENERGY CONSUMPTION AND ECONOMIC ASSESSMENT OF LOW-COST COMMUNITY PLANT FACTORY

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ABSTRACT

This research aims to study the energy consumption and assessment of economic value of cultivation *Anoectochilus burmannicus*n in flasks at a low-cost plant factory that was developed from a traditional orchid nursery in flasks in Ban Pong Krai, Pong Yang Sub-district, Mae Rim District, Chiang Mai Province. The 18,000 Btu/hr of air conditioner, twelve bulbs of 18 W LED full spectrum was installed inside plant factory, for controlling environment both air temperature and lighting. Furthermore, the grid-connected 3.15 kWp PV system was installed for the plant factory use during the day. The research was found seasonal weather influences energy consumption in plant factory. The summer has the highest average energy consumption 0.30-8.12 kWh, followed by the rainy season and winter 0.00-6.06 kWh and 0.00-4.86 kWh, respectively. Throughout the cultural period, the solar PV system produced most of the electricity around 69.19%, with roughly 30.81% was from grid lines at a cost reduction of 5,189 baht. For the growing of *Anoectochilus burmannicus* in flasks, the samples cultured inside the plant factory showed an average stem growth of 0.5-1.0 cm has been able to grow better doubly better than samples cultured outside the plant factory. The period of plant growth was short about 2.6 times from 8 months to achieve in 3 months culture period. The survival rate was raised to 60.35 %, compared to 40 percent for samples grown outside of the plant factory. For the assessment of economic value, low-cost plant factory required about 3 years to achieve a total net return equal to the total investment value. The net present value (NPV) was 14,851 Baht, of which was internal rate of return (IRR) to calculate the equal to 16.04%, it was an attractive project for investment.

Keywords: Energy consumption, Plant factory, Economic assessment, Community.

1. Introduction

Anoectochilus burmannicus, a jewel orchid, can be found in Ban Pong Krai, a village in Pong-yang Sub-district, Mae Rim District, Chiang Mai Province. However, because it takes a long time to develop and reproduce on its own, it is rare and endangered (Perada et al., 2018) because it takes a long time to grow up and be reproduce on its own. For this reason, a community orchid conservation group of Ban Pong Krai was formed. The cultivation is based on tissue culture by the villager's knowledge. The survival rate of *Anoectochilus burmannicus* in flasks is low and take a long time to grow up due to warmer weather condition. This research needs to apply plant factory technology to improve the orchid in-flasks that appropriates for the community use. The air conditioning system was installed for controlling optimum temperature for the cultivation of *Anoectochilus burmannicus* in flasks around 25-27°C (Selvaraju et al., 2015; De et al., 2021). The artificial lighting system is use instead of natural light and grid-connected solar PV system was installed to reduce the electricity during daytime, which can help reduce production costs in terms of electricity costs (Wael et at., 2020). From many researches about plants factory found that a suitable environment inside plant factory made growth of in-flasks orchid was greater survival rate and had good quality (M.A. et al., 2019; K. et al 2022). However, their investments are needed to renovate the conventional orchid in flasks nursery into a plant factory and have to increase energy consumption comparing traditional cultures. Therefore, it will be interesting to study the application of the plant factory as applied for the low-cost plant factory by community demand.

2. Research Objectives

To studied the energy consumption of cultivation and assessment of economic value of low-cost plant factory of Ban Pong Krai community.

3. Literature Review

3.1 Theory, Concept and Related Research

Plant factory is places where the environment is controlled to suit plant growth can be classified into 3 categories as following full sunlight plant factory, it is a plant factory that uses the only sunlight for the plant photosynthesis. Partial sunlight plant factory, it is a combination of sunlight at daytime and use an artificial lighting system at night. Full artificial light plant factory. it can strictly control the environment within the plant factory, including the air temperature, lighting, and nutrients for plant without affected from outside by using air conditioning system and artificial lighting system, which is the focus of this study (Wen et al., 2018).

A plant factory in this research uses an electricity from solar PV system and grid line. A solar PV works on the principle of the photovoltaic effect. PV cell converts light energy into electricity. PV cells are stimulated by electromagnetic waves, giving electrons a higher energy, and moving freely. The current flowing in the circuit is direct current (DC) electricity for supply electricity to source demand (Aghaei e al., 2020). Theoretical optimum air temperature inside the plant factory for *Anoectochilus burmannicus* in-flasks should be about 25-27 °C. The Photosynthetic Photon Flux Density (PPFD) should be about 35-50 $\mu mol/m^2 \cdot s$. Once the orchid has reached the

desired size, it will be taken out of the flask for acclimatization with further culture in open greenhouses with airflow, air temperature about 30-32 °C, The PPFD is between 70-130 μmol/m$^2\cdot$s for a period of 4-6 weeks that was increase the survival rate of orchids.

According to research about plant factory full artificial light plant factory it is using an air conditioning system and artificial lighting system, it can strictly control the environment inside the plant factory without being affected by outside plant factory (Toyoki et al., 2019) which suitable environment for orchid should be about 25-27 °C (Wen et al., 2020). The PPFD should be about 35-50 μmol/m$^2\cdot$s that was made growth and quality of in-flasks orchid better than conventional process and the solar PV system can be reduce production costs in terms of electricity costs.

3.2 Research Framework
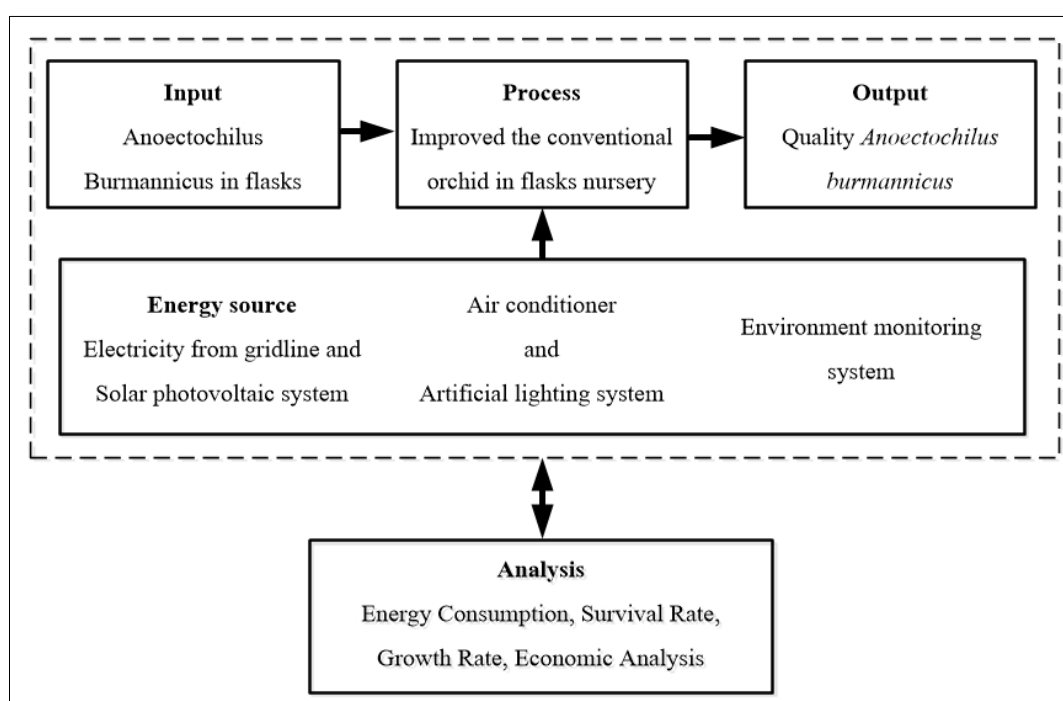
Fig 1. Research Framework

3.3 Research Hypotheses

The improvement of the conventional orchid in-flasks nursery to a low-cost plant factory could establish a suitable environment for *Anoectochilus burmannicus* in flask. That made growth and quality of in-flasks orchid better than conventional process, great for investment and match to community demand.

4. Methods and materials

A low-cost plant factory in this research locates at Ban Pong Krai, Pong Yang Sub-district, Mae Rim District, Chiang Mai Province that was improved from the conventional orchid in flasks nursery. The structure of the conventional nursery is a room of 6 m of width, 6 m of length and 6 m of height. The improvements addition

used a lightweight concrete as wall, the air conditioner of 18,000 Btu/hr and LED full spectrum 18 W light bulb were installed for controlling environment inside the plant factory with 25-27 $^{\circ}$C and the Photosynthetic Photon Flux Density (PPFD) values were in the range of 7 to 55 μmol/m$^2\cdot$s. The grid-connected Solar PV system was used 10 panels of 315 W polycrystalline solar panels, 315 kWp and grid-tie inverter to reduce the electricity consumption from the grid line. The two 12V 80A batteries used to back up electricity for the artificial lighting system after daytime no electricity generation from the Solar PV system. The diagram of the plant factory is shown in Figure 2.
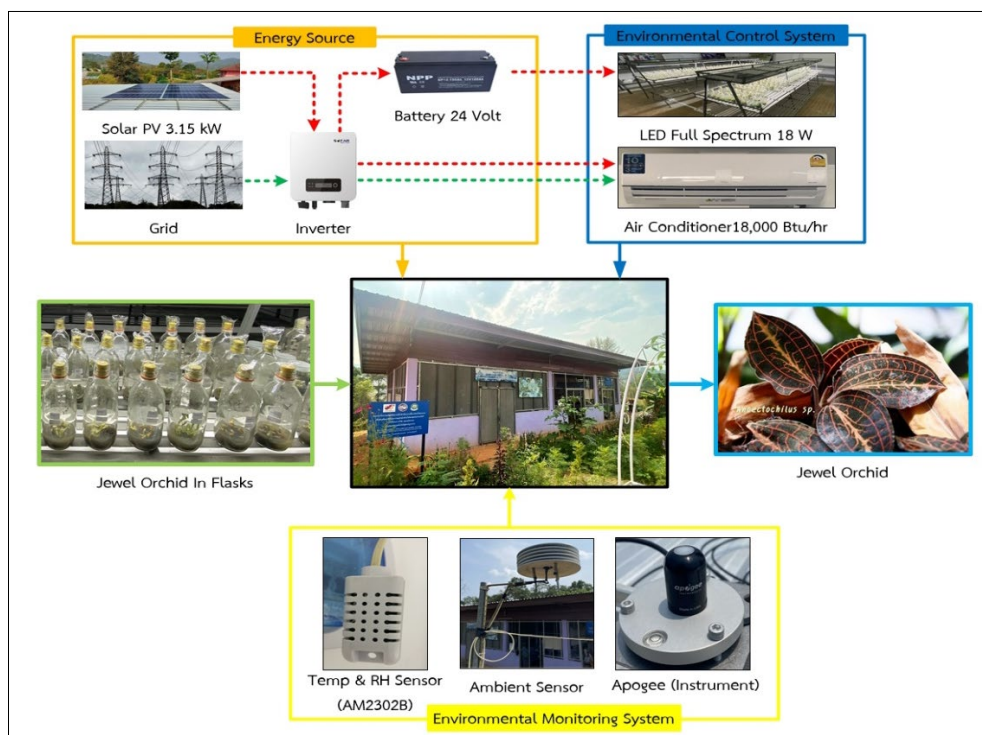
Fig 2. The diagram of low-cost plant factory.

The plant factory was continually monitored for 24 hours during the 8-month culture period, since March 25, 2021 to October, 25 2021. The inside air temperature ($T_{Air\ In}$), and outside air temperature ($T_{Air\ Out}$), were recorded by air temperature and air relative humidity sensor (Model: AM2302B Resolution $\pm$ 2%RH $\pm$ 0.5 $^{\circ}$C) and then compare with energy consumption in air conditioning systems. The electricity from Solar PV system (E_{PV}), the electricity from grid lines (E_{grid}), and total electricity used of a culture crop (E_{total}) to analyze the proportion of energy consumption, energy costs and savings costs, respectively.

For the growth of *Anoectochilus burmannicus* in flasks, a sample was randomly chosen to study the survival and growth rates of 15 samples within the plant factory and 5 samples outside the plant factory for result comparison. Every month for eight months, height photographs of orchids in flasks were taken and used to track growth (April to November 2021), as shown in Figure 3.
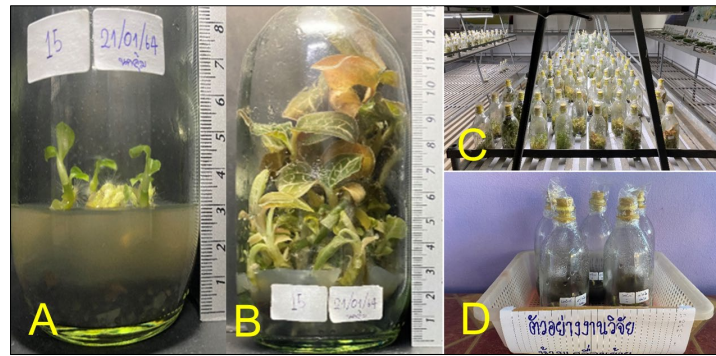
Fig 3. (A) in-flasks orchid in first month. (B) in-flasks orchid after 8 months.

(C) in-flasks orchid inside plant factory. (D) in-flasks orchid outside plant factory.

For economic assessment, the simple payback period, net present value (NPV), and internal rate of return (IRR) were calculated. Simple payback period (SPP) is a how long the return on operations is equal to the investment, regardless of the value of the money that changes over time as shown in equation (1) (T.H. et al., 2021).

$$\text{Simple payback period} = \frac{\text{Initial investment}}{\text{Annual income}} \qquad (1)$$

However, simple payback period is a preliminary calculation without considering the value of money that changes over time, so net present value (NPV) has been calculated to determine the risk of the project when the value of the money changes in the future as shown in equation (2), and internal rate of return (IRR) has been calculated to find the profitability of potential investments as shown in equation (3).

$$\text{NPV} = \sum_{n=0}^{N} \frac{B_n - C_n}{(1+i)n} \qquad (2)$$

$$\text{IRR} = i_1 \frac{NPV1}{NPV1 - NPV2}(i_2 - i_1) \qquad (3)$$

When B_n is the benefit on the nth year (Baht), C_n is the cost in the n year (Baht), n is the project age (Years), i is the discount rate or interest rate (Aloysius et al., 2021)

5. Research Finding and Discussion

5.1 The behavior of Energy Consumption

Due to this low-cost plant factory consumed electricity from both sources solar PV system and grid line so the energy consumption in each season was different. In Figure 4 shows the energy consumption behavior in summer between April 15, 2021, to May 15, 2021 (Meteorological Department of Thailand, 2021). It was found that the daily energy consumption of an air conditioner ranges from 0.30-8.12 kWh/day. The solar PV system could produce an average of 2.13-9.26 kWh/day which was enough for the air conditioning system to control the temperature within the plant factory between 24-27 °C. On April 16, 17, 24, and May 5, the maximum ambient

temperature was 32–34°C, therefore the air conditioning systems used more electricity than the solar PV system could provide. As a result, the grid line used 1.75–4.48 kWh/day. Additionally, there was a storm on April 28 to May 2 that caused a power outage, so the air conditioning system could be used at certain times of the day, however the ambient air temperature wasn't too high, keeping the air temperature inside the plant factory around 25 °C, which was suitable for growing orchids in flasks. Total energy consumption in summer was 263.6 kWh, of which 174.4 kWh, or 64.1% was from solar PV systems, and 89.3 kWh or 33.9% from grid line.
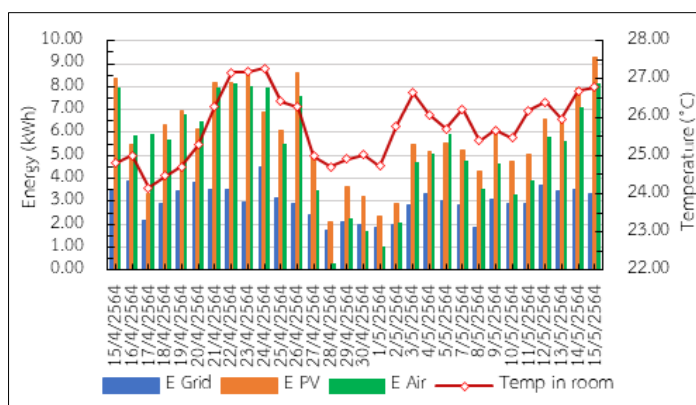
Fig 4. Energy consumption within the plant factory during 15 April–15 May 2021.

In rainy season, the ambient air temperature was lower than summer about 8 °C. The inside air temperature was around 24-26 °C affects the operation of the air conditioning system. Some days the sky is overcast as a result, Solar PV system produced less electricity. Figure 5 shows the energy consumption behavior between June 23 to July 22, 2021 were used as data representative of rainy season (Meteorological Department of Thailand, 2021). It was found that the daily energy consumption of an air conditioner ranges from 0.00-6.06 kWh/day. The solar PV system could produce an average 2.96-8.00 kWh/day. The electricity from gride line was averages between 2.40-5.02 kWh/day. Additionally, the air conditioning system was not used on July 10–11, 2021 because the outside temperature was below 23 °C, which is suitable for in-flask orchids. Total energy consumption in rainy season was 266.4 kWh, of which 172.4 kWh, or 64.7% was from solar PV system, and 94.0 kWh or 35.3% was from grid line.
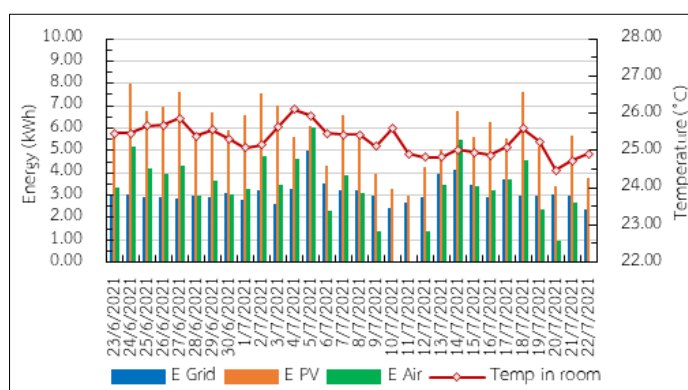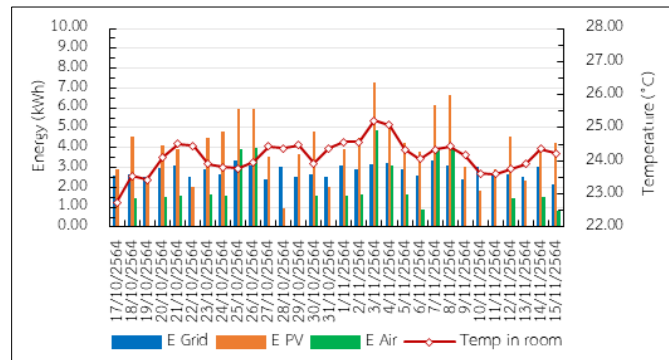

Fig 5. Energy consumption within the plant factory during 23 June–22 July 2021.

In winter, the ambient air temperature was varied between 21-24 °C. On somedays, the sky is cloudy, which has an impact on the solar PV system. Figure 6 shows the energy consumption behavior that inside the plant factory between October 17 to November 15, 2021 were used as representative of winter (Meteorological Department of Thailand, 2021). It was found that the daily energy consumption of an air conditioner ranges from 0.00-4.86 kWh/day. The solar PV system could produce an average 0.92-7.30 kWh/day that was sufficient for the use in plant factory to maintain an average temperature of 22-25 °C. The electricity from grid line was between 2.15-3.37 kWh/day. Moreover, somedays on October and November, the air conditioning system was not used because the ambient air temperature was lower than 23 °C. Total energy consumption in winter was 204.7 kWh, of which 120.3 kWh, or 58.7% was from solar PV system, and 84.5 kWh or 41.3% was from grid line.

Fig 6. Energy consumption within the plant factory during 17 October - 15 November 2021.

In terms of the proportion of energy consumed, it was found that the total energy consumption during cultivation was 1,874.9 kWh, about 1,297.2 kWh or 69.19% was from solar PV system, and 577.7 kWh, or 30.81% was from grid line as shown in Figure 7. if just using transmission line energy. Energy costs one per cultivation are about 7,500 Baht, with an electric charge of 4 Baht per kWh. However, while using the solar PV systems to reduce the transmission lines energy consumption. This enables an electrical cost savings of roughly 5,189 Baht.
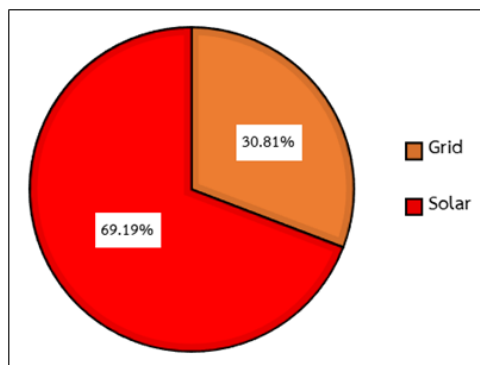

Fig 7. Proportion of total energy consumption over the cultivation within the plant factory.

Figure 8 shows that the height of the sample orchids grown in the plant factory increased on average about 1 cm from April to July before dropping to an average of 0.5 cm from September to November. The through-cultivated crop had an 8 cm average stem height. While the samples orchid outside the plant factory had an average height about 0.5 cm on April to July, then dropped to almost unchanged in September to November. An average height of cultivated outside the plant factory is about 4 cm. Additionally, samples grown outside of a plant factory needed 8 months to reach an average height of 4 cm for a jewel orchid flask, so while samples grown inside of a plant factory created the same height on average in just 3 months, highlighting the importance of growing plants in the ideal environment. That's in addition to causing the plants to grow 2. 6 times faster. Even if it has the same period, it also has an impact on how long things take to grow. Plants can grow more quickly when they are raised in the right conditions. Additionally, compared to samples collected outside of the plant factory, which had a survival rate of 40%, samples grown in the plant factory had a 60.35% greater survival rate.
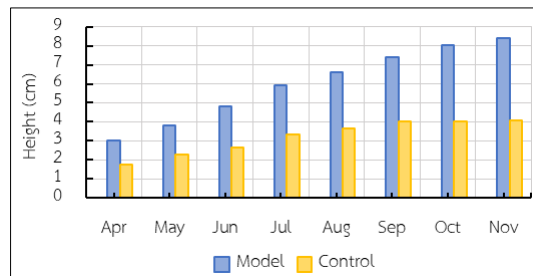

Fig 8. The height of orchid in flasks since April to November 2021.

For economic assessment analysis, the data of initial cost, income, and expenses accounts of plant factory, as show in Table 1 and Table 2. The cost effectiveness analyze of low-cost plant factory are calculated by equations (1) – (3) mentioned above.

Table 1. Initial cost of plant factory.

Type	Amount
Improvement cost	80,000
Solar PV system	31.650
Average Electric bill	2,060

Table 2. Data from the income and expenditure accounts of plant factory.

Years	Income (Baht)				Expense (Baht)	Balance (Baht)
	Balance from last years	Orchid flasks sale	Tourism*	Total		
2018	-	27,715	15,750	43,465	33,057	10,408
2019	-	11,235	20,244	31,479	18,403	13,076
2020	13,076	13,076	-	13,076	8,516	4,560
2021	4,560	3,500	4,400	12,460	6,931	5,529

Remark: * Tourism is an activity that the community is open to tourists to visit and do conservation orchid cultivation

activities.

Based on the data in Table 1, which analyzed by Equation (1) for simple payback period calculation, it was found that the low-cost plant factory will need about 3 years to achieve a total net return equal to the total investment value but that does not take into the time value of money, so the calculation according to equation (2) net present value (NPV) was a positive result equal to 14,851 Baht, and the internal rate of return (IRR) was equal to 16.04%, resulting value is considered an attractive project for investment.

6. Conclusion

This research studied the energy consumption and assessment of economic value of cultivation *Anoectochilus burmannicus* in flasks at the low-cost plant factory of Ban Pong Krai in Chiang Mai Province. It was found that the summer months have the highest daily average of 0.30-8.12 kWh for air conditioner energy consumption. Additionally, the amount of electricity that solar PV systems may produce and supply to a plant or factory accounted for 69.19% and 30.81% of the electricity consumed via grid lines, saving an estimated 5,189 Baht.

In terms of *Anoectochilus burmannicus* in flasks growth has been found to be able to grow better than samples outside the plant factory. The height ranged from 0.5 to 1.0 cm on average, while samples grown outside of the plant ranged from 0.5 to 0.0 cm. Additionally, samples grown in the plant factory had a survival rate of 60.35 %. while samples grown outside the plant factory had a survival rate of 40%. It also has an impact on how long it takes for 2.6 times as much to grow. In addition, a low-cost plant manufacturer needs roughly 3 years to produce a total net return equivalent to the complete investment worth, according to economic value assessments. With a net present value of 14,851 Baht, a positive rate of return, and an internal rate of return (IRR) equal to 16.04%, the project is concluded to be profitable.

7. Suggestion

Further research should be collected data with bottled orchids after tissue culture has been completed, which would allow for long-term results of the plant factory use.

8. Acknowledgment

9. References

Aghaei M., Kumar N.M., Eskandari A., Ahmed H., Oliveira A.K.V., Chopra S.S. (2020). *Photovoltaic Solar Energy Conversion*. United Kingdom: Academic Press.

Aloysius Damar Pranadi., Qasthalani Haramaini., Agus Setiawan., Eko AdhiSetiawan., Chaizar Ali. (2021). Sensitivity Analysis of Financial Parameters in Varying PV Penetrations in the Optimum Location of a Feeder. *Energy Procedia,* (156), 95-99.

De-YunChen., Xin-JuWang., Tai-QiangLi., Neng-QiLi., Jiang-YunGao. (2021). In situ seedling baiting to isolate plant growth-promoting fungi from Dendrobium officinale, an over-collected medicinal orchid in China. *Global Ecology and Conservation,* (28).

K. Nowakowska., P. Marciniak., A. Pacholczak. (2022). A protocol for efficient micropropagation of rare orchid Vanda brunnea Rchb.f. *South African Journal of Botany,* (150), 233-239.

M.A.Ramírez-Mosqueda., C.A.Cruz-Cruz., J.Atlahua-Temoxtle., J.J.Bello-Bello. (2019). In vitro conservation and regeneration of Laelia anceps Lindl. *South African Journal of Botany,* (121), 219-223.

Meteorological Department of Thailand. (2564). *Entering the rainy of Thailand 2021.* [Online]. Retrieved 17 August 2022, https://news.thaipbs.or.th/content/304285.

Meteorological Department of Thailand. (2564). *Entering the summer of Thailand 2021.* [Online]. Retrieved 17 August 2022, https://news.ch7.com/detail/470112.

Meteorological Department of Thailand. (2564). *Entering the winter of Thailand 2021.* [Online]. Retrieved 17 August 2022, https://www.khaosod.co.th/breaking-news/news6703303.

Perada Kaewthongprakum., Tipsuda Tangtragoon., Pathipan Sutigoolabud., Adisak Kanpington. (2018). Environmental Factors Affecting the Growth of Anoectochilus burmanicus Rolfe, Ban Pong Krai, Pong Yang Sub District, Mae Rim District, Chiang Mai Province. *Research Journals Rajamangala University of Technology Srivijaya, 11*(1), 181-196.

Selvaraju Parthibhan., Mandali Venkateswara Rao., ThiruppathiSenthil Kumar. (2015). In vitro regeneration from protocorms in Dendrobium aqueum Lindley – An imperiled orchid. *Journal of Genetic Engineering and Biotechnology, 13*(2), 227-233.

T.H.Chowdhury. (2021).Technical-economical analysis of anaerobic digestion process to produce clean energy. *Energy Reports,* (7), 247-253.

Toyoki Kozai., Genhua Nui., Michiko Takagaki. (2019). *An Indoor Vertical Farming System for Efficient Quality Food Production.* United Kingdom: Academic Press.

Wael El Kolaly., Wenhui Ma., Ming Li., Mohammed Darwesh. (2020). The investigation of energy production and mushroom yield in greenhouse production based on mono photovoltaic cells effect. *Renewable Energy,* (159), 506-518.

Wen-KeYang., Tai-QiangLi., Shi-MaoWu., Patrick M.Finnegan., Jiang-YunGao. (2020). Ex situ seed baiting to isolate germination-enhancing fungi for assisted colonization in Paphiopedilum spicerianum, a critically endangered orchid in China. *Global Ecology and Conservation,* (23).

Wen-PinHu., Chin-BinLin., Chen-YingYang., Min-ShiangHwang., (2018). A Framework of the Intelligent Plant Factory System. *Procedia Computer Science,* (131), 579-584.

A REVIEW OF ARTIFICIAL INTELLIGENCE FUNCTIONALITY FOR AUTONOMOUS TRANSPORTATION: CURRENT CHALLENGES AND FUTURE ADMINISTRATION IN THAILAND

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ABSTRACT

Artificial Intelligence (AI) is a predominant part of an advanced society. AI can effectively change the Conventional Transportation (CT) system to provide better understanding and control. Still, the majority percent of human beings strongly rely on CT in Thailand. Nevertheless, there have been updates to the reliability of Driverless Cars (DC). Big data is indispensable because it seeks information from the surroundings to provide directionality. Moreover, detection and direction are the most significant part of DC. Consequently, this article will elaborate in depth on the advancement of AI in Autonomous Transportation (AT) and how effectively it could make a meaningful change in traffic circulation in Thailand and also assist in understanding how big data processes the obtained information from surroundings. However, the current traffic circumstances have been known in Thailand and how hazardous it is. Therefore, this study contributes to the literature on two fronts. The first is to understand traffic circulation in Thailand better, and the second is to study the internal processes of advanced autonomous technology.

Keywords: Autonomous Transportation (AT), Traffic Signal Detection (TSD), Detection, Big Data, Driverless Car (DC).

1. Introduction

The importance of Artificial Intelligence (AI) is not fully unrevealed. The demand and significance are increasing each day. New technology has a substantial influence on transportation. 2020 and 2021 was the year to offer commercial Autonomous Transportation (AT) to the general market (Daniel J. Fagnant, 2015). According to the Federation of Thai Industries, the total number of vehicle sales in January-June 2022 increased by 15.4 percent, and the estimated domestic sales increased by 850,000, a rise of 12 percent (Wangvipula, 2022). As per the report, the number of vehicles is rising.

In consequence, the number of accidents is also dramatically increasing. In each hour, two people pass out, and the total approximate diminution is more than 121 billion bahts (Chantith, April 2021). Hence, safe and reliable driving is quite important, and driverless cars are one of the possible ways to resolve accident complications. Many studies anticipate that 94 percent of car accidents are caused by human error.

In contrast, the environment is also essential, and driverless cars are eco-friendly. From the recent scrutiny, Thailand is also confronting environmental degradation in many regions, not only just the environment but also minimizing the overall maintenance cost. Nevertheless, this article elaborates on AT, levels of autonomy, working procedure of AV, harmlessness and crashes.

2. Objective

The key objectives of the article are to study the following:

1. The current traffic circulation narrows down the traffic complication in Thailand; and

2. The internal processes of advanced autonomous technology

3. Anecdote Characteristics of Driverless Vehicles

Driverless vehicles have been around for more than 100 years. Many formulas or contrivances have been developed to remain competitive and to bring the advancement of AT technology. Advanced development comes from different aspects, such as researchers, car manufacturers, etc. The maneuvers have been utilized since it was invented. Many countries are adopting AT technology, and Thailand is one of them. In Table 1, the level of autonomous vehicles has been described, and it also discloses the invention of AT.

3.1 Levels of Autonomous

Autonomous are classified into zero to full autonomous see Table 1. It has four classifications:

Table 1 Levels of Autonomous

No-Autonomous	Generally, it is recognized as level 01. Only the driver has solo full command and control of the vehicle.
Function and Combined function Autonomous	In general, this is level 02, where the driver has some specific control, such as adaptive cruise control (ACC) or electronic stability control, and so on.
Self-driving Autonomous	Indeed, this is conceded as level 03. The drivers can rely on vehicles for safety and critical function, and also the drivers are also allowed to take over control in any situation.
Full-Driving Autonomous	At level 04, the vehicles can take action based on necessity.

Source: (Khan Muhammad, 2021)

3.2 Working procedure of AV

In General, AT operates on a three-phase design known as Collection-Process-Direction, as shown in Figure 1. A substantial critical process has been done to provide a dynamic driving environment. There are quite a few pieces of equipment that collect basic information from the surroundings and offer recommendations for the appropriate course of action, such as acceleration, deceleration, lean changing, and overtaking
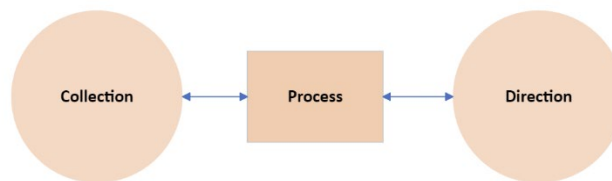

Figure 1 Three-Phase Design

3.3 Harmlessness and Crashes

This section addresses the first objective: Autonomous Transportation can communicate with other vehicles on the road. This system assists them in sending signals to other cars to coordinate speed and reduce risk and traffic. With the constant speed, more cars can fit on the road, and the principal benefit is that cars can move faster and closer, reducing traffic jams and accidents (Futurside, 2022). Unfortunately, the statistics for road accidents in Thailand are shocking and escalating daily. An estimated 1.2 million die, and 10 million people are disabled each year from road accidents (Witaya Chadbunchachai, 2012). In contrast, the adoption of new technology such as airbags, anti-locks, brakes, electronic stability, head protection, and side airbags.

3.4 Implementation barriers of Autonomous Transportation

Autonomous vehicles have many aspects of barriers, not only economically but also ethical issues. The overall cost and the road infrastructure of AT hindered large-scale production. The ethical problems encompass cyber security, hijacking, GPS spoofing, Vehicular Ad hoc network distributed denial of service, Traffic sign modification, and so on (A.Khadka, 2021). Parking space is another crucial part of Thailand never had a

comprehensive parking policy (Saksith Chalermpong, 2020). Parking space and area are critical in the implementation of autonomous vehicles. Most road infrastructure in Thailand is not pedestrian friendly.

3.5 Demand Forecasting in Thailand

Some uncertainties have hindered the Implication and execution of AT technology, and the reasons are exorbitant cost and the ability to reliable DCs. However, car manufacturers and scholars forecasted the anticipated demand for AT. In addition, 50 percent of the worldwide car market will be changed to AT by 2040 (Saeed Asadi Bagloee, 2016). The value of time and a safe journey is more important than anything else. Driverless vehicles emphasize safe driving, the environment, reduction of fuel consumption, and much more.

4. Data Collection and Processing of Autonomous Vehicles

Many things are relevant to AT, but the most important parts are the sensor, lidar, radar, detection, and big data. This section will briefly explain the most significant factor, such as sensor detection.

4.1 Engine Knock Sensor: Knock sensor throws the signal to the Engine Control Unit (ECU) to detect the high-frequency engine pulsation characteristic of hitting and transmitting. Vehicles run faster in the ignition timing that depends on the knock sensor to Allow the engine to work. After that, Engine Control Modules (ECM) cut down the knocking in the machine to delay the ignition timing (Daniel Korenciak, March - 2018).

4.2 Oxygen Sensor: Another name is lambda sensor. An electronic device measures the ratio of oxygen in the gas essence analyzed. Principally, it does assist in maintaining a healthy environment, escalating fuel economy, and detaining the balance of the air-fuel ratio (Kubra Ekinci, 2019).

4.3 Throttle Sensor: The throttle sensor is used on the engine to keep control of the air moving. Velocity tracking is the cornerstone of autonomous technology, impacting driving safety and travel experience (Mingxing Li, 2019).

4.4 Lidar: Lidar is a light detection and ranging technology to measure space by illuminating an object with a laser beam and analyzing the reflected light. However, it can accurately identify the object under poor visibility. Moreover, the advanced lidar can identify pedestrians and determine what direction pedestrians can move. As a result, driverless vehicles can achieve more accurate information (Ji Dong Choi, 2022).

4.5 Object Detection: Object Detection is a method that can identify anything, such as vehicles, trees, humans, roads, and lights, and from images, video, or real situations to develop system ability, upstanding optimization, and create decisions by the data mining (Hafiz Mughees Ahmad, July 2022).

4.6 Lane Detection: Lane detection has a key role in ensuring the safety of autonomous vehicles via lane keeping, lane Departure Control Systems (DCS), and Lane Departure Warning (LDW) complexion in Advanced Driver Assistance Systems (ADAS). Neglect is the most highlighted lane detection technique in lane marks for the sign-on color features (Yujing Zhou, 2021).

4.7 Vehicle Detection: AT must detect and track other vehicles to provide a safe driving experience. To execute, it has to estimate different aspects of surrounding vehicles, such as shape, relative speed, size, and 3-dimensional locations. The hyper-parameters optimization model is a test conducted by well-known boxy vehicle

detection data, containing more than 200,000 vehicle images and 1,990,000 annotated vehicles (Youcef Djenouri, 2022).

4.8 Pedestrian detection: - Pedestrian detection is an intelligent video surveillance system. It throws out the different information on the video footage for semantic understanding. It also has an improved safety system for automotive applications. Autonomous Transportation for detection, tracking, and possible recognition of pedestrians for avoiding collisions and other purposes, as well as automated vehicle's potential for cutting-off pedestrian fatalities by analyzing closely 5,000 pedestrian fatalities saved in 2015 in the "Fatality Analysis Reporting System" (Tabitha S.Combs, 2019).

4.9 Traffic Sign Detection: Traffic sign detection is a technology by which a vehicle can recognize the signs on the road, such as preventing injury, property damage, higher sprite, lower sprite, stop or run and so on. The dataset for instruction and touchstone of the proposed model is obtained by capturing real-time images on roads. The evaluation outcome indicates less than 3 percent system error (Rajesh Kannan Megalingam, 2022).
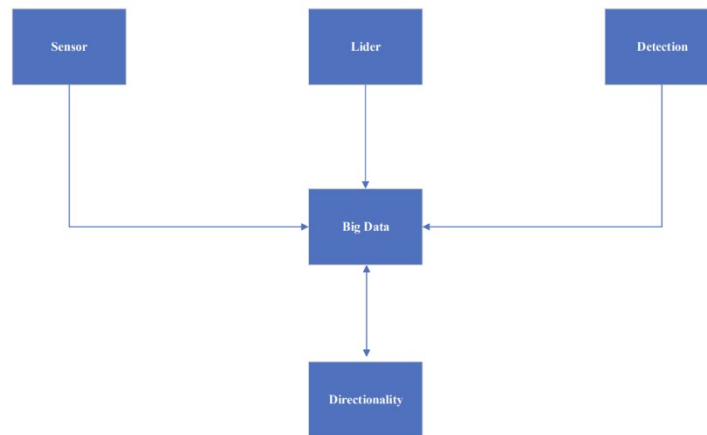

Figure 2 Process of Data Flowing

5. Data Flowing Consequence

This section addresses objective two: the internal processes of advanced autonomous technology. AT is the predominant and one of the best ways to steadily minimize transportation complications in Thailand. However, Figure 2 exposes the machination of data flow. The data has been collected from the sensor, leader, and detection. Quite a few essential sensors have been shown in Figure 3.

Similarly, Figure 4 elucidates the Collection phase of detection. After that, Big Data begins to analyze and anticipate to provide the best direction, such as acceleration, deacceleration, Len-changing, overtaking so on. Most frequently, the data has to be sent back to the big data to avoid accident incidents.
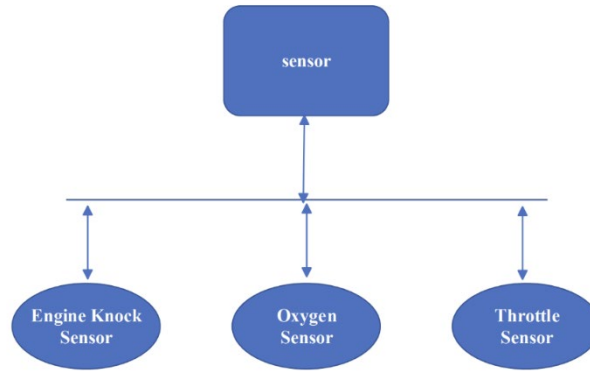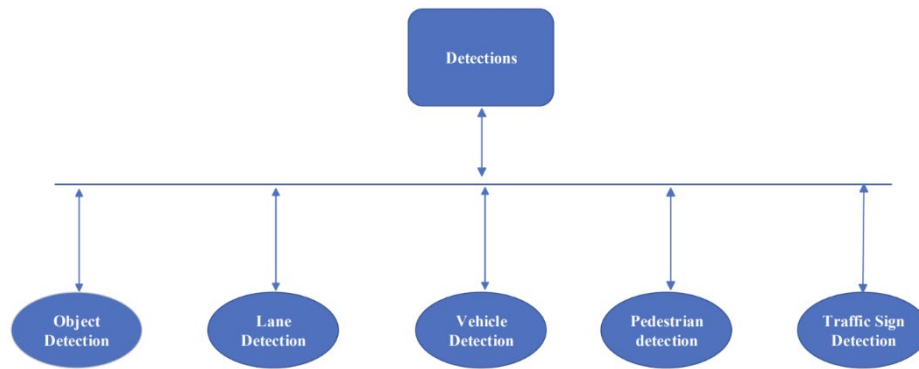
Figure 3 Collection Phase of Sensor

Figure 4 Collection Phase of Detection

6. Conclusion

This study has presented the potentiality of autonomous transportation or AT and how internal action has been done. Safety is a basic need for everyone's life, and autonomous vehicles certify safety. AT has many benefits not only for human beings but also for the environment. However, the current challenges will be diminished steadily with the assistance of AT. When the transportation system is switched to AT, traffic circulation and reliability will advance momentum.

7. Suggestions

The suggestions for this paper are to carry out comprehensive research on the topic as future work. The authors believed that AT would be the future of transportation in Thailand, as mentioned above, the advantages and benefits for human beings such as reliable journeys and preserving a healthy environment.

8. Acknowledgment

9. References

A.Khadka, P. K. (2021). A benchmarking framework for cyber-attacks on autonomous. *Transportation Research Procedia, 52*, 323-330.

Chantith, C. a. (April 2021). Measure of productivity loss due to road traffic accidents in Thailand. *IATSS Research,* 45, 131-136.

Daniel J. Fagnant, K. K. (2015). Preparing a Nation for Autonomous Vehicles Opportunities, Barriers and policy recommendations for capitalizing on self driven vehicles. *Transportation Research Part A, 77,* 167-181.

Daniel Korenciak, j. A. (March - 2018). *Analysis of Engine Knock Sensor.* Komunikacie, 37-41.

Futurside. (2022, Apr 15). *self-driving-car-is-the-simple-solution-to-traffic-problems*. Retrieved from https://futurside.com/: https://futurside.com/self-driving-car-is-the-simple-solution-to-traffic-problems/

Hafiz Mughees Ahmad, A. R. (July 2022). Deep learning methods for object detection in smart manufacturing: A survey. *Journal of Manufacturing Systems, 64*, 181-196.

Ji Dong Choi, M. Y. (2022). *A sensor fusion system with thermal infrared camera and LiDAR for autonomous vehicles and deep learning based object detection.* ICT Express, 1-6.

Khan Muhammad, A. U. (2021). Deep Learning for Safe Autonomous Driving: Current Challenges and Future Directions. *IEEE Transactions on Intelligent Transportation Systems,* (22), 4316-4336.

Kubra Ekinci, S. E. (2019). Model Based Diagnosis of Oxygen Sensors. *IFAC-PapersOnLine, 52*, 185-190.

Mingxing Li, Y. X. (2019). Velocity Tracking Control Based on Throttle-Pedal-Moving Data Mapping for the Autonomous Vehicle. *IEEE*, 1-7.

Rajesh Kannan Megalingam, K. T. (2022). Indian traffic sign detection and recognition using deep learning. *International Journal of Transportation Science and Technology*, 1-17.

Saeed Asadi Bagloee, M. T. (2016). Autonomous vehicles: challenges, opportunities, and future. *J. Mod. Transport, 24*, 284-303.

Saksith Chalermpong, A. R. (2020). Chapter 12 - Bangkok, Thailand. An international perspective, 207-227.

Tabitha S.Combs, L. S. (2019). Automated Vehicles and Pedestrian Safety: Exploring the Promise and Limits of Pedestrian Detection. *American Journal of Preventive Medicine, 56*, 1-7.

Wangvipula, R. (2022, August 26). *Bevy of factors cut car output.* Bangkok, Bangkok, Thailand.

Witaya Chadbunchachai, W. S. (2012). Road Traffic Injuries in Thailand: Current Situation. *J Med Assoc Thai, 95*, S274-81.

Youcef Djenouri, A. B. (2022). Vehicle detection using improved region convolution neural network for accident prevention in smart roads. *Pattern Recognition Letters,* (158), 42-48.

Yujing Zhou, Y. Z. (2021). Real-Time Adaptive Threshold Adjustment for Lane Detection Application under Different Lighting Conditions using Model-Free Control. *IFAC-PapersOnLine, 54*, 147-152.