กลุ่มที่ 1 International Papers

LEARNING FROM THE PAST BUBBLES AND BURST: UNDERSTAND IRRATIONAL BEHAVIOR AND LEARN FROM INTELLIGENT INVESTOR FOR SUSTAINABLE RETURN

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ABSTRACT

Knowledge and knowing one's investment goal are keys to improve investment returns. People tend to put blame on fate and misfortune regarding wealth and investment, in fact, it is the human beings particularly driven by emotions that tend to make mistakes. As in the global financial crisis, it was the result of series of irrational behaviors, emotional and cognitive biases, made by people. This paper introduces basic concept of financial behaviors to see how emotional biases impact investment decisions and cause market inefficiencies as seen in the past financial history and what processes could be used to seize investment opportunity to stay on course of improving one's investment returns. With financial markets around the world going through rapid and unprecedented changes, learning from past events could help us understand financial market today but not to predict the future. It is through continuous learning and knowing ones' long term investment goal which will help investors avoid emotional mistakes experienced in past financial crisis and improve investment returns.

KEYWORDS: financial bubbles, financial behaviors, investment goal, long term investment

1. INTRODUCTION

In history lies wisdom, a lot could be learned from past economic and financial history. According to Galbraith, financial memory is "notoriously short," and this paper will hence focus on looking back at a few of financial history economic crises and lessons to be learned for today investment.

There are many economic crises in our history around the world. As in many financial crises, it usually begins with various asset bubbles where asset prices appreciate unrealistically followed by a contraction resulting in a selloff. These could be rising of real estate values, economies, securities, and stock market. And as the world is interconnected today, economic bubbles and burst in one country may also impact other countries.

Market speculative and bubbles have been discussed and studied since the early 1600s by Professor John Kenneth Galbraith. Bubbles are created by human speculation when something is new and there are ample amounts of money from leverage (Galbraith, 1994). This paper, therefore, aims at exploring major financial history of bubbles looking at financial behaviors to see how emotional biases affect investment decisions, which cause market inefficiencies. The paper also discussed techniques used to seize investment opportunity and to stay on course of meeting long-term investment plans, hoping that learning from past events could help investors understand financial market today and plan long-term investment goals.

2. OBJECTIVES OF THE STUDY

- 1. To explore major historical economic and financial bubbles
- 2. To investigate the causes of investors' financial losses in economic bubbles
- To indicate the 'lessons learned' from the emotional stages phenomenon and processes to minimize emotional biases

3. LITERATURE REVIEW

Major Economic and Financial Bubbles

A major economic bubble is the recent housing bubble in 2007-2008 caused by the United States became a wide spread global financial crisis in our recent history and resulted in today's economic downturn. Another example is the dot com bubble in the late 1990s and early 2000s, where people chased tech stock at high prices believing these tech stocks could be sold at higher prices. Like the dot com bubble, the British Railway Mania in 1840 was the result of over excitement toward business prospects of a disruptive innovation of a railroad then (Colombo, 2017). The largest one day crash in financial history is known as Black Monday stock market crash of 1987, when US market was driven by a great bull market, and index nearly double from 1986 business environment was boosted by hostile takeovers, leveraged buyouts and merger craze (Colombo, 2017).

Economic bubble was nothing new, the earlier recorded economic bubble was the Dutch tulip bubble of 1637, when speculation drove the value of tulip bubbs to immoderations (Wood, 2006). At the market peak, the rarest tulip bubbs could price for six years of average annual salary of a skilled worker. Though tulip seems to be associated with Holland, it is not native there, it was bought to Europe in the middle of the six teenth century from the Ottoman Empire, or the Turkish Empire. Then tulip was seen as a status symbol among Holland's upper classes, and prices began to increase. By 1636, tulip bubbs were traded on many Dutch cities' stock exchange, making it easier for more people in the society to speculate in the tulip markets. People were selling lands and houses to speculate in the market. Tulip traders were making (and losing) lots of money, and the local government could not stop or regulate the trade. And like any bubble, it will come to an end when prices dropped, and this was caused by a fail trade, rumors spread, fears created, panic sell began and the bubble busted.

Another historical bubble on the stock market involved the hottest stock in England, the South Sea Company Bubble in late 1720, where stock value was wiped out, and investors were losing a lot of money (Colombo, 2017). In the early eighteenth century, it was a prosperous time for British, when British Empire was strong, and most British people have a lot of money to invest and seek for places to invest their money. This is when the South Sea Company (SSC) was established and was granted a monopoly to trade in the South Seas in exchange for assuming England's war debt. Monopoly was a great appeal for investors, and stock price began to rise. Investors were attracted to SSC stocks, with the company issued an IOU (I Owe You) to the government worth 10,000,000 pounds sterling in exchange for the rights to all trades in the South Seas. No one questions the performance of the company nor the quality of the management, so they kept buying the expensive stocks. High prices drove more speculation and drove the price even higher until the bubble burst. Soon the management of SSC realized and admitted that the company value did not worth its trading prices. So they sold the stocks in the summer of 1970 but the news on the failing company leaked to other shareholders. And like any ending of the bubble, when there was bad news, panic sell triggered.

Sir Isaac Newton, one of the smartest people in all history who invented the entire theory of classical physics including calculus and three laws of motion, was also drown into the speculation of the South Sea Company. He too had invested a large sum in SSC and made 100% profit in the first trade. After he sold, SSC price continued to rise at even at faster pace, he went back into the trade but this time sold his position at a great loss at the end of 1720 which caused him his life savings (Guenthner, 2017). For the rest of his life, the word 'South Sea' is forbidden at his presence (Holodny, 2017). At this point, Sir Isaac Newton also mentioned that "I can calculate the movement of stars, but not the madness of men."



South Sea Stock



December 1718–December 1721

Source: Daily Reckoning (2017)

Causes of Financial Loss in Economic Bubbles

As with the average investor, we do not like to lose and are afraid of missing out of new perceived profitable ideas (or stocks). Average investors are relatively new to the market (Tian, 2017), and many of them went from greed to satisfaction and excitement of the trade. Based on investor psychological basis, during speculative bubble, investors are fear of missing out of something great that our friends and neighbors are making more money than us (Shiller, 2016). Then from fear of missing out, more greed and envy drive us to take more risks and eventually lose as shown in the chart above.

When people feel good and optimistic, market goes up. On the other hand, when things go bad or some uncertainties occur, people tend to take extreme actions like selling low and buying high, not vice versa (Graham 2016). Market emotions can be a great risk to financial performance. It is important to be mindful of one's emotions from taking irrational and rash investment decisions. When market is overly enthusiastic by news of higher prices of stocks, more investors tend to add more positon to the overvalued stocks which causes speculative bubble (Shiller, 2016).

Increase and decrease in market prices are driven by various factors. It is very difficult to predict price movement. Most stock valuation based on fundamental analysis focused on companies' specific risk and company development, global economic factors, geopolitical risks, inflation, interest rates, and exchange rate, to determine the underlining stock's risk and return, while the technical analysis based their prediction on past prices movement, volume and pattern. However, market prices are not driven only by company's performance and macro-economic views but also by investors' moods (Graham, 2016). In addition to the specific risk (company focus) and unsystematic risk (market risk), it is important to emphasize that human own risks of emotional and psychological influence are significant factors that drive price movements in the market as well.

The chart in figure 2 shows investors emotional effects on reactions and decision on price movement from 1996 to 2015. Stock valuations do not exclusively depend on company specific data or economic and industry information, but market price movements are importantly affected by uncertainties and emotional stages of investors in the market.

The ups and downs price movement could be explained in 14 stages of investor emotions (Hannon, 2011), see Table 1 and also figure 3.





Source: BlackRock

Table 1: The 14 stages of investor emotions

- 1. Optimism- Most investors enter the market with positive outlook to make money.
- 2. Excitement- Then investors start making some money, thus anticipate brighter future and hope for more successes.
- 3. Thrill- The market continues to be favorable, investors are making more money and at this point believing in the right trading process for being 'smart' not 'luck'
- 4. Euphoria- This is the point of maximum financial risk but also maximum financial gain. Investors feel very confident from the easy return made and start to ignore the risk. Ignoring the risk and chase higher price stocks expecting to make quick return.
- 5. Anxiety- Market is now showing a different side of the trade where unrealized losses incur; at this point investors tend to comfort ourselves for being long term investors.
- Denial- The market is yet turning around quick enough. Becoming more eager for any sign of short term price improvements.
- Fear- At this point investors are no longer confident in the trading process and become confused. At this point, it might be best to sell the position with some profits.
- 8. Desperation- The market moves further down. Investor loosing chance to profit is higher.
- 9. Panic- The market continues to go down and loss incur
- 10. Capitulation- At this point investors lose hope in the market and want to get out to prevent any bigger losses.

- 11. Despondency- After selling the last position at losses, investors no longer want to participate in the market though this is the point of maximum financial opportunity.
- 12. Depression- Investors are still hurt by the bad trading experiences. At this point there are those who permanently exit the market while other may look back and learned from the past mistakes and became better investor in the market. It takes emotional intelligence for investors to learn from their past mistakes.
- 13. Hope- Market starts to turn around and investors have had the time to reflect on previous mistakes and realize that market actually have cycles. This is where analytical skills of new investment opportunities arise.
- 14. Relief- The market is turning positive again and investors start to believe in the better investing future this time around.



Figure 3: The 14 stages of investor emotions

Looking at financial history, stock investment is the asset to grow wealth over the long term (see also figure 4). Professor Siegel studies show that, over the long term, return on equities is not only greater than other financial assets but more predictable than bond return when measured in terms of purchasing power (Siegel, 2012).

Source: Stocktrader.com (2017)



Figure 4: show stocks provided the highest returns over a 210 year period. Source: Siegel (2012)

Lessons Learned: Winning ourselves and not the market

Market efficiency theory assume that all relevant information available to investors has already been reflected in the stock prices. According to the theory, information use under fundamental or technical analysis would not be useful to predict stock prices and gain excess return as there would be no bargains from undervalue or overvalue stocks (Jordan, Miller, & Dolvin 2015). Jordsn, Miller, and Dolvin (2015) explain further that factors that make market efficient are as following: 1) investors always make rational investment decisions; 2) irrationality is temporary and will be diversified away; and 3) well capitalized rational investors will eventually arbitrage, exploiting the price differences in the market and make market efficient again.

Market efficiency theory is perhaps one of the most debated and stimulating issues in investments. Supporters of the theory would rather match market performance by investing in market index fund instead of analyzing and investing in the winner stocks trying to find undervalue assets. Investing in total stock market index fund could be one rational method for general public who has long term investment horizon (Graham, 2006).

4. PROCESSES

Market has not always been efficient as seen in various past bubbles and crises. People do not always act rationally and most of the times emotions and cognitive biases crowd our judgements (Thaler, 2015). It is

hard to say whether all the relevant information to make informed trades are available and obtained. Behavioral finance has emerged by combining psychological theory (emotion and cognitive biases) with conventional economics to understand investment decision making process.

Supporters of behavioral finance believe that emotions and cognitive biases by investors will cause market inefficiencies. Researchers have found number of biases impacting investment decision. Thaler's research showed how traits such as lack of self-control and fear of loss could prompt decisions that have bad long-term outcomes. Other behavioral biases studied by Kahneman and Tversky (1979) includes overconfidence and prospect theory. "Overconfidence", studies show that overconfident investor trade more frequently and lack of appropriate diversify portfolio. "Prospect theory," studies investors view on gains and losses and the tendency of investors to choose sure gain with regard to gains and choose the gamble over the sure loss when it comes to losses. Kahneman and Tversky (1979) studies proposed that losses cause greater emotional impact on investor than an equivalent amount of gain.

In addition, different investors have diverse investment objectives and appetites for risk. Investment is not about making quick speculative and excessive return or competing with others in the market, the key is to understand one's expected return, control our investing behaviors and meet our set investment objectives. Successful investors are those who put in place a financial plan and a behavior discipline that will make them reach their investment goals (Graham, 2006). Below are techniques to help control emotional biases and minimize risks. This is not to generalize the case that these processes work best for all investors because each has different investment objectives, life circumstances and appetite for risks. Some investors might have more time and resources to spare and more tolerance for risks regardless of their ages.

- Stay on course with the predetermined investment objectives instead of being dominated by the market, chasing trends and focus on short-term gain. Maintain long term view on quality stocks investment. Know the business of the stocks invested and not only the prices of the assets (Graham, 2006).
- 2. Diversification- diversified could help preserve long term investments (Koesterich, 2015). Uncertainties are certain in the future, it is important to keep the portfolio diversified and not to chase the hottest stocks in the market. Risk of losses is always possible, hence it is important to invest in good quality stock at high prices rather than low quality stock at low prices to minimize loss and protect principle (Graham 2016). Nevertheless, the higher the price we paid, the lower our return.
- 3. Dollar cost averaging (DCA) DCA can help controlling emotion and managing greed by not buying high when the market is overly optimistic and selling low when market is too pessimistic. Knowing human tends to buy high and sell low, investors could minimize these mood swings by exercising DCA, setting regular investment schedule, and focusing on long terms financial goals.
- 4. Managing risk- It is more important to keep losses at minimal than to focus on making short term speculative gains. Set sensible expectation for making adequate return on investment goal not excessive return that

could drive emotions out of control. Like the use of leverage can be a useful tool when used moderately in a portfolio to increase return. However, without sufficient resilience in the portfolio and strong equity of the investor, it could lead to real trouble. During financial crisis, many investors with too much leverage suffered the most resulting in forced sell at the bottom.

5. CONCLUSION

Bubble and bust will occur again today in the latest and hottest economies around the world. These could be in bitcoin, alternative energy, robotics, tech startups, general investment assets which are being boosted by leverage, liquidity and or changes in economic policy in the market. It is significant to understand one's emotional stages and the techniques discussed above for more successful long term investment return. As of this writing, many stock market around the world are reaching new all-time highs with Dow trading above 22,200 and S& P 500 at 2,500 for the first time including Stock Exchange of Thailand reaching above 1,700 in 24 years. People are attracted to short term gains perspectives, things that are difficult to get and especially if they are popular and new. Until the crowds are following along, and people no longer see the value in the search, prices started to drop, panic occurred which will trigger the massive selling and then most people just want to get out of the trade at any prices. The point to ponder for any investor is to make money on long term investment goals and situations with continue improvement. As the world is changing, we have to build the culture to continue to improve and question existing processes and technology. What work today might not work ten years from now, we must be prepared psychologically and financially to weather the crisis or opportunity as they will reoccur.

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WILLINGNESS TO PAY FOR LOW CARBON PORK PRODUCT IN THAILAND

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ABSTRACT

The objective of this study is to investigate consumer's purchasing behaviors and willingness to pay for carbon reduction of pork product in Bangkok. The data were collected from 312 of packed pork consumers, which were analyzed by double bounded closed-end contingent valuation method. Although majority of respondents were interested and concerned about climate change, have not known about carbon reduction label accounted 95 percent. Result found that 250 respondent is willing to pay a premium for carbon reduction label. Result from analysis found that attitudes and concern of respondents about climate change did not influence the willingness to pay. However, young consumer and consumer who usually purchase high grade of pork would like to pay higher for packed pork with carbon reduction label. High educated consumer and consumer who purchase high quantity would pay lower for carbon reduction label. The willingness to pay of consumers who give premium price was 10.88 baht per 100 gram or accounted for 30 percent of packed pork price.

It has recommended that government or related agency concerned should provide more sustainability labels since consumers have little understanding and knowledge of the sustainability labels

KEYWORDS: Contingent Valuation Method, Carbon Reduction Label, Willingness to Pay, Pork Product

1. STATEMENT OF PROBLEM

Livestock might be a huge greenhouse gas emission sector that demand of livestock has expected to double from 2000 to 2050 (Steinfeld et al., 2006). Currently, livestock emission has contributed about 7.1 billion ton CO_2 eq or about 14.5 percent of total emission (Steinfeld et al., 2006). In order to mitigate their emissions, Intergovernmental Panel on Climate Change (IPCC) has established the international agreement which to be commitment and guideline for developing countries such as using low carbon feed, developing breeding and

reduction or reusing waste in farming (IPCC, 2014; Gerber et al., 2013; Kaufmann, 2015). However, the adoptions of production might increase cost so that the incentive mitigation could be supported by consumers, such as using the ecological label on products.

Thailand, developing country, attended COP21 in order to improve the mitigation has prepared Intended Nationally Determined Contributions (INDCs) and has aimed to reduce about 20 percent of business of usual (BAU) in 2030 compared to 2005 and might increase to be 25 percent. For a recent, evaluated emission of Thailand in 2000 is about 229.08 million ton CO_2 eq. Agriculture part has represented second main of total emission, which mostly was from rice cultivation and livestock.

Thailand livestock emission contributed about 13.33 million ton CO2 (Figure 1) or 25.7% from enteric fermentation and manure management. It had been lower only rice cultivation which is a Thai economic crop. In 2015, main of livestock production comprises of chicken followed by swine and beef respectively accounted for 1.8 million ton, 1.064 million ton and 0.165 million ton (OAE, 2016). Table 1 shows that trend of chicken and swine production had increased continuously. Contrast to beef production has decreased slightly. Thus, emission of livestock roughly found that swine is the most emission about 4.9 million followed by chicken and beef accounted for 4.2, 2.5 million ton respectively (see Table 2). Hence, some technologies to decrease emission in pork production might be beneficial to environment and the greenhouse gas reduction agreement.



Figure 1 Thai Agricultural emission of greenhouse gas in 2000 in term of Mt CO₂

Source: ONEP (2000)

Table 1 Main livestock p	(Unit:kg)		
Year	Chicken	Pork	Beef
2011	1,362,997	951,000	161,410
2012	1,446,352	1,026,000	147,810
2013	1,512,418	1,046,000	143,290
2014	1,657,994	1,026,000	140,360
2015	1,796,515	1,064,000	$164,790^1 (141,249)^2$

¹Change ratio per unit of beef from 300 kg to 350 kg, ²Before changing of beef ratio per unit

Source: OAE (2016)

Animal Species	kg CO ₂ e per kg product**	Quantity of kg product***	kg CO_2 e
Chicken	2.33	1,796,515	4,185,880
Pork	4.62	1,064,000	4,915,680
Beef	15.23	164,790	2,509,751

Table 2 Table greenhouse gas emission of main livestock in Thailand in 2015*

*adopted by researcher, **Average of emission of EU production from The Meat Eater's Guide to Climate Change and Health by Hamerschlag, 2011, ***From OAE, 2016

Source: Hamerschlag (2011) and OAE (2016)

Concerns of emission on agricultural product are few in domestic market, which especially has shown by carbon label on it. Even though, CPF, a big livestock company, has recently obtained carbon label on chicken product for export market (CPF, 2016). In domestic, agricultural products with carbon label are possibly found on instant noodle, vegetable oil, dried fruit, sugar and some beverages. Carbon label programmes are still voluntary, which some companies prefer to join it. Carbon labels consist of carbon footprint and carbon reduction label, meaning about greenhouse gas emission in CO_2 eq and greenhouse gas reduction in process respectively. To achieve carbon reduction label, a producer has to reduce greenhouse gas at least 10 percent of their emissions. Livestock production which one of the emission has never been used carbon label in domestic market, which may be possible to drive low emission to producers. For example, Wiedemann et al. (2016) found using of anaerobic digestion can reduce about 31-64 percent of greenhouse gas emission. However, the producers who attend to operate a lower carbon might receive higher cost than conventional farming. It could be possible to encourage producers by using market intensive program that needs to be supported by consumers.

In this paper, we find consumer perception and willingness to pay for low carbon pork product by given information through carbon labeling. The result of this study would provide government guideline of greenhouse gas reduction. The pork producers could obtain more evidence to support lower carbon practice. Finally, consumer reaction may provide higher among for the lower carbon product and emerge of the ecological market.

2. OBJECTIVE OF THIS STUDY

1) To investigate consumer's purchasing behaviors of carbon reduction of pork product in Bangkok.

2) To examine price premium on carbon reduction label on pork product in Bangkok.

3. RELATED STUDY

In study of willingness to pay for non-market product, double bounded closed-ended CVM is one of the most popular methods to evaluate willingness to pay because this method is flexible to apply to new products. Moreover, Alberini (1995) also found that double bounded closed-ended CVM is less variance than single closedended question. Many of studies applied contingent valuation method to evaluate consumers' preference for food in terms of organic products (Huang and Lee, 2014; Sriwaranun et al., 2013), safety products from pesticide residue (Buzby et al., 1995; Fu et al., 1999), genetic modification product (Boccaletti and Moro, 2000) and ecolabeled product (Salladarre et al., 2016). However, double bounded closed-ended CVM include of two times asking to accept initial and followed price which were selected from pre-survey with open-ended question.

Related study of carbon label, carbon label also employed environmental friendliness as eco-label. The related studies of carbon label also were found about consumer behavior, factor affecting the decision to purchase carbon label products. It was found that understanding of carbon label is limited especially meaning of "carbon footprint" (Upham et al., 2010), although consumer quite has medium to high environmental concern in sustainability issues (Grunert et al., 2014). Australia consumers prefer carbon label that is possible compared to other products such as concept of traffic light color system (Sharp and Wheeler, 2013), however, study of UK suggested using carbon reduction label than incentive reduction by comparison of emission's products (Upham et al., 2010). Use of sustainability label has correlation with motivation and understanding which affected by demographic characteristics, human values and country differences (Grunert et al., 2014). Giving more problem information such as climate problem near the carbon label expected to increase motivation to purchasing carbon label products (Nishino, 2014; Upham et al., 2011). The study of premium price of sustainability label on chocolate found that factors affecting to willingness to pay premium for carbon label chocolate consisted of female, young age, having environmentally friendliness, level of label use and trust. The premium price is about 10 percent of general product's price (Vehicho and Annunziata, 2015). Likewise, study of Promin (2011) about willingness to pay for the products with carbon label in Thailand found that maximized willingness to pay for carbon label products as instant noodle, bulb and cotton shirt are 10, 20, and 10 percent respectively.

4. RESEARCH METHODOLOGY

This study employed contingent valuation method by using dichotomous question with follow-up or double bounded method. In contingent valuation method, scenario before bidding included conditions to receive carbon reduction label from Thailand Environmental Institute which possibly was applied for packed pork.

4.1 Model of this study

The model of willingness to pay was adopted from censored econometric model of Cameron and James (1987) and Cameron (1988), which followed the study of Pinuccia and Elisabetta (1998). The willingness to pay model is the following:

$$WTP_i = x'_i \beta + \varepsilon_i \tag{1}$$

Where, WTP_i is individual willingness to pay, which is assumed to depend on individual factors (x'_i) . The error term of this model (ε_i) is normal distribution with zero mean and variance equal to v^2 . In this study of double bounded close-ended method, observed variable is the answer Yes and No to initial bid (t_i) and follow-up bid $(t_i^u \text{ or } t_i^l)$. In case of Yes for initial bid, respondent would be asked with follow-up bid which is higher

than initial bid (t_i^u) and then, case of No for initial bid, respondent would be asked with follow- up bid which lower than initial bid (t_i^l) . Then, this method conduces four possible outcomes, show as probabilities as follows:

$$Pr(YES, YES) = Pr(WTP_i \ge t_i \ge t_i^u) = 1 - F(t_i^u)$$

$$Pr(YES, NO) = Pr(t_i \le WTP_i \le t_i^u) = F(t_i^u) - F(t_i)$$

$$Pr(NO, YES) = Pr(t_i^l \le WTP_i \le t_i) = F(t_i) - F(t_i^l)$$

$$Pr(NO, NO) = Pr(WTP_i \le t_i^l \le t_i) = F(t_i^l)$$
(2)

with log-likelihood function:

$$LogL = \sum_{i=1}^{n} \begin{cases} I_{i}I_{i}^{u}\log[F(t_{i}^{u} - x'_{i}\beta/\nu)] \\ +I_{i}(1 - I_{i}^{u})log[F(t_{i}^{u} - x'_{i}\beta/\nu) - F(t_{i} - x'_{i}\beta/\nu)] \\ +I_{i}^{l}(1 - I_{i})log[F(t_{i} - x'_{i}\beta/\nu) - F(t_{i}^{l} - x'_{i}\beta/\nu)] \\ +(1 - I_{i})(1 - I_{i}^{l})log[F(t_{i}^{l} - x'_{i}\beta/\nu)] \end{cases}$$
(3)

Where, I_i , I_i^u and I_i^l are dichotomous variable with one when respondent's answer to the first bid or the follow-up bid has been positive or zero.

4.2 Sampling design

This study employed questionnaire to collect willingness to pay. Population of this study was packed pork consumers in Bangkok, which had purchased packed pork and the sample size of this study was 312 respondents by multistage cluster sampling when July-August 2017. The sampling was divided into six parts of Bangkok which each part collected two districts. The location collected survey included supermarket, university and other community malls.

4.3 Variables of study

From model of willingness to pay, this study aims to estimate coefficient of independent variables (β) which were estimated through independent variables (x'_i). The variables which expected to willingness to pay model consisted of demographic factors, purchasing behavior and attitude related climate change as Table 3.

Variables	Meaning and Interpretation	
FEMALE	dummy variable of gender of respondent that 1 represented as female and 0	
	represented as male	
AGE	number of respondent age (years)	
BACHELOR	dummy variable of respondent that 1 represented highest respondent's studied	
	bachelor degree and 0 represented other degrees	
THANBACHLOR	dummy variable of respondent that 1 represented highest respondent's studied higher	
	than bachelor degree and 0 represented other degrees	
INC	amount of money per mouth (baht per month)	
TRUST	Level of trust to label with Likert scale that 5 is represented as strongly trustable level	

Table 3 Meaning and interpretation of independent variables of willingness to pay for this study

SCORE	a score of climate change knowledge between of 0 to 5
CL_CONC	climate change concern with Likert's scale that 5 represents as strongly high concern
CL_IMP	attitude of climate change impact with Likert's scale that 5 represents as strongly high
	impact to consumer
SUP_LP	attitude of supporting low greenhouse gas pork production with Likert's scale that and
	5 represents as strongly high agree
KN_carbon	dummy variable of understanding carbon reduction label that 1 is represented
	respondent's understanding carbon reduction label and 0 is represented respondent's
	not understanding carbon reduction label
KN_footprint	dummy variable of understanding carbon footprint label that 1 is represented
	respondent's understanding carbon footprint label and 0 is represented respondent's
	not understanding carbon footprint label
Pacf_1kg	consumer's purchased quantity of packed pork per mouth (kilogram per month)
Price_p100g	price of packed pork (baht per 100 grams)

4.4 Analytical data

The investigation of consumer's behavior of packed pork in Bangkok employed with descriptive statistic to explain with portion or percentage of objective one.

In step of evaluation of willingness to pay for packed pork with carbon reduction label with scenario explaining carbon reduction label meaning and used on the packed pork product, this study employed double bounded model and using simulated maximum likelihood method to evaluated coefficient of willingness to pay function as

$$WTP = \beta'_{0} + \beta'_{1}FEMALE + \beta'_{2}AGE + \beta'_{3}BACHELOR + \beta'_{4}THANBACHLOR + \beta'_{5}INC + \beta'_{6}TRUST + \beta'_{7}SCORE + \beta'_{8}CL_{CONC} + \beta'_{9}CL_{IMP} + \beta'_{10}SUP_{LP} + \beta'_{11}KN_{carbon} + \beta'_{12}KN_{footprint} + \beta'_{13}Pacf_{1kg} + \beta'_{14}Price_{p100g}$$

Finally, analysis of model can explain mean willingness to pay for packed pork with carbon reduction label by STATA and it can be found factors affecting to willingness to pay for packed pork with carbon reduction label.

5. RESULT OF STUDY

Demographic factors of consumer who has purchased packed pork product from 312 respondents found that most respondents were female about 74 percent. Majority age was 21-30 years about 213 or 68 percent followed by 31-40 years and more than 50 years accounted for 52 and 24 or 17 and 8 percent respectively. Most respondents had finished bachelor degree about 229 respondents or 73 percent followed by higher than bachelor and lower than bachelor accounted for 61 respondents and 17 or 20 and 7 percent respectively. Average monthly income of respondent, 122 respondents had income less than 20,000 baht or 40 percent followed by 20,001-30,000 and higher than 40,000 baht accounted for 102 and 51 respondents or 33 and 16 percent respectively.

Purchasing behaviors of respondents found that 201-250 gram is the most size of packed pork about 56 respondents or 18 percent, which followed by 151-200 and 101-150 accounted for 55 and 49 respondents or 18 and 16 percent respectively. Most packed pork price per 100 gram which was chosen by most respondent was 51-60 baht accounted for 17 percent of total respondents, which followed by 61-70 and 71-80 baht or 15 and 13 percent respectively. Most frequencies of packed pork of respondents were 1 times per month accounted 82 respondents or 26 percent followed by 4 and 2 times per month accounted for 67 and 59 respondents or 21 and 19 percent respectively.

Although respondent had known carbon reduction and carbon footprint label was few about 4 and 2 percent respectively, level of knowledge was high level and level of concern for climate change was highest level. Respondents highly agreed on climate change impacting to them and they highly agree to support low greenhouse gas emission for pork production.

Respondents who willing to pay for packed pork with carbon reduction label about 250 respondent of 80 percent of all respondents to analysis with double bounded contingent valuation method. Result of double bounded contingent valuation method found that age and monthly purchasing quantity of respondent were significantly negative at the confidential level of 90 percent. Education level of respondent was statistically significant negative to willingness to pay at the confidential level of 95 percent. Packed pork price was significantly positive to willingness to pay at confidential level of 99 percent. But, trust of label, knowledge and attitudes were not significantly affecting to willingness to pay for packed pork with carbon reduction label. Average willingness to pay for packed pork with carbon reduction label was 10.88 baht per 100 gram.

Coefficient	Coef.	Std.Err.	P-value
Constant	10.88746	5.225152	0.037**
FEMALE	.8437371	1.136254	0.458
AGE	0937032	.0534063	0.079*
BACHELOR	-3.980951	1.89749	0.036**
THANBACHLOR	-4.849731	2.088666	0.020**
INC	0000126	.0000166	0.449
TRUST	6965121	.5365044	0.194
SCORE	7193538	.6786848	0.289
CL_CONC	.807921	.7841391	0.303
CL_IMP	.5648524	.6481865	0.384
SUP_LP	6518122	.5115945	0.203
KN_carbon	.1682422	2.32188	0.942

Table 5 Coefficients of willingness to pay for packed pork with carbon reduction label

Coefficient	Coef.	Std.Err.	P-value
KN_footprint	8852595	4.290413	0.837
Pacf_1kg	7945169	.4632231	0.086*
Price_p100g	.2519405	.0294809	0.000***
Log likelihood			-351.17488

Noted: * significant level at 90 percent, ** significant level at 95 percent, *** significant level at 99 percent

6. CONCLUSION

Challenging of reduction livestock greenhouse gas emission, the demand for livestock would increase from increasing population and might lead to high sector of emission. The mitigation method by market incentives might be supported from consumers to producers. It could lead to better production to mitigate emission. This study employed double bounded CVM to estimate packed pork with carbon reduction to find willingness to pay and factors affecting willingness to pay.

Most of respondent who purchased packed pork was still lack of understanding of meaning of greenhouse gas. Although they had high attitude to concern climate change, moreover, understanding of other sustainability labels such as organic, carbon reduction and carbon footprint label was limited. It might influence to be insignificant in willingness to pay model.

However, factors affecting willingness to pay for packed pork with carbon reduction label consisted of age, education, quantity of purchasing per month and price of packed pork. The factors affecting positively to willingness to pay for carbon reduction label were younger age and price of packed pork. It showed that younger consumers prefer to pay higher than older. The higher price of packed pork would be paid for environment higher. In contrast, high education and quality of purchasing per month have negative effects to willingness to pay. Educational consumers might prefer to use other approaches to reduce climate change. Similarly, the consumers who buy large quantity of packed pork would avoid higher price. Average willingness to pay for the packed pork with the carbon reduction label was 10.88 baht per 100 gram or about 30 percent of the average price of consumers who paid for the label.

7. SUGGESTION

1. Most respondents do not know sustainability labels that 95 percent had not known carbon footprint and carbon reduction labels. However, consumers also are willing to pay for packed pork with carbon reduction label about 30 percent under a scenario of understanding meaning of carbon reduction label. The factors affecting to willingness to pay are age, education, quantity of purchase and price of meat. The sustainability labels could not provide higher willingness to pay without knowledge and understanding of the labels. So, government and related institutes have to provide more information to support to consumers to understand meaning of the labels. 2. 2. Education affected negatively to willingness to pay for packed pork with carbon reduction label. The consumers who are high education might understand meaning of carbon reduction label that does not actual reduction. Carbon reduction label has condition based on only same company or producer, which might be opportunity to get high emission before to reduce and get the label. This condition of carbon reduction label might not be suitable for actual reduction. It would be better if standards were provided actual reduction.

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DEVELOPMENT OF MANAGEMENT PROCESS OF COMMUNITY ENTERPRISE ON THE PARTICIPATION CONCEPT.

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ABSTRACT

The purpose of this research was to implement process development of community enterprise management base on the participation concept. Specifically, the paper aimed to identify the approach involved group management, product management and marketing management. This paper embedded in the participatory action research. The data were collected by means of the focus group discussion among fifteen key informants.

The results found from the study were not only the strengths but also weaknesses of the management in the community enterprise. The strength of this enterprise was having creative product that combined rock salt with the coconut oil. On the other hand, the weaknesses were being new process management group and not having new marketing channels. The development approach in group management had operated through the six good governance principles, including membership, committees, office, rules, fund and activity measurement. For the product management approach, it should be developed to be suitable to the standards of production, product label and packaging. For marketing management, it should be developed to the customer database in digital marketing. The monitoring progressive of management, it is shown that the operations were measurable, approvable and reliable. The product was also suitable to the governmental standard, regarding the community product, packaging and labeling design. The marketing management of the community enterprise has been developed in Website, Facebook and Line to promote in marketing and public relation.

KEYWORDS: Management, Community enterprise, Participation.

1. INTRODUCTION:

Bandung district, Udon Thani province has supported the policies of Udon Thani Province to strengthen its local community. There have been a lot of rock salt in the district so most of local wisdom line in rock salt boiling knowlwege. Recent years, the local government has focused on knowledge management to do valueadding in the rock salt (Bandung Subdistrict Administration Organization, 2012). So they have examined the context of community capabilities in rock salt refining in Bandung district, Udon Thani Province. As such, this community has cooperated to develop products from the local rock salt. One of the product is a coconut oil spa salt scrub, which certified by Small and Micro-Community Enterprise Department, Thailand. This community is entitled as "Health Spa Salt - BanNonThongChai" group. This group has supported the economic policy of Subdistrict Administrative Organization Bandung. They are likely to develope their stable group to improve on group management, product management and marketing management (Kreethep, 2015).

Previous studies have found and developed community enterprises in a variety of formats. Some studies on the development of the community enterprise, for instance, Rohitsathein (2006) who studied the operations of community enterprises in the fabric product sector in Chiang Mai province. This work suggested key success factors of community enterprises are customer service, market accessment, product innovation and leadership. Furthermore, Jatuporn (2007) who investigated the sustainability of farmers and community enterprises in Chalerm Phra Kiat district, Saraburi province and research indicated to improve operations in marketing, production management and corporate social responsibility, with the use of renewable energy to preserve and sustain of forest resources. Likewise, Runglerdkriangkrai (2004) who studied the factors affecting on operations model of the community enterprise, and found such factors, general condition of the community, person responsibility and account management system. Moreover, Chantawongsri (2004) pointed that manufacturing processes, marketing management, finance management, community participation, leadership, laborer, connection, member and information have been the significant factors of the operations model. While, Phromsaka Sakolnakorn and Sangkhlarat (2015) who studied the development guidelines for the small and micro-community enterprises in the Songkhla Lake Basin, suggested that the enterprises should be developed to products, standards and marketing management. This paper adopted these guidelines for community enterprise, in terms of group management, product management and marketing management. This research would be advantage for implement process community enterprise with community participation on community-based-development sustainability.

2. LITERATURE REVIEW:

The group management concept, with the approach to develop in group management, has operated through the six good governance principles, including membership, committee, rules, office, fund and activity (YaLa Community Development Office, 2015). Moreover, funding was also instrumental in the group operations (Susuki, 2009). Furthermore, factors affecting the operations of the community enterprise model involved a common feature of community enterprise, in responsibilities, in management planning systems and especially activities in finance and accounting (Runglerdkriangkrai, 2004).

The product concept, the importance recognized on quality product development, new product development, main local material usage, production technology improvement, packaging development, product label development and production specialization were componented of the small and micro enterprise (Office of the Secretary of the Community Enterprise, 2005)

For the marketing management concept, focused on applying social networking and website development, marketing support, process of website designing guidelines with the site content and purpose, personal target, preparing information on website, as well as website design (Pinsri, 2009). Likewise, the research on database systems development in terms of the e-commerce formated to enhance data search and public relations (Greewattana and Pattarasrigiragul, 2015).

3. METHODOLOGY:

The paper is embedded in the community action research. First, the research area is identified as Health Spa Salt - BanNonThongChai group. Second, the key informants, fifteen people were selected specificly as members of community enterprise "Health Spa Salt - BanNonThongChai" group. Third, the research instruments consisted of interviewing, focus group discussion, and questionnaire. Having interview from the group leader and members, data gathered were generated to enterprise management in the group, product management, raw materials, production methods, product processing, training skills, packaging, product label and marketing management in their group. Fourth, the collected data were analyzed by techniques of SWOT analysis and content analysis.

Research phase

The action research process consisted of four stages as followings:

Phase 1) For focus group discussion, all participants were invited to participate in a discussion forum which organized in order to obtain the in-depth data of their group problems and needs. The session of focus group discussion was divided into three parts: 1) participants' general information, 2) their opinions about problems and needs of the group in group management, product management and marketing management process in group 3) other suggestions.

Phase 2) For data group analysis, the strengths, weaknesses, opportunities and threats analysis (SWOT Analysis) was used to analyze and synthesize the data pertained to group management, product management, marketing management.

Phase 3) For seeking guidelines of activity process within participatory in action group development, through researchers and group members analyzed and summarized the development of the sector together.

Phase 4) For group development based on the resultant guidelines from the Phase 3, the activities and trial practices performed particular guidelines to group development, product management and marketing management.

4. RESEARCH RESULTS:

The results were presented according to the research objectives as following:

4.1 A Situation Study of Community Enterprise Group, Bandung District, Udon Thani.

Group Management: The fifteen members of the group have been quite ready for the preparation in group management, such as responsibility for group management, organization board, rules, fund group, group tasks and accounting management. This group was settled as the community enterprise in 2013 and named as Health Spa Salt - BanNonThongChai group. The group behavior acted as model of trust, philanthropy, and benevolent, which performed like family or community business.

Product Management: The new product development of the rock salt that is coconut oil salt scrub and branded as "BD Beauty" which is an acronym from Bandung. _This product has combined with previous community knowledge in rock salt production and new knowledge. Then it has been certified by community enterprise department of Thailand. The product of this group was pure salt scrub, coconut oil salt scrub and coconut oil soap. The package of this product was a zip-lock plastic envelope which is very useful as it can show product clearly, prevent product spilling and protect bacteria from dust.

Marketing Managment: The results shown that this group has only one marketing channel which is sales in local group shop.

4.2 An Analysis of Community Enterprise "Health Spa Salt - BanNonThongChai" Group, Bandung District, Udon Thani.

This paper used the SWOT technique for data analysis in the focus group discussion. The group discussion sessions arranged as the group management, product management, and marketing management.

First of all, the SWOT Analysis information about group management was shown in Table 1 below:

Group Management				
Strengths		Weakne	sses	
1.	Group members have honestly	1.	No Paperwork evidence preparation for	
2.	Group members have responsibility for their		Group Management, include group	
	own duties.		structure, register of Members, Application	
3.	Group members can help each other all roles		Form, dividend documents and share	
	and responsibilities.		certificates.	
Opport	unities	Threats		
1.	State government co - networking to support	1.	Local governments not financially ready to	
	groups, group development.		group support.	

Table 1 : SWOT analysis information of group management

Crown Managamant

Second, the SWOT analysis information about product management was shown in Table 2 below:

Table 2 : SWOT analysis information about product management.

Product	t Management		
Strengths		Weaknesses	
1.	Manufacturing workers have enough no need	1.	The Packaging non-convenient to use
	to increase the number of workers.		as it should.
2.	Workers with specialized in production, know	2.	the kind of product with less.
	all the procedures and processes and		
	knowledge transferred.		
3.	The production Low costs		
4.	Has to registered local products for reassuring		
	the consumer.		
5.	Raw materials for manufacturing not imported		
	from outside, because can produce in local.		
Opport	unities	Threats	
1.	Udon Thani Rajabhat University to Co	1.	Coconuts are grown in local For
	academic network with support to product		production as cold pressed coconut oil
	development, packaging design and product		has a small amount.
	label design.		
2.	The market has cold pressed coconut oil for		
	sale at low price.		

Third, the SWOT analysis information about marketing management was shown in Table 3 below:

Table 3 : SWOT	Analysis	information	of marketing	management.
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Marketing Management				
Strengths	Weaknesses			
1. All group members are interested to study	1. Group members don't know with about			
for marketing information technology	marketing information technology.			
developments.				
Opportunities	Threats			
1. State government co - networking to	1. Internet System has a limited range and			
support groups, to usability training.	speed, some member house is not accessible			
Include, facebook, line and website.	for use			
All group members are interested to study for marketing information technology developments. Opportunities I. State government co - networking to support groups, to usability training. Include, facebook, line and website.	 Group members don't know with about marketing information technology. Threats Internet System has a limited range and speed, some member house is not accessible for use 			

4.3 The Developmental of Guidelines for Activity Process Community Enterprise.

The results revealed the developmental guidelines about the group management, product management, marketing management were as followings.

Group Management:

Group management should be a structured group, preparing the record of registered members, preparing the clear-cut register form, preparing group rules, setting the location of group operations, setting the agreement of funding, setting the planning group procedures in order to provide the clarification for implementation in group management.

Product Management:

Product management should specify the processes of new product development, consider reducing costs of production. The guidelines entailed in giving priority to the development of the main raw material production technology, inventing to improve production methods that reduce the production time and lower power consumption, and focusing on productivity workers, with the development of production skills.

Marketing Management:

They should add more various marketing channels on the social network, including Website, Facebook and Line, to support public relations group through the internet device.

4.4 The Activity Process Community Eenterprise Development.

The research focused on the activity process community enterprise development, group management product management and marketing management. Each of these was an important part to drive the group's work. This group has developed the following on each side.

1) Group Development: The following strategies were of the group development.

1. The Group Members: Each member has to commit in the allocation of operational plans regarding the production. In order to increase the continuous production, the group has improved production skills. And it also has allocated operational plans of marketing and the financial, with based on interests and voluntarily of members. The group has executed the record of members, information management, and prepared the application form for data gathering as evidence.

2. The Board Group: The chairman of the group will do duty in the management and facilitate in group operations. The consultant is served to advise on all aspects of operational activities within the group. The production division has performed raw material sourcing, and production, which all processes conformed to standards and quality. The market division has served distributors and sales contracts with customers. It's also prepared print media documents for PR activities, such as brochures, the vinyl, and the market information technology. The Financial accounting managed the income and expense accounts, debtor balance sheet and accounts income statement.

3. The Group Rules : The group procedure has been specified rules documented, the guidelines for the regulation group, the objective of the group, the qualifications of members to community joined, the termination of membership, the resignation of members, for out of membership, funding group, operations roles group, roles of group management board and advisory group, features of directors, the timing of directors, out of the position director, duties and responsibilities of directors and board meetings.

4. The Office: The group has determined working facilities of the members at the presidential home.

5. The Group Fund: The group has determined how to raise funds from the register and the purchase shares. And an annual dividend.

6. Group activities: They have activities plan with weekly for group members. And has to the presentation the group activities, including product production method on the posters and leaflets.

7. Financial Group: The group has prepared a group financial account, including payment receipt, bill of money lading, credit document, purchase order, products document control, goods issue document control, materials document control, materials document widen control, fixed assets document control, cash book, cash received journal, cash disbursement journal and account receivable.

2) Product Development: The followings were the main issues in the product development

1. Product: They have taken the "coconut oil salt scrub" product certified for community products. Moreover, they have introduced the new products to the market, for instance, coconut oil Salt scrub mixed with turmeric for a body scrub, turmeric salt soap product for treatment to skin itchy, Salt spray product for treatment to skin itchy from mosquito bites and acne.

2. Manufacturing Technology: The group has focused on the shift in raw material, energy fuel from woods for production. The idea is to find ways to use renewable energy matched to the concept of ecofriendly and have locally. The preliminary operation and development, and the study compared the pros and cons of renewable energy led to the change. As a result of the study shown fuel from the chaff has been more sustainable produced than fuel-related wood. In particular, the wood fuel was more expensive, efficient heating, faster and stronger, and have time to burn faster. But the salt from boiling obtained at less resolution level. While raw husk fuel cheaper than the effective heating and longer duration of burn out. In addition, salt for boiling obtained with the more resolution level. So it has shifted from how to salt boiled by charcoal from wood to salt boil by rice husk. That is development approach aspects use of renewable energy and sustainability of forest resources.

3. Packaging: It was developed by adding packages based on the needs of consumers, and the right price. It's a wide mouth plastic jars' packaging with screw cap. According to the concepts of packaging the strength unsullied clean, convenient packaging, anti-bacterial product access after activation.

4. Product labels: In partnership with the student network from Udon Thani Rajabhat University, they have contributed the design development of product labels. The selected pattern on the label is a woman cartoon, use colorful sight stumble. The label concepts emphasized on a skin conscious health to reaching women customers. The information presented on the labels such as group name, product name, product features, how to use product components, price and date of manufacture.

3) Marketing Development: Having been the more marketing channels development, this research has applied social network perspective for developed Facebook application and Line application to assist marketing management. Also, website design and development for the group have established to build a public relations activities of the group. The process is started training scheme provides knowledge about Facebook and Line. After that, the group members took action to create a Facebook account, a page on facebook and line application.

For the website development, it's has processed Website design and development in issues as follows:

1. The objective of the website was to promote the group. That is disseminated knowledge about the production of rock salt in Bandung district, and to disseminate knowledge about the privatization of rock salt and product introduction of the group.

2. The content presented on the site, including members, producing rock salt by boiling and drying, the coconut oil production, the salt scrub production, and presentation of group products.

3. The target audience is the general public as well as, students.

4. The main Information for preparation, it's got from the group's members and operators of rock salt in Bandung District.

5. The free program for creating websites, that's the name "Joomla".

6. The Web hosting (Web Hosting), that is getting the cooperation from Tambon Administration Organization Bandung

7. Site Map, it's Has prepared a chart of the sites internal linking structure.

8. Website Design, this is focused on designing the highlight the slideshow supporting

content presented.

9. The components of a Website, including designed website header to display group name, at a middle of a website to display menu link content and at below of website to display the address information for a contact.

The marketing network: The following were the main issues in the marketing network development. The group has built a marketing network in the form of stores to shop. It has jointed networks with community groups in Tambon Ban Chiang, Nong Han district, Udon Thani, through building a network of partners together between Spa Salt Scrub Ban Non Thong Chai group and Ban Chiang pottery jars group, and distributors of souvenirs group Ban Chiang, to contribute to the network, with a concept common approach to promoting all groups. Moreover, collaboratory of the coconut oil Salt Scrub products of group Ban Thongchai and bring Ban Chiang pottery or earthen jar from Ban Chiang, in format the twin pack consignment, at the sales shop of souvenirs group Ban Chiang, with management by giving the commercial credit at reasonable and acceptable to all parties.

5. DISCUSSION:

The research is focused on developing community enterprise. There has been group management, product management and marketing management. So the group has an operation on each side as the followings.

5.1 Group Management: The operation began development of members have the preparation with the plan making members structure, and the operation plan within a group. This finding has consisted of with the work of Yala Community Development Office, that the success factor of community enterprise including, group information management, registration document, group fund, membership status, operations roles group, the role of the group management board and advisory group, features of directors, the timing of directors, out of the position director and duties and responsibilities of directors and board meetings. And this is planned to raise funds from members. Additionally, the research findings also correspond with Susuki (2009) who stated that providing information that financial organizations in the community are one tool that people use as a development tool. And must admit that source of funding that is needed to take care of them. The development of this sector. It's has a consistent with the research of the Runglerdkriangkrai (2004) who studies the patterns of implementation of the project one district, one product, and suggested factors affecting the operation of the Community, including general characteristics of community, responsible manner, deployment system management in each business activity, especially in finance and accounting. The concept of such to the subsidiary of group management for ready and clarity of operations indicated that the group has the potential for richer management. According to the group management. Also, group members need to understand and comply with regulations of the group, namely honest, carefully in finance, planning and compliance strictly, and cooperate in the implementation of activities. These were a very important part in the development of the group to be strengthened even further.

5.2 Product Management: The group has operated with a creative concept by combining existing knowledge and new knowledge. Also utilization the materials were locally to develop products. It's a coconut oil salt scrub, and to focus on bringing products to register of products communities. It has also developed more new products continuously. There have been coconut oil mixed with turmeric salt scrub, salt soap and salt spray, it's consistent with the guidelines of Community Enterprise Promotion Division (2005) that has the policies encourage community bundles to build careers. Until Product development and registration of community products and develop more new products continuously, it's consistent with the guidelines of Phromsaka Sakolnakorn and Sangkhlarat (2015) who studies to develop guidelines for small and micro community enterprises in Songkhla Lake Basin, and suggested the community enterprises should be developed to products standards and marketing information technology. These have been to build credibility in the products itself, and the main raw material used to produce, it can bring from local. The paper result show creation of low-cost products, it's consistent with the guidelines of Rohitsathein (2006) who studied the operations of community enterprises which customer service, market access and leadership at a lower cost. However, it depends on other factors underpin as well.

The group has developed products in new packaging to ease of use, and developments in the product label to beautifully colored. It has product information presented on the label. Moreover, the group has focused on changes in raw material, energy fuel from wood for production. The idea is to find ways to use renewable energy to the concept of eco-friendly and have locally. These have been consistent with the guidelines of Jatuporn (2007) who studied the sustainability of communities farmers and community enterprises in Chalerm Phra Kiat district, Saraburi Province, and found to improve operations in marketing, production management, product management and corporate social responsibility, with the use of renewable energy to preserve and Sustainability of forest resources. Moreover, the implementation of the product development of the group, also complies with guidelines of Community Enterprise Promotion Division (2005) that recommended the importance recognizes the quality product development, new product development, the main material used locally, improved production technology, packaging development, the product label development and specialize in the production.

5.3 Marketing Management: It's important to the development of Marketing Information Technology this. It was applied social network for development, by the Facebook application and Line application to assist the marketing work of the group, also website design and development for the group. These have created a distribution channelled to reach more customers quickly and created commercial opportunities. Such processes Consistent with the concept of Greewattana and Pattarasrigiragul (2015) who stated that should the featured on database systems development, in to form the e-commerce, to search data and for public relations. And also

consistent with Rohitsathein (2006) who studied the operations of community enterprises in the fabric products sector in Chiang Mai Province, and found the key success factors of community enterprise is customer service, market access, innovations and leadership at a lower cost. This is an indication of the direction that can create the group success in the future.

In addition, the group also has developed a website for public relations by the principles of website design process, including the objective, the content, presented through the site, the target, information preparation, program for creating websites, sitemap, website design, the components of a website (Pinsri, 2009). Moreover, development of this website consistent with the concept of Sakolnakorn and Sangkhlarat (2015) who studied the development guidelines for small and micro-community enterprises in Songkhla Lake Basin, and found to should be developed to products standards and marketing information technology. By supporting the operator community enterprise. Have developed their own training by creating a website with free program. This is to create a marketing channel for increased group size. As well as building a marketing network in the form of stores to shop. It has a jointed network with community groups in Tambon Ban Chiang, Nong Han district, Udon Thani, by building a network of partners together.

6. CONCLUSION:

This paper has argued that the potential factors in the group development, include, 1) group management: The focus to members management and group rules, it has resulted to make the operation more clearly, 2) product management: it has focused importance to product quality, adjusted and changed to production technology with the use of renewable energy and improving the packaging and packaging label, order for adaptation to the current situation in the field of environmental conservation and product standards. 3) marketing management: has been conducting training to online marketing for group members, who accepted to technology, that has the role in the marketing today. Addition group has also created a products network and network between groups, a partner in the creation value-added of products. These have been consistent with the concept of Chantawongsri (2004) who studied the factors affecting operations model of community enterprise. And it found from the study that factors included manufacturing processes, marketing, management, finance, participation, leadership, laborer, connection, member and information.

7. RECOMMENDATIONS:

The following are recommendations based on the research results:

7.1 The developments in group management should be applied to guide implementation for developing community enterprise, to add up more interests in community group and to be model for other community group.

7.2 The community enterprises should study further of product development, product standard and production technology within product industry standard.

7.3 The community should recognize on network commercial, marketing network and public relation for enlarging more product target group.

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AN EXPLORATORY FACTORANALYSIS OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT COURSE

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ABSTRACT

The objective of this research was to analyze factors that affect learning of the logistics and supply chain course. Relied on purposive sampling technique, the samples used in this research were 385 students who enrolled in logistics and supply chain management courses in six universities:Burapha University Chanthaburi Campus, Rajapruk University, Rajamangala University of Technology Suvarnabhumi, SuanSunandhaRajabhat University, Kasetsart University Sriracha Campus and Rajamangala University of Technology Bangpra. Questionnaire was used as a research tool in order to collect data about factors that affect learning of the logistics and supply chain management course, approved in terms of accurate content by three experts and of reliability by using Cronbach's alpha coefficient 0.89.The data analysis was conducted via Principal Components Analysis (PCA) as factor extraction method and Varimax orthogonal rotation method. The results revealed that there were overall 9 factors that affect the learning of the logistics and supply chain management; audio visual equipment and classmates; up-to-date course content and job opportunity;lecturers' educational qualifications;students' attitudes towards course and lecturers; arithmetic and communicative skills; learning disciplines; self-awareness; guardians' financial

statuswhich the variance were accounted for of27.342%,5.984%, 4.344%, 4.268%,3.911%, 3.639%, 3.278%, 3.150%and2.849%respectively.

KEYWORDS: Factor Analysis, Logistics and Supply Chain Management, Logistics, Supply Chain

1. BACKGROUND AND STATEMENT OF PROBLEM

National Education Act B.E. 2542(1999) section 7the aims of the learning process in this section is toinculcate awareness of politics; democracy of government under a constitutional monarchy; capability forprotection and promotion of human rights, responsibilities, respect for the rule of law, equality, freedom and people's dignity; being proud of Thai identity; capabilityfor protection of public and national interests; promotion of religion, national art and culture, sports, indigenous knowledge, Thai wisdom and universal knowledge; inculcating capability for preservation f natural resources and the environment; capability toearn a living; self-reliance; creativity; and acquiring thirst for knowledge and ability of self-learning to continue lifelong learning(Office of the Prime Minister, Ministry of Education, 1981).

The Council of Supply Chain Management Professionals (CSCMP) states that logistics management is procedures associated with planning, operation, organizational control, as well as data and relevant financial transaction, leading to effective mobility, storage, collection, raw material distribution, components, and services. Entrepreneurship, therefore, applies logistics management as a tool and strategy to foster competitiveness and advantages. The context of free trade and production spread of businesses region wide and worldwide are also based on competitive advantages, not only an increase in domestic productivity, but also creation of supply chain collaborative relationship. Logistics and supply chain management course, then, remains importance due to a combination of these two areas.

Logistics and supply chain management course, even though, has an importance to the study of logistics, it has been problematic to a number of universities; for example, a number of students who obtain their grade below "C" and other causes affecting learning efficiency in which it is called "variables". There are a large number of positive and negative variables affecting teaching and learning in logistics and supply chain management course. Lecturers' aspects are, namely teaching techniques of lecturers, content insight, teaching experience, and lecturers' personalities. Students' aspects are, namely knowledge basis, arithmetic skills, language and communication skills, learning disciplines, learning approaches, and learning styles. In addition, other affective variables include amicability referring to how the students select peers, guardians' financial status, and self-awareness. Concerning these variables as mentioned above, they were from three groups of stakeholders of logistics and supply chain management: 1) the students studying this course as aforementioned in abstract 2) five lecturers in four universities 3) two logistics and supply chain management entrepreneurs. Hence, when combining all these variables, it will result in a large number of variables and it seems apparently difficult how much each variable really affects learning and teaching and how different each one is.

Factor analysis is a technique of statistical analysis of the research in order to typically group variables together which is the process to minimize items into a smaller set. If certain variables which are unrelated cannot be grouped together, they are removed from the model. Nevertheless, reducing variables to a smaller number of factors is explained which variables show a similar relationship. Therefore, this set of the variablesiscalled "Factor" which can be divided into several factors. There are two types of factor analyses; 1)Exploratory Factor Analysis (EFA) which aims to explore the loadings of variables and group them. For instance, Exploratory Factor Analysis is utilized whenthe researcher would like to group 30 variables in a research. After grouping by this method, the 28 variables are formed into four factors (the two variables are deleted by the method). 2) Confirmatory Factor Analysis (CFA) is to precisely confirm defined hypotheses regarding the relationship between variables(Vanichbuncha, 2011;Kaiyawan, 2008).

As not the research in the fields of factor analysis of logistics and supply chain management as literature reviews was found, there were relevant journal articles. To illustrate, Krannarong (2013) investigated the factors influencing the efficiency of logistics management of construction material distributors and the study of Sommanawat (2010) were to investigate the factors affecting towards the decision to study inbusiness school with a major inlogistics and supply chain management. Other relevant journal articles were Ozelkan and Rajamani (2006) 'The Effective Framework for Logistics and Supply Chain Management', Khan and Zhang (2017) The Effective Role of Visiting Lecturers in the Courses of Supply Chain Management and Carter *et al.* (2006) 'Executive Education's role in our Supply Chain Future'.

With regard to the outstanding technique of exploratory factor analysis, it was used as research tools of analysis and distinguishing variables affecting learning and teaching management of logistics and supply chain management coursein order to group the variables which were related or had effects on similar learning and teaching together. In addition, it was used as guidelines of learning and teaching management for effectively rectifying the problems as aforementioned in this chapter.

2. RESEARCH OBJECTIVES

1)The research aims to study the variables affecting learning and teaching management of logistics and supply chaincourse.

2) The purpose of this research is to analyze exploratory factor analysis affecting learning and teaching management of logistics and supply chain course.

3. RESEARCH FRAMEWORK

- 1. The context of learning and teaching
- of logistics and supply chain management course.
- 2. Exploratory factor analysis
- 3. The problems of learning and teaching of logistics and supply chain management course.



Factor (group of variables) affecting learning of logistic and supply chain management course.

Figure 1 Research Framework

Ozelkan and Rajamani (2006) claim that the effective framework for logistics and supply chain management course should combine learning techniques, theory and practice; industry drivers, best practices, trends, tools and techniques for planning and designing supply chain. Supply Chain Management Process Map providing clear and comprehensiveconsisted of end-to-end coverage of supply chain process and decision phases were utilized in Ozelkan and Rajamani's study. Therefore, this process map can be the effective teaching of supply chain management course.Khan and Zhang (2017)purpose that the learners should not study in the textbook thus, the universities are able to invite professional lecturers and industrial experts to convey not only the experiences, but they also share their implementation of theory. Moreover, the curricula of this course should be developed after tracking the careers (Carter *et al.*, 2006).

4. RESEARCH METHODOLOGY

4.1 Population and Sample

The population of the research was the 385 students who were currently studying for a bachelor's degree in logistics and supply chain management coursein the different universities. There were166 participants who were fromBurapha University Chanthaburi Campus; 13 participants fromRajapruk University; 27 particitants fromRajamangala University of Technology Suvarnabhumi; 24 participants from SuanSunandha Rajabhat University; 119 participants from Kasetsart University Sriracha Campus and 36 participants from Rajamangala University of Technology Bangpra. These samples were selected purposively.

4.2 Research Instrument

The questionnaires for the participants towards levels of effecting on logistics and supply chain management courseof several variables. The questionnaires were developed:

4. 2. 1A variety of document about the principles, concept and objectives of learning and teaching management for the course of logistics and supply chain management were studied. In the process of developing the questionnaire, three groups of stakeholders of logistics and supply chain management were interviewed. In the beginning, 15 students studying logistics and supply chain management course were asked about factors affecting their learning in logistics and supply chain management course. In addition, five lecturers from four universities and the entrepreneurs from two organizations in the business related to logistics and supply chain management were asked the same question in order to include more aspects in the questionnaire. The examples of additional aspects from lecturers are the use of ICT as a tool in classroom teaching. Other additional aspects of the entrepreneurs are policies of Thailand 4.0 and trend of eastern economic growth.

4.2.2 The gained information was analyzed. In addition, the questionnaire was designed to collect the data about factors affecting learning in the course of logistics and supply chain. The draft of the questionnaire was evaluated by three experts in this field in terms of the content validity. This step was conducted by considering

how many the questions and the objectives were correlated. This was followed by calculating the questions to find Index of Consistency: IOC. After that, the questions with IOC in the level of 0.6 and higher were selected.

4.2.3 The questionnaire passing the process in 4.2.2 was piloted with the 37 students at Burapha University Chanthaburi Campus. These groups of students were the ones who have studied in the course of logistics and supply chain. The results of piloting the questionnaire were analyzed in order to see the reliability and Coefficient Alpha (Cronbach's). The questionnaire was improved to be the questionnaire with the reliability not less than 0.89. This consisted of 37 variables (A1-A37).

4.3 Data Collection

The researcher requested the lecturers teachinginlogistics and supply chain management course of target universities to distribute the questionnaires to the sample group. They then returned the researcher the questionnaires. A research period was from September to October 2017.

4.4 Data Analysis

The procedures of analysis were to create correlation matrix, factor extraction, Varimax orthogonal rotation, factor loadings and factor titles, respectively.

5. RESEARCH FINDINGS

The findings of factor analysis on variables affecting learning logistics and supply chain management coursewith 385 participants were more than 10.40 times as much as a number of variables. As a result, there were sufficient data in order to analyze exploratory factor (Kaiyawan, 2013).

5.1 Descriptive statistics were employed such as Mean; (\bar{x}) and Standard Deviation; *SD* of 37 variables. All variables were found to have a mean score more than 0.50. The highest mean score of variables was A1; course significance's perception of learning logistics and supply chain management course (\bar{x} =4.32, sd.=0.637) and A16; lecturers' personalities namely welcoming and accessible personality (\bar{x} =4.32, sd.=0.735). However, A13 was the lowest mean score of variables (\bar{x} = 3.06, sd.=1.086) which was about personal problems of learners such as love, finance, companions, and family.

5.2 Prior to factor extractions, the simple sets of data were determined by Kaiser-Meyer-Olkin; KMO andBartlett's in order to assess the suitability of the data for factor analysis. In terms of statistical hypothesis tested bychi-square statistic, if chi-square value washigher and the significance was less than.05, it referred to reject null hypothesis (H_0) or accept alternative hypothesis (H_1) in terms of statistical significance (α). As a result, these variables tested were correlated, thus they cannot be employed in factor analysis. Regarding to KMO returning valuesbetween 0 to 1, it was found that KMO value, which generallyshould be greater than 0.50 and closer to 1, was .908, hence it can be considered suitable for factor analysis. In terms of B a rtlett's Test using chi-square was 4536.929. This significance was .000 which is supposed to be less than .05 for the factor analysis to be appropriate showing that 37 variables in the questionnaire can be analysis in factor analysis.
5.3 ForCommunalitiesranging from 0 to 1 (0<Communalities< 1) were used as a correlation coefficient between a variable and other variables, if the communalities are all tiesvalue was less than 1, these variables cannot beexplained in the part of variance. On the other hand, the variance in a set of the variables are able to be explained if the variables were higher than 1. The initial value of the communalities in a principal components analysis is set to 1. With regard to the extraction communality of each variables after extracting factors, the value of the extraction communality was greater than 0.5. The lowestextraction communality valueof the variable at 0.533 which was not low enough to be removed was A11; select classmates for group work. Conversely, the highest value of the variable at 0.728 was A30; guardians' financial status affecting this course.

5.4 Regarding theTotalVarianceExplained converting the variables to 9 factors, the eigenvalue of all the factors was greater than 1 and in combination explained 58.735% of the total variance. The highest variance 27.342% was in factor 1. Factor 2 to 9 accounted for 5.984%, 4.344%, 4.268%, 3.911%, 3.639%, 3.278%, 3.150%and2.849% respectively of total variance.

5.5 OrthogonalVarimax rotation was conducted in this study. It was showed that factor loadings changed when compared to previous factor loadings without rotating (Table1). It indicates that factor loadings are supposed to be higher than 0.3; therefore, there were overall 9 factors by 37 variables with average variance accounted for of 58.735 %. Each factor comprising various variables and factor loading values of the variables were presented in this chapter: The eight items loaded on to Factor 1. This factor comprised create pleasant and supportiveatmosphere of learning with stress-free environment(0.715%) , counselling service more often by lecturers (0.694%), handout that easy to understand (0.669%), measurement and assessment covering all lessons (0.618%), summarizing main issues at the end of classes (0.605%), lecturers' personalities namely welcoming and accessible personality(0.578%), ICT applied to learning and teaching (0.572%) and self-learning (0.5 4 0 %). This factor was in combination explained 27.342% of the variance. This factor was labelled, "capabilities of learning and teaching managements".

Variable	Component								
	1	2	3	4	5	6	7	8	9
A19	0.715	0.170	0.120		0.143				
A21	0.694	0.140	0.166						
A18	0.669		0.129		0.241		0.101		
A17	0.618		0.103	0.335	0.209		0.113		0.174
A23	0.605	0.192	0.229	0.125		0.207			-0.248
A15	0.578	0.241		0.282	0.260	0.137		-0.134	
A22	0.572	0.204	0.382		-0.133		0.161		
A20	0.54	0.184	0.228	0.285			0.182	0.205	
A25	0.16	0.700			0.211		0.176		
A26	0.215	0.679	0.176		0.251		0.127		
A30	0.25	0.661	0.146	0.100		0.13		0.114	
A27		0.590	0.264			0.141	0.182		
A32	0.219	0.539	0.151	0.288		0.205			0.141

Table1. Rotated Component Matrix

					Component				
	1	2	3	4	5	6	7	8	9
A31	0.405	0.511	0.211			0.202		0.103	
A37	0.183	0.2	0.773						
A36	0.203	0.199	0.744		0.149		0.138		
A34	0.323		0.578		0.169	0.197	0.138		
A35	0.261	0.300	0.576		0.323		0.159		
A33		0.220	0.439	0.336	-0.172	0.265		0.268	
A13			0.188	0.734	0.217				-0.152
A24	0.222	0.217		0.586			0.180	0.206	
A16	0.434	0.128		0.516			0.180	-0.137	0.318
A1	0.146	0.111	0.225		0.663	0.17	0.146		
A4	0.203	0.231	0.102	0.107	0.449	0.384			-0.263
A14	0.367	0.106		0.387	0.449	0.101	0.19		-0.115
A5	0.301	0.149			0.393	0.19	0.300		-0.369
A2			0.110		0.219	0.735			0.250
A6	0.115	0.114	0.173			0.642	0.382	0.181	-0.124
A3	0.291	0.12		-0.281	0.327	0.487		0.235	
A28	0.196	0.351	0.226	0.223		0.358	0.169	-0.141	0.160
A7	0.113		0.117	0.169			0.738		
A9		0.169	0.180		0.304		0.644	0.156	
A8	0.251	0.202				0.324	0.629	0.178	
A11					0.145			0.735	
A12						0.181		0.726	
A10	0.176	0.242			0.446			0.474	
A29						0.148		0.138	0.813

Table 1.Rotated Component Matrix(Cont.)

Six items were loaded onto Factor 2. This factor contained classroom environment such as effective air flow and lightening (0.700%),audio visual equipment(0.679%), teamwork(0.661%), Attending to learn by classmates (0.590%), amicability referring to how the students select peers(0.539%) and adaptability on team building(0.511%). It was in combination explained 5.984% of the variance. This factor was labelled, "audio visual equipment and classmates".

The five items loaded onto the third factor. Factor 3 included policies of Thailand 4.0 (0.773%),trend of eastern economic growth(0.744%), job opportunity(0.578%),up-to-date course content (0.576%) and students' background knowledge of high school (0.439%).It was in combination explained 4.344% of the variance. This factor was labelled, "up-to-date course content and job opportunity".

Three items loaded on to Factor 4. This factor consisted of lecturers' academic titles and degrees(0.734%), the number of students in each class(0.586%) and providing early feedback and scores on assignment(0.516%). It was in combination explained 4 . 2 6 8 % of the variance. This factor was labelled, "lecturers' educational qualifications".

The four items loaded onto Factor 5 namely, course significance's perception oflearning logistics and supply chain management course(0.663%), students' attitudes towards logistics and supply chain management course(0.449%), techniques; approaches; experiences and capability in teaching (0.449%), the relationship

between learners and lecturers (0.393%). It was in combination explained 3.911% of the variance. This factor was labelled, "students' attitudes towards course and lecturers".

Four items loaded on to Factor 6. This factor comprised of arithmetic skills (0.735%), preparing the lesson before the class (0.642%), English communicative skills (0.487%) and moral support from parents (0.35%). It was in combination explained 3.639% of the variance. This factor was labelled, "arithmetic and communicative skills".

Three items loaded onto Factor 7 which werelearning disciplines namely attendance and punctuality (.738%), honesty such as cheating on assignment (0.644%) and self-determination in studies (0.629%). It was in combination explained 3.278% of the variance. This factor was labelled, "learning disciplines".

The three items loaded on to Factor 8 including the behavior of technological addiction namely smart phone, internet and games (0.735%), personal problems of learners such as love, finance, companions, and family (0.726%) preference for group work (0.474%). It was in combination explained 3.150% of the variance. This factor was labelled, "self-awareness".

The item for the last factoridentified guardians' financial status(0.813%) affecting this course. Factor 9 was in combination explained 2.849% of the variance. This factor was labelled, "guardians' financial status"

6. DISCUSSION

Following from the discussion of Exploration Factor Analysis (EFA) or Factor Analysis of variables that affect learning of the logistics and supply chain management course, all variables were formed into 9 groups. Concerning the findings, the approach of learning and teaching management will be presented in this chapter.

Factor 1 represents "capabilities of learning and teaching managements". The first factor accounted for 27.342% of the total variance which was a very large amount. It can therefore be seenthat the participants mostly agreed with capabilities of learning and teaching managementsaffectingefficiency in learninglogistics and supply chain course. Consequently, the lecturers should mostly attach great importance to 8 variables in Factor 1. Theteaching approaches were to provide easily understandable handouts and create pleasant and supportive atmosphere of learningwith stress-free environment. The self-learning could be implemented more often. The lecturers measured and assessed the learners' progress covering all topics the learners taught. The lecturers not only summarized main points every time after ending of the lessons, but the lecturers who can be counsellors also work closely with the learners.

Factor 2 represents "audio visual equipment and classmates". Factor 2 accounted for 5.984% of the total variance which was lower than the first factor, yet it can also affectlearning and teaching of logistics and supply chain course. The lecturers therefore attached great importance to six variables in Factor 2. The variables which can be implemented by lecturers were to report the classroom environment repair such as effective air flow, lightening and fully-equipped multimedia classroom to the director. Conversely, the variables that the lecturers

could not conduct directly can share certain suggestions to the learners instead. To illustrate, the unity was needed in team; the students should be attentive in studies and careful about adaptability and preference for group work.

Factor 3 represents "up-to-date course content and job opportunity"; Factor 4 represents "lecturers' educational qualifications", Factor 5 represents" students' attitudes towards course and lecturers", Factor 6 represents " arithmetic and communicative skills, Factor 7 represents" learning disciplines, Factor 8 represents" self-awareness", Factor 9 represents" guardians' financial status". These factors relatively a lower amount of variance which were4.344%, 4.268%, 3.911%, 3.639%, 3.278%, 3.150% and 2.849% respectively. In contrast, it was supposed to be clear that these7 factors produced a total variance accounted for of 25.439% which was rather high. As a consequence, the influence of variables in Factor 3 to 9 affected the logistics and supply chain course. The director and lecturers should devote much attention to the reasons based on variables in Factor 3 to 9 divided into 3 groups. Group 1: The group of variables relating to the lecturers can be implemented by following these statements. The lecturers should enable the students aware of the benefits for learning logistics and supply chain management courseaffecting more concentrated than normally possible. In addition, up-to-date course content should be applied. The lecturers should provide early feedback in order to improve the academic performance of weak students. The professional lecturer should always engage in continuing education. Lecturers' academic titles and degrees were supposed to be considered as reassuring students. The lecturers can provide suggestions concerning this course namely asking the learners to revise their high school's knowledge basis allied to arithmetic and communicative skills, motivating the students to prepare the lesson before the class, cultivating good moral traits, grouping strength and weak studentstogether for group work. Asaforementioned above, it can be seen that the students's attitudes towards the lecturers involved the relationship between the students and the lecturers were positive. Group 2: The group of variables which had to be supported by the director comprised of appropriate class size. Group 3: The group of variables that the lecturers could not conduct related to guardians' financial status and receiving guardians' support. By contrast, some variables that the lecturers can play a role as advisors such as cultivating good moral traits, pros and cons perception of uncreative technology using including counselling service for students' personal problems.

7. SUGGESTIONS

Practical implications: The lecturers who responsible forlogistics and supply chain management coursewill apply the findings to develop their teaching qualities.

Research implications:

1)There should be an analysis to find Casual Model that has an effect on teaching and learning of Logistics and Supply Chain Management

2)There should be a development of a new Logistics and Supply Chain Management learning model

8. LIMITATIONS OF CURRENT STUDY

As not many relevant journal articles were found that were analyze factors that affect learning and teaching of the logistics and supply chain management course. The study has certain limitations and perhaps future studies should attempt to include more. The author can find only a few articles as mentioned in chapter 1; paragraph 5.

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THE DEVELOPING OF KHON ACTIVITIES TO SUPPORT LEADERSHIP SKILLS FOR LEARNERS AGED 13 – 15 YEARS OLD

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ABSTRACT

The objectives of this research were to develop Khon activities that promote leadership skills and to compare the effects of leadership skills before and after the activities. The sample consisted of 13-15 years old students from Chulalongkorn University Demonstration Secondary School. Data was collected from related document and researches, interview with experts, activities development from key elements of Khon, and teambased learning and transformational leadership theory. The results showed that there were 5 Khon activities that promote leadership skills: 1. Get to Know Leadership - to promote knowledge, morality, and enthusiasm; 2. Change the Mask - to promote emotional control, self-confidence, and creativity; 3. Who Is the Army Activist? - to promote confidence and risk sharing with others, positive reinforcement, and giving others a chance; 4. Listen to Differences, Practice with Creativity - to promote the acceptance of different opinions and consideration of the needs of others; 5. Order and Taking Orders Strategies - to promote the cooperation in problem solving, the commitment to the goal, and to encourage followers to comment and reason. The t-test analysis showed that the mean was 24.35 before the activities, and the mean was increased to 94.45 after the activities, indicating that the students gained higher leadership skills after participating in the activities.

KEYWORDS: Khon Activities, Leadership Skills

1. IMPORTANCE AND RESEARCH PROBLEMS

"Transformational Leadership" is a new theory for leadership study, or a new paradigm of effective and satisfying leadership skills, as seen in many empirical researches (Rattigorn Chongvisal. 2016: 245). This theory can solve the problem of youth who are familiar with being a follower rather than a leader and lack the confidence to express opinions, especially on issues that differ from others because of fear of being a black sheep. This problem affected their decisions in life, for example, choosing study area for secondary school by following friends' decision results in the problem in the working age after graduation because the work is not in their preferred area, or worse, they cannot complete the study courses.

Leadership skills development in the present includes a variety of techniques, such as group discussion, brainstorming, role playing, team building, and formal practices and training. Specifically, the activities that promote the expression of good leadership behaviors require a form of instruction that focuses on self-actualization, such as team-based learning that requires the participation in all activities. The behavioral expression of leadership is very clear when the learners gather in small groups and discuss the activities together. Most training programs are designed to develop these skills and behaviors. (Rattigorn Chongvisal. 2016: 467-469) One of the suitable stages in leadership skills development is the youth age. (Draft of National Child and Youth Development Plan, 2017-2021. 2560: 4-5) The development of adolescence is rapid because it is the age of finding identity for themselves, ready to change and accept new things. They are able to adjust to the changes and there is a motivation to develop themselves.

The researcher found that promoting leadership skills in youth can be developed through the development of teaching and learning activities where students can freely express their ideas, along with the leadership skills enhancement. The researcher applied a team-based learning process, together with the uniqueness of Khon in the development of the activities. Khon is an activity that must be performed in groups. Students will gain experience, especially life skills including social skills and collaboration skills with others; self-directed learning skills including teamwork skills, leadership-followship skills, and responsibility; and words analyzing skills in order to convey meaning in lyrics. The acceptance in various matters enables the learners to develop leadership skills and gain confidence to undertake future matters, be able to be a good leader and follower, realize their contexts and duties in society. (Supachai Chansuwan. 2017. Interview)

2. RESEARCH OBJECTIVES

(1) To develop Khon activities that promote leadership skills for learners aged 13-15 years old.

(2) To compare the leadership skills of learners before and after participating in Khon activities.

3. CONCEPTUAL FRAMEWORK

The researcher has studied the key elements of Khon, transformational leadership theory, and teambased learning in order to synthesize and create the guideline for the activities.



Diagram 1 Conceptual framework of the research

4. METHODOLOGY

4.1 Research Plan

This study is an experimental research. The researcher conducted a research in one group pretest - posttest design.

4.2 Population and Sample

- Population Students of Chulalongkorn University Demonstration Secondary School, aged 13-15 years old, who did not meet leadership assessment criteria. The selection was based on leadership score of less than 30% out of the total score of 102.
- Sample 20 students of Chulalongkorn University Demonstration Secondary School, aged 13-15 years old, who did not meet leadership assessment criteria. The selection was based on leadership score of less than 30% out of the total score. Parental consent was required to attend the activities.

4.3 Variables

Independent variable: Khon activities

Dependent variable: Leadership skills

4.4 Research Tools

Tools used in the research included:

1. The tool used to measure dependent variable was the Student Leadership Outcome Inventory developed by Saifon Wungsra (2009: 67), adapted from Al-omari's Student Leadership Outcome Inventory (SLOI) (Al-omari et al. 2008: 252). The inventory consisted of 20 situational questions with 5 rating scales:

Very Frequently (5), Frequently (4), Average (3), Sometimes (2), Rarely (1). The answer is limited to only one answer per question.

2. The data collection tool included a Behavioral Observation Form which can be used for behavioral analysis based on Bass's transformational leadership theory. The form consisted of 15 behaviors including knowledge, moral, enthusiasm, emotional control, self-confidence, creativity in work, positive reinforcement, risk sharing with others, give others a chance, listen to others' opinion, acceptance of others' differences, consideration of others' needs, cooperation in solving problems, commitment to the goal, and motivate followers to express opinions and reasons. Each behavior was measured in 3 levels: 1 - less likely, 2 average, and 3 - mostly.

3. Khon activities to promote leadership skills is the activities based on Thai dance (Khon) that analyze Khon's key elements, integrated with transformational leadership theory and team-based learning. There are 5 activities: 1) Get to Know Leadership, 2) Change the Mask, 3) Who Is the Army Activist?, 4) Listen to Differences, Practice with Creativity, and 5) Order and Taking Orders Strategies. The activities were developed by integrating Khon elements into the content and media, as well as the team-based learning and Bass' transformational leadership theory.

4.5 Data Collection

The data was collected from 20 students of Chulalongkorn University Demonstration Secondary School, aged 13-15 years old, with a leadership score of less than 30%, who received parental consent to participate in the activities between 12 June 2017 to 17 July 2017. The total session is 8 sessions, with 100 minutes per session.

4.6 Data Analysis

1. Analyze the appropriateness of the activities by 3 experts. The analysis is as follows:

Activity	Mean	Rating Scale	Suggestions
1. Get to Know Leadership	4.32	Most	Each step of TBL activities should be elaborated to reflect
		appropriate	the learning activities of the learners.
2. Change the Mask	4.49	Most	The feedback process should be enhanced to increase the
		appropriate	promotion of leadership skills.
3. Who Is the Army Activist?	4.38	Most	There should be an exchange between learners and
		appropriate	instructors to enhance the promotion of leadership skills.
4. Listen to Differences,	4.49	Most	Activity's name should be renamed from "Creative
Practice with Creativity		appropriate	Listening to the Differences" to "Listen to Differences,
			Practice with Creativity" because the process is focused
			on listening, then practicing.
5. Order and Taking Orders	4.49	Most	Khon's roles should be assigned as homework and let
Strategies		appropriate	learners memorize and create dance postures by
			themselves.

Table 1: The Appropriateness of Khon Activities to Promote Leadership Skills

From the table, it is found that the experts assessed all activities as most appropriate. The mean was 4.32 - 4.49. The experts also provided suggestions, for example, 1) The feedback process should be enhanced to increase the promotion of leadership skills., 2) Each step of TBL activities should be elaborated to reflect the learning activities of the learners.

2. Analyze the effects of leadership skills before and after Khon activities. It can be summarized as seen in table 2:

Table 2: Leadership score before and after the activities

Experiment	Ν	\overline{x}	S.D.	t.	Sig.
Before	20	24.35	2.519	43.232	
After	20	94.45	2.724	155.082	.000

From the comparison of leadership score before and after the activities, it is found that there were 2 0 participants in the Khon activities to promote leadership skills. The mean of leadership score before participating in the Khon activities was 24.35, with the standard deviation of 2.519. The mean of leadership score after participating in the Khon activities was 94.45, with the standard deviation of 2.724. The mean of leadership score before the participation differed from the score after the participation with the statistical significance at .05 level. Therefore, the leadership score after the participation was higher than the score before the participation.

3. Analyze leadership behavioral observation during the activities.

The researcher applied the complete participant observation each time by observing and recording learners' behaviors during the Khon activities to promote leadership skills. There were 5 activities as follows:

From the behavioral observation after participation in the activity **"Get to Know Leadership"**, it is found that there were 75% of the learners with good knowledge, 55% with good moral, and 75% with enthusiasm. After participation in the activity **"Change the Mask"**, it is found that there were 60% of the learners with good emotional control and 20% with moderate control, 85% with self-confidence, and 70% with creativity in work. After participation in the activity **"Who Is the Army Activist?"**, it is found that there were 70% of the learners with good confidence and risk sharing quality, 85% who give others a chance, and 85% with positive reinforcement. After participating in the activity **"Listening to Differences, Practice with Creativity"**, it is found that there were 90% of the learners who listen to the others' opinions, 80% who accept the others' differences, and 85% who consider the others' needs. After participating in the activity **"Order and Taking Order Strategies"**, it is found that 75% of the learners willing to work together on the choreography, 90% with the commitment to the goal, and 70% who motivate the followers to express their opinions and reasons.

5. RESULTS

1. Development of Khon activities to promote leadership skills consisted of 5 activities: 1) Get to Know Leadership, 2) Change the Mask, 3) Who Is the Army Activist?, 4) Listen to Differences, Practice with Creativity, and 5) Order and Taking Orders Strategies. The researcher began by studying document and researches related to Khon, team-based learning, and transformational leadership theory. Then the activities were draft using the stated elements. The objective of the activities was to provide learners with behavioural elements based on Bass's transformational leadership theory. The primary objectives and secondary objectives of each activity were as follows: "Get to Know Leadership" - The primary objective was to provide learners with knowledge about the leadership characteristics which can be adaptable according to circumstances. The secondary objectives were to provide learners with the enthusiasm to adapt the leadership characteristics according to circumstances, and to provide the learners with the understanding about morality and the application to the leadership role. "Change the Mask" - The primary objective was to keep learners in control of their emotion. The secondary objectives were to provide learners with emotional confidence, assertiveness, and creativity in work. "Who Is the Army Activist?" - The primary objective was to let the learners learn about the cooperation in solving problems. The secondary objectives were to let learners know how to give others another chance through the varieties of army formation experiences, and learn how to provide others with positive reinforcement. "Listen to Differences, Practice with Creativity" - The primary objective was to remind the learners of the needs of others through the practice of uplift posture. The secondary objectives were to let the learners know how to listen to others' opinions, be confident to do the right things, and allow the learners to accept the differences of others. "Order and Taking Orders Strategies" - The primary objective was to provide the learners with the knowledge to use the spoken language for ordering. The secondary objectives were to provide the learners with the opportunity to solve problems together, and encourage them to express their opinions and reasons.

Activities Procedures - The Khon activities to promote leadership skills integrated Khon elements as the content of the activities, as well as the application of team-based learning in 7 steps. Step 1: Assigned readings - Assign reading materials to the learners before the activities; Step 2: Readiness assessment by individual test - Test basic knowledge; Step 3: Group work on simple problems by team test - Knowledge discussion; Step 4: Writing appeals - Examine and summarize key concepts; Step 5: Instructor Input - Instructors suggest or give more advise in unclear issues; Step 6: Group work on complex problems and application of concept - Apply the concepts to analyze complex situations and present the learning outcomes; Step 7: Instructor Feedback - The instructors suggest, evaluate, and reflect the learning outcomes and results of the group process.

Measurement and Evaluation - Authentic assessment was applied, which were behavioral observation during the activities, quizzes, discussion, collaboration, and leadership outcomes after participating in all activities.

Learning Media / Equipment - Appropriate media was used, such as character images from Ramakien, Khon masks and mask images in Ramakien, videos of army marching in Ramakien, the images of the army formation in Ramakien, weapons such as arrows, swords, shields, and halberds, videos and images of the uplift posture in Ramakien's Khon performance, lyrics-conversation in Ramakien, large sheets of paper, coloring tools, and whiteboard markers for presenting knowledge.

2. The comparison of leadership score before and after the participation in Khon activities to promote leadership skills showed that, before participating in the activities, the mean of leadership score was at 24.35. After the activities, the mean was 94.45. The learners' leadership score before the participation differed from the score after the participation with the statistical significance at .05 level: the leadership score after the participation was higher than the score before the participation. From the behavioral observation of the learners during the activities, the leadership behaviors were increased, for example, 2.1) Knowledge of the leadership characteristics which can be adaptable according to circumstances - The behavioral indications for good learners were, for example, presentations, intentions and interests when instructors lecture, etc. 2.2) Morality and application of leadership roles - The behavioral indications of good learners were, for example, fairness in choosing members for a presentation, expressing kindness when the members misspelling or doing mistakes in presentation. 2.3) Emotional control in various situations - The behavioral indications of good learners were, for example, not showing anger or sorrow when there was a mistake in the activities, etc. 2.4) Creativity in work -The behavioral indications of good learners were, for example, having new ideas other than the examples given by the instructors, depicting and drawing emotion on masks in a positive and creative way. 2.5) Confidence and risk sharing - The behavioral indications of good learners were, for example, letting other members be a representative or doing activity together, have trust in others. 2.6) Acceptance of others' differences - It can be seen from the group of learners who treat all friends equally and do not show dislike to friends who are different while doing activities. 2.7) Motivating the followers to express their opinions and reasons - The behavioral indications of good learners were, for example, politely speaking and gesturing to encourage others to express their opinions.

6. DISCUSSIONS

6.1 Development of Khon activities that promote leadership skills for learners aged 1 3 -1 5 years old consisted of 5 activities: 1. Get to Know Leadership, 2. Change the Mask, 3. Who Is the Army Activist?, 4. Listen to Differences, Practice with Creativity, 5. Order and Taking Orders Strategies. These activities were developed using Khon performance's approach: learners must practice the basic principles, which require a lot of effort and training. It was easier for young people to practice and memorize (Supachai Chansuwan. Interview). The activities included key elements of Khon, which were Khon characters, Khon masks, army battles, army formation, uplift posture, scripts, and gesture dances (Thapanee Sungsitivong. 2014: 56). Bass's

transformational leadership theory was also applied: 1) Idealized Influence, 2) Inspirational Motivation, 3) Intellectual Stimulation, 4) Individualize Consideration (Rattigorn Chongvisal. 2016: 253-255).

The assessment of the experts was at the most appropriate level. The mean was 4.32-4.49. The experts also provided suggestions:

1) The feedback process should be enhanced to increase the promotion of leadership skills. The researcher then added feedback process in all activities as step 7: Instructor Feedback, in order to provide suggestions, assessment, reflection, learning outcomes, and results of group processes, such as reflecting learning outcomes through mind map presentation at the end of all activities. The development is consistent with Michaelsen's opinion that, it was the opportunity for the learners to practice workshop training and provide feedback in a timely and precise manner (Michaelsen. 2015: 7). This is also corresponded to Sirasin Fungsakul's that, the feedback made the learners aware of the content they have learned, the application of content, the value of teamwork in the creation of works or the solutions to difficult and challenging problems, and the interaction that effectively encouraged teamwork (Sirasin Fungsakul. 2013: 50). Yukl also has the same opinion that, for the leadership development to succeed, the learners should receive accurate and timely feedback from many sources, and create learning tasks that require analysis process. This can be done by helping the learners track their and their friends' progress. Diagnostic questions, analysis, and reporting may be provided as needed (Yukl, 2010: 425-427).

2) There should be an exchange between learners and instructors to enhance the promotion of leadership skills. The researcher has applied the exchange in step 3 : Group Work on Simple Problems by Team Test - discussion for group testing, and step 4 : Writing Appeals - examine and summarize key concepts. Discussion for group testing was the question-and-answer between the learners and instructors. After the conclusion of the concept, each group will present the concept to the instructors to discuss about the probability. This development is consistent with Pairoj Thongkumsuk's opinion that, in the teaching of Khon, the teachers must be together with the students to see and transfer knowledge and correct the postures. When the learners demonstrate, the teachers must respond to exchange knowledge with them (Pairoj Thongkumsuk. 2006: 85). This is corresponded to Amnaj Sriratanaban's that, the team-based learning process allows each team to review the team's answers. For the question which the team answered incorrectly, but after carefully reviewing and considering the content and the team thought that it was the right answer, or believed that it was the fault of the question itself, the team can request an appeal to the instructors (which encourages critical thinking and reasoning). If the appeal is heard, the team will gain additional points (Amnaj Sriratanaban. 2013: 24).

6.2 For the results of comparison of leadership scores before and after participating in the activities, it is found that, there were 20 participants who participated in Khon activities to promote leadership skills. The mean of the leadership score before participating in the activities was 24.35 with the standard deviation of 2.519. The mean of the leadership score after participating in the activities was 94.45 with the standard

deviation of 2.724. The learners' leadership score before the participation differed from the score after the participation with the statistical significance at .05 level: the leadership score after the participation was higher than the score before the participation. This is corresponded to the transformational leadership theory that, leadership is a quality that has been ingrained since birth and can be developed with techniques, methods, time, situations, etc. in order to clearly accentuate the leadership quality (Rattigorn Chongvisal. 2016: 457). Trairat Pipatpokkapole also expressed similar opinion, "Learning Khon is a way to practice teamwork. Whichever role you get, you must perform it the best you can. All the children have joined in the show and the learning meaningfully. Learn and then perform, develop, practice with friends. They even have a chance to perform on the real stage, with actual recitation and audiences, so they gained direct experience, resulting in mutual success." (Trairat Pipatpokkapole. 2017, Interview) This is also in accordance with the research of Saifon Wangsra (2009: 145) that, after participating in the activities according to the aptitudes and interests of the Conservative Club for the Beautiful World, which was the club that promoted and gave an opportunity for the learners to express leadership skills, and provided activities that trained skills related to leadership development. The leadership skills of both sample groups were increased: the development of the experimental group was higher than the control group. This is in line with the results of Sirasin Fungsakul's research (2013: 69) in teambased learning, which is found that, after participating in the program, the score of the experimental group was significantly higher than the control group at the .05 level.

Leadership development is an ongoing process that takes time to practice. The 21st century society has changed enormously, and leaders face new challenges. The leaders who will succeed in the 21st century need higher skills, better performance, and ability to work with others. Therefore, leadership development in the present day requires the use of techniques, including the creation of the right leadership attitude, as well as the reinforcement of this quality into the basic life style, giving the opportunity for learners to gain experience from the situational activities, in order for the 21st century learners to accumulate the life capital to become a quality leader of the nation in the future.

7. SUGGESTIONS

Only one of leadership behaviors should be selected for development to maximize the effectiveness of leadership development. The activities may cause confusion in leadership behaviors' assessment. It may be necessary to increase the duration of the activities if the learners do not achieve the intended objectives, or take a video while doing the activities and then re-watch them to provide the assessment later.

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STUDENTS' ATTITUDES TOWARDS THE CORNELL NOTE-TAKING METHOD

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ABSTRACT

The aim of this study was to investigate the university students' attitudes towards the Cornell notetaking method. Data were collected from 38 English major students in Bangkok, Thailand. They underwent a training session on how to take the Cornell notes. The data collection was done in September, 2017. The research instruments included a test and a questionnaire. A week after the training, the students were asked to do the tests and answer the questionnaire. Results showed that the majority of the students had positive attitudes towards the method. It was found that the students' note-taking frequency was significantly correlated with the test performance.

KEYWORDS: Cornell note-taking method, Attitudes, English major students, English, Learning strategies

1. INTRODUCTION

Despite the wide-spread use of the Internet and information technology in education, note-taking still remains an essential and effective learning strategy not only for school students but for college and university students as well (Buttrill, Niizawa, Biemer, Takahashi, & Hearn, 1989). However, not all students, including college students, are adequately equipped with learning tools and strategies. Over fifty percent of college educators have reported that their students lacked basic learning strategies (Jairam & Kiewra, 2010). Over the years, several learning tools have been proposed to equip students with effective learning skills, and one of the proposed tools is the use of a note-taking technique.

Note taking is a way to summarize and organize key or major ideas and concepts of the study materials for easy understanding, review, and remembering. Effective notes not only help the students remember concepts and gain a better understanding of a topic, but it also help them develop meaningful learning skills. Several note-taking techniques have been developed such as the mapping method, the outlining technique, the charging method, the sentence method, and the Cornell Method, to cite only a few, with each having its own advantages and disadvantages. Among these various note-taking strategies, the Cornell Method has been and remains popular among college students today. According to Puak and Owens (2011), the Cornell method,

...which was developed at Cornell University almost fifty years ago, has been embraced by countless colleges and universities in the United States and throughout the world. It can be used for taking separate notes, for marking your textbook, and even for annotating electronic texts. (pp. 243-244)

The Cornell note-taking method employs a structural approach to note-taking, yet it is flexible enough to allow individual differences and creativity. It is also relatively simple to do. The exact instruction on how to create an outline given by Puak and Owens (2011) is the following.

First, draw a vertical line down the left side of each page two-and-one-half inches from the edge of the paper; end the line two inches from the bottom of the sheet. This creates the cue column. Next, draw a horizontal line two inches from the bottom of the page. This is the border for your summary area. The large space to the right of the cue column and above the summary area is where you write your notes. (p. 244)

The right column is an area where a summary of the most important ideas are placed or written, while the left area is used for writing keywords related to the ideas in the right column. The last area is used to write a summary of the ideas in the sections above for reviewing and studying the class notes. The following shows how a note organized based on the Cornell Method looks like.



Figure 1 Sections of the Cornell notes

Source: https://www.goconqr.com/en/examtime/blog/4-note-taking-strategies/

Under the Cornell note-taking method, note takers are advised to focus on the information itself, not on its numbering scheme or outline. Learners can take notes in sentence or paragraph form, in lists, as definitions, by adding drawings, mind maps, or by using a combination of these modes. Previous studies reported relationship between note-taking and academic performance. Hamid Reza Haghverdi, Reza Biria,, and Lotfollah Karimi (2010), for example, reported that note-taking strategy instruction significantly affected the students' academic performance.

However, results of research on the use of Cornell method were mixed. Some studies, for example, Quintus, Borr, Duffield, and Napoleon (2012) did not find a significant relationship between the high school students' test performance and their practice of Cornell notes. Jacobs (2008), on the other hand, reported that the Cornell method was superior to the guided method in learning tasks or objectives that require critical thinking and connection of different ideas.

Given the fact that note-taking skills are essential for college students, little research has actually been done to investigate what and how the students think about the method, especially the Cornell note-taking one. The current study was a small endeavour to fill a gap in the research literature on the effects of learning strategies in general and the Cornell note-taking method in particular on English language learning and teaching.

2. RESEARCH OBJECTIVES

(1) To investigate the relationship between the Cornell notes instruction and the students' attitudes towards the Cornell note-taking method

(2) To investigate the relationship between the Cornell notes instruction and the students' test performance

(3) To investigate the relationship between the students' note taking practice in general and their learning outcomes

3. RESEARCH FRAMEWORK

The students were given a set of instruction on the Cornell note-taking method. The lesson included the topics on the rationale behind the use of the method, the method of how to take the notes, and the practice. The instruction was given during the fourth week of the semester. On week five, the students were given a test on the subject matter relevant to the subject (theories on English language teaching). The students were also asked to answer the questionnaire on their attitudes towards the method.



Figure 2 Research Framework

4. RESEARCH METHODOLOGY

4.1 Research Design

This study is an action or exploratory research and its design is a mixed research design between one-group post-test only design and a survey design. The research design of the study is the one group post-test only design.

4.2 Participants

The participants were 38 English major students currently enrolled in a course titled *Introduction to English Language Teaching* (EN 391), a major elective course offered at one of the private universities in Bangkok, Thailand. The majority of the participants were fourth year students.

4.3 Variables

The dependent variables were the students' test result and their attitudes. The independent variables were (1) their note-taking frequency, and (3) the instruction on Cornell note-taking method.

Independent variables:

dependent variables

Note-Taking Practice (general)

The Cornell Note Taking

----→ students' test performance ----→ students' attitudes

4.4 Research Instrument

The instruments were the questionnaire and the test. The questionnaire comprised of both open-ended and close-ended questions, asking them to identify their gender, note-taking frequency, attitudes towards the Cornell note-taking method. The two open-ended questions were used to probe into their perception of the method as well as their previous note-taking techniques. The test was comprised two parts: (1) Short-answers, and (2) Multiple-choice items. The test was an integral part of the course which accounted for 5 percent of the total course evaluation. The Cornel Note-taking method aims to help students comprehend the study material—the main idea and the detail.

4.5 Data Collection

The data were collected in September, 2017. The total of 38 students underwent an instruction on the Cornell note-taking method. The course entailed two sessions per week, each was 90 minutes long. The instruction entailed a one session on how to take the Cornell notes facilitated by the researcher. In addition, the students also watched a short video presentation available on Youtube by Jennifer DesRochers. This session was done both in the classroom and as homework. After the instruction, the students were asked to practice taking notes by reading a lesson on the role of attitudes and motivation on foreign language learning, in addition to normal classroom practice. During the second session of the following week, they were asked to do the test and answer the questionnaire. The table below summarized the intervention, spanning over the period of two weeks..

	Table	1	The	intervention
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Session (Time)	Activity
1(00 Minute)	Classroom instruction on how to take the Cornell notes +
I (90 Minutes)	Watching video + practice (Homework given)
2 (90 Minutes)	Practice + Discussion
3 (90 Minutes)	Practice
4 (90 Minutes)	Students answered the questionnaire and the quiz questions

4.6 Data Analysis

The data collected were analyzed using basic statistical techniques: frequency, percentage, mean, standard deviation, and Pearson product-moment correlation. The qualitative data were analyzed using content analysis.

5. RESEARCH FINDINGS

The findings were as follows:

 Table 2 Note-taking Frequency

Statement	Rarely	Occasionally	Sometimes	Usually	Almost Always
How often do you take			21	10	7
notes when you study?			(55.30%)	(26.30%)	(18.40%)

From Table 2, the majority of the participants (55.30%) indicated they sometimes took notes when they studied. This was followed by ten students (26.30%) indicating that they usually took notes, and by seven student or 18.40% reporting that they almost always took note, respectively.

Table 3 Attitudes towards the Cornell note-taking method

	Mean	Strongly	Disagree	Undecided	Agree	Strongly
Statement	(SD)	Disagree				Agree
I like Cornell note-taking	3.94	1	1	5	23	8
method.	(.83)	(2.60%)	(2.60%)	(13.20%)	(60.50%)	(21.10%)
The Cornell note-taking	3.92		1	8	22	7
method helps me learn better.	(.71)		(2.60%)	(21.10%)	(57.90%)	(18.40%)
The Cornell note-taking	4.02		2	4	23	9
method helps me in	(.75)		(5.30%)	(10.50%)	(60.50%)	(23.70%)
remembering and						
understanding main ideas.						

Statement	Mean	Strongly	Disagree	Undecided	Agree	Strongly		
	(SD)	Disagree				Agree		
The Cornell note-taking	3.84		1	10	21	6		
method helps make my	(.71)		(2.60%)	(26.30%)	(55.30%)	(15.80%)		
learning more effective.								
The Cornell note-taking	3.86		2	7	23	6		
method is an effective	(.74)		(5.30%)	(18.40%)	(60.50%)	(15.80%)		
learning technique.								
Average	3.92 (.65)							

Overall, the students had positive attitudes towards the Cornell note-taking method. Most students (81.60%) agreed and strongly agreed that they liked the method. Most of them (76.30%) also agreed and strongly agreed that the method helped them to learn better. Many students mentioned that the Cornell note-taking method helped them to remember and understand the main ideas. The majority of the students (71.10%) agreed and strongly agreed that the method helped make their learning more effective. The majority of them agreed that it was an effective learning technique.

Table 4 Correlation between note-taking frequency and the quiz result

Variable	Quiz Score	Note-taking Frequency
Quiz Score	1.00	.36*
Note-taking Frequency (Generic)	.36*	1.00

*. Correlation is significant at the 0.05 level (2-tailed).

There was a significant positive correlation between the students' quiz score and their note-taking frequency. The correlation was significant at .05 level. The graph below shows the scatter plot of the students' quiz performance and their attitudes toward the method.



Figure 3 Scatter plot between the students' note-taking frequency and the test score

Results from the open-ended questions

The students were asked to respond in writing to the two questions: (1) Prior to your learning of how to use the Cornell note-taking method, what method of note-taking have you been using?, (2) How has the Cornell method been helpful to your learning? The students responded to the first question as follows.

Cited Method	Frequency	Percentage
My own personal note-taking method.	9	21.95
Never use any method or technique	6	14.63
Taking notes of only the main ideas or keywords	5	12.19
Taking notes from the PowerPoint slides (Follow the	4	9.75
Doing mind-mapping	3	7.31
Summarizing main ideas	2	4.87
Taking notes of the main points and important details	2	4.87
Using symbols and shapes, arrows + main ideas	2	4.87
Arranging the notes into topic and subtopics	1	2.43
Taking notes in the notebook and textbook	1	2.43
Using the single-page note-taking technique by Toyota	1	2.43
Taking notes by using different colors to organize	1	2.43
Taking notes of the main ideas; then classifying them into	1	2.43
Jotting down what I saw or heard; mostly short expressions	1	2.43
Writing down main ideas, key words, sometimes	1	2.43
Listing main ideas or key words	1	2.43
Total	41	100

Table	5 Note-taking	methods pric	or to the int	roduction of	the Cornell method
		, <u>.</u> .			

As seen from the above table, the students did use some kind of note-taking technique, even though the technique might not have been employed in full form. The majority of the students used their own method of note taking based on their own understanding, and this may suggest that the majority of them might have never been explicitly taught how to properly take notes. Some of them mentioned using a mind-mapping method. One student said that he has used the Toyota method, which he acquired through self-learning.

Cited Benefits	Frequency	Percentage
My notes are better organized; clean and easy to follow.	8	13.11
I could better systematize my notes (e.g. classification)	7	11.47
I could take more organized notes; helpful for reviewing.	7	11.47
The Cornell note-taking method has sections; so it is easy	6	9.83
The method helps me to better understand the content.	5	8.19
Better than just taking notes; easy to understand	4	6.55
The method is useful, as it helps me to better recall the	4	6.55
The method helps me to take notes of more specific details.	3	4.91

Table 6 Benefits of the Cornell note-taking method

Cited Benefits	Frequency	Percentage
I could better see the details and information.	3	4.91
The method helps me better summarize the main ideas.	3	4.91
Compared to my previous notes, the Cornell method helps	3	4.91
The Cornell note-taking method enables me to learn and	2	3.27
I can better grasp the main ideas of the lesson or text.	2	3.27
It depends on an individual learner (The method is not	1	1.63
It helps me to see the overall picture of my understanding	1	1.63
The method makes note-taking more complex; it's hard to	1	1.63
The method helps enhance my learning performance.	1	1.63
Total	61	100

The majority of the students said that the Cornell note-taking method helped them to better organize their notes, as written by one student, "The Cornell method helps me to classify the ideas, making my notes more organized." Some of them said that the method helped them to better remember and recall the content. The more recurring words expressed by the students were: "easy to understand", "systematic', categorize". In short, most of the students perceived the method as a useful tool to help them learn better.

6. DISCUSSION

The following are the discussions.

Cornell note-taking was positively perceived by the students under the study. The average of their attitudes was as high as 3.92 with the standard deviation of .65, which showed that their attitudes was at a high level. The majority of the students liked the method, perceiving it as being helpful and effective. The qualitative data also point to the same direction. Their attitudes reflect one of the strengths of the Cornell note-taking method, that is, a systematic approach of recording information for academic purposes.

We have revealed the significant relationship between the students' note-taking frequency (general note-taking) and the results of their test performance. This finding confirms the findings of previous studies, for example, the one conducted by Hamid Reza Haghverdi, Reza Biria, and Lotfollah Karimi (2010), which found that note-taking influenced academic achievement. However, taking notes is not an end in itself; it must be accompanied by other learning process like questioning, reciting, revising, and critical reflection (Puak, 1989; Puak and Owens, 2011).

The students cited several benefits of the Cornell note-taking method. It helps them to better organize their notes and understand the content. It also provides the learners an opportunity to get back to their notes and engage in higher-order cognitive activities, as mentioned by one of the students: "The Cornell note-taking method helps me to learn and analyze the information as I am taking notes." This realization echoed what Puak and Owens (1989) call active note-taking. Students learn as they take notes and when they review their notes (Bohay, Blakely, Tamplin, & Radvansky, 2011)

The Cornell note-taking method has a feature that is conducive to second/foreign language learners. The bottom of the page requires that the students sum up the content or the lesson using their own words. This necessitates the learners to make extra efforts to come up with words of their own. Through the process, the leaners have acquired to ability to summarize the content.

Our findings seem to suggest that the majority of the university students did not take note-taking seriously, some of them did not take notes on a regular basis. As shown, the majority of the student participants (55.30%) said they sometimes took notes when they studied. Ten of them (26.30%) said they usually took notes. Only seven of them (18.40%) almost always took notes. Many students said that their note-taking was not systematic. One student said: "I only write down the main ideas. My notes are not systematic." Another student mentioned that his notes follow no principle. He just jotted down the main ideas. Most students took notes based on their own experience. As note-taking and lesson reviewing are essential for college education, they should be explicitly taught and reinforced, especially in the context of English language learning.

7. RECOMMENDATIONS

Based on the findings, the researcher would like to offer the following suggestions.

(1) University lecturers should not assume that their students already know how to take notes. The students should be taught how to take effective notes such as the notes under the Cornell method as well as other learning strategies.

(2) Further research should investigate the quality of the students' note-taking skills as well as the effects of Cornell notes on their learning achievement.

(3) Since there is a limitation in the present study regarding the length of note-taking practice and the number of students, it is recommended that a study with extended practice time of the Cornell Method and their test performance and attitudes should be conducted.

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VARIATIONS IN THE PATTERNS OF FISH FINGERLING ABUNDANCE IN THE NA THAP TIDAL RIVER OF SOUTHERN THAILAND

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ABSTRACT

The aim of this study is to investigate the pattern variation of the abundance of fish fingerling based on month, year and sampling site. Monthly data from June 2005 to October 2015 were obtained from the Na Thap tidal river of southern Thailand. In order to maintain the normality of the fingerling data, the square root transformation was used. Factor analysis was then applied for clustered number of fingerling species and multiple linear regression was used examine the association between fingerling abundance and year, month and site. The results from the factor analysis were used to classify the fish fingerling into 3 factors which were based on saline preference; saline water, freshwater and ubiquitous fingerling species. There was a statistically high significant relation between fingerling abundance, month, year and sampling site from the results obtained with abundance of saline water and ubiquitous fingerling abundance showing similar pattern. To sustain fish population management, factor analysis and general linear regression methods can be used as an effective tool in the prediction and monitoring of wild fish fingerling.

KEYWORDS: Fish fingerling abundance, pattern variation and linear regression

1. INTRODUCTION

The food and Agriculture Organization predicts that by 2022, fishery production worldwide will plummet to 181 million tons and 161 million tons would be consumed by humans (FAO, 2012). This is as a result of most people's dependence on aquatic animal's consumption purposed which largely includes fishes.

There are important predictors for fish recruitment, which includes fish birth, survival and the rate of catch among fish population in the various water bodies (Hilborn and Walters, 1992). Productivity increase in the aquatic ecosystem is dependent on the abundance and species composition of fish fingerlings. Moreover,

future forecasting of fish stock can be done using the amount of fish fingerling variation. From the year 2000 to 2003, Thailand had an annual average per capital consumption of fish of 30.9 kg which was higher than the average fish consumption worldwide. This shows that in Thailand, there is a high demand of fish for consumption (FAO, 2008). Many research works have been found with studies on the prediction of fish catch in territorial waters of Thailand.

However, other researchers have used linear regression (Fausch et al, 1980), multivariate analysis and ARIMA model (Precio et al., 2006) and multiple regression (Hilborn and Walters, 1992) for the prediction of fish fingerling. Multiple and linear regression models are usually used to strike the relation between independent and outcome variables. Multivariate analysis and Autoregressive integreated moving average (ARIMA) models. However, are used generally to describe the effectiveness of the data with decreasing weight or the averageing of past observations. Distinctively, an ARIMA model can be used in the construction of historic autocorrelation of data (Venugopalan and Srinath, 1998). In tidal revers, however, not many studies have been done in the prediction of wild fingerling pattern using three ecosystems. Therefore, the aim of this study is to investigate the variations in the pattern of the spatial and temporal trend in the abundance of fingerling as a way of developing as appropriate statistical model. This model can be used a tool in aquatic animal monitoring and assess.

2. MATERIAL AND METHODS

In this study, the Na Thap tidal river which is 26.5 km in length was used as the sample area. The range of mountains adjacent the Thailand-Malaysia border serve as a source of the river and this travels through Na Thawi and Chana district in Songkhla province forming a large estuary exiting into the Gulf of Thailand. The river also produces aquatic flora and fauna with three aquatic ecosystems, which are saline, brackish and freshwater. Covering a stretch of 7.5 km in upstream, the freshwater ecosystem in mainly used for peat swamp forest and agriculture. The downstream are comprises of household settlements, fishing port and shrimp farm. In this study was collected monthly by surrounding net from 10 sampling sites along the Na Thap River from June 2005 to October 2015. The samples were counted and as classified in taxa per 1,000 cubic meter of water volume. Fifty-eight species of fish fingerlings were obtained together with 1,220 observations from 10 stations.

2.1 statistical analysis

The study used fingerling abundance as the dependent variable whiles month, year and sampling site were considered to be the independent variables. Square root transformation was then used for satisfied normality distribution (before using factor analysis). The strengths of the relationship between fingerling in each species were identified and tested using Pearson's correlation. Factor analysis was deployed to group 58 numbers of fingerlings into 3 interpretable factors based on maximum likelihood method. Species with high correlation were grouped into the same factor. The factor analysis provided loading score for individuals and

selected the highest score in each species. After using the factor analysis, factor scores were calculated from the sum in each species of fingerling in each month, year and sampling site.

For the model assessment, r-square value and normal Q-Q plot were evaluated. The linear models were investigated by using the relationship between sum of species of abundance fingerling species in each factor by month, year and site.

$$f_{iik} = m + a_i + b_i + c_k + e$$

In the model, f_{ijk} is the sum of fingerling abundance in each factor, μ is the overall mean, α is the coefficient for month of the calendar *i* (January = 1, February = 2, ..., December = 12), β is the coefficient for year *j* (2005, 2006,, 2015), *C* is the coefficient for the data collection sampling site *k* (1,2,...,10) and *e* is the error from the model. All of the statistical analysis and graph were performed by R program.

3. RESULTS

3.1 Preliminary analysis

In Figure 1, the Q-Q plots of square root of fingerling weight in populated samples are shown. Three different colors of circles for three different species categories are shown in the graph. Saline water species is represented using a brown color, blue color is for freshwater and yellow color is for ubiquitous fingerling. The circle sizes denote the average fingerling occurrence in each species and a normality distribution shown in the graph. Saline water species is represented using a brown color, blue color, blue color, blue color is for freshwater and yellow color is for ubiquitous fingerling. The circle sizes denote the average fingerling occurrence in each species and a normality distribution shown by the Q-Q plot (black color). In Figure 1, more than half of the species are shown which presents the normal distribution after the square root transformation is applied. The blue bar shows the prevalence of fingerling in each species based on its well-known name.



Figure 1 The abundance and distribution of fish fingerling during study period

The correlation matrix of 58 different species of fish fingerling abundance is shown in Figure 2. The color Gray, red and yellow explain the positive, negative correlation and the correlation of itself, respectively. The figure shows three groups by the size of square; biggest, medium and smallest group that represents the saline water, freshwater and the ubiquitous fingerling abundance respectively.



Figure 2 Bubble plot correlation matrix of fish fingerling abundance

3.2 Results from models

In order to examine the association between abundance and the environmental factors, multiple linear regression model was applied. A model assessment was done by creating a studentized residuals which were displayed in Figure 3. The r-squared value for saline water fingerling abundance (87.3%) and fresh water fingerling abundance (86.4%) are nearly closed and higher than ubiquitous fingerling abundance (51.3%).



Figure 3 Studentized residuals plots from the linear model for three aquatic ecosystems

Figure 4, shows the results from the model using 95% confidence interval for the three factors. The pattern distributions of fingerling in months, years and sampling sites are shown in the three sub figures. The overall mean of fingerling is represented using the red horizontal line. The capital letter of each month is used for identification with J as January, F as February, M as March, etc. There was a similar pattern among the fish fingerling abundance in the three aquatic ecosystems. From 2005 to 2011, the fish fingerling abundance was lower than the overall mean, which until 2015 sharply increased to higher the overall mean.

From February until April, the saline water fingerling abundance was higher than the overall mean and this gradually decreased until December. On the other hand, the freshwater fingerling abundance was lower than the overall mean from January to May. This increase continued until December. The ubiquitous fingerling abundance fluctuated throughout the year.

The maximum peak for saline water occurred in estuarine zone at site 1 to site 3, which then decreased slowly in the upstream until site 10. The ubiquitous fingerling abundance was higher than the overall mean until site 1 to site 5 which then decreased to a value less than the overall mean until site 10. Fish fingerling for freshwater was not found at saline water area, but some were found from site 5 to site 10 with site 8 and 10 having the highest.



Figure 4 Pattern distributions of fish fingerling abundance in three aquatic ecosystems by month, year and sampling site

4. DISCUSSION AND CONCLUSION

The 58 species of fingerling abundance were reduced into 3 interpretable factors based on saline preference including saline water, freshwater and ubiquitous fish fingerling after using factor analysis. The results were consistent with the characteristics of their habitat in the ecosystem.

There was a good fit with the saline and freshwater fingerling as shown by the model whiles the ubiquitous fingerling presented a poor fit. There was an increasing trend during the summer and decreasing trend during the rainy season among the saline fingerling abundance. These happenings were in contrast with the trend of freshwater fingerling abundance. In April, the saline water fingerling abundance was the highest.

This was as a result of tropical monsoon effect. The finding was consistency with a previous study about the prediction of standing crop using lagged fingerling abundance of freshwater fish Saheem (Saheem *et al.*, 2014) and the fish catch in the Songkhla (Chesoh and Lim, 2008). Again, standing crop in weight and fish fingerling densities of freshwater fish species were found to be at maximum levels during heavy rainy seasons during November and December (Angsupanich and Rakkheaw, 1997). The ubiquitous fingerling was increasing and decreasing most of the time and may be as a result of different habitat preference of various ubiquitous fingerling species exhibiting fluctuations in moving between upstream and downstream with some migrating into and out of floodplain. Additionally, during the dry seasons, the seasonal effects of high percentage estuarine fish species were found. In a tropical lagoon in South-West Nigeria, freshwater fish species were also found during the wet seasons in tropical lagoon (Olukolajo and Oluwaseun, 2008).

The three aquatic ecosystems of the Na Thap tidal river showed a systematic pattern of three fish fingerling clusters which were based on the preference of their habitat throughout the year. Overall fish fingerling abundance (2005-2011) was less than average, while there was an increase in the level of fingerling abundance from 2012-2015. The abundance of fingerling shows the same pattern in saline-preferred fingerling and ubiquitous, which appeared to be the highest fingerling densities that occurred in downstream to middle zone of the river which is saline to brackish water. However, in the upstream or freshwater ecosystem the high freshwater fingerling abundance can be found. Some environmental factors including water quality parameters, fishing ability and ecosystem functional association to fingerling behavior, are not considered even though the model fits well.

It can be concluded that the abundance of fingerling number was found to be in association with month, year and sampling site and thus varied by distinct habitat preferences. In order to sustain fish population management, factor analysis and general linear regression methods can be used as an effective tool in the prediction and monitoring of wild fish fingerling.

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COMPARATIVE ANALYSIS OF DATA MINING TECHNIQUES FOR FINDING MODEL PREDICTION OF SOFTWARE PROJECT RISK MANAGEMENT

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ABSTRACT

Software project risk management is a critical issue. Common risks in software project management include inherent schedule flaws, requirements inflations, employee turnover, incomplete specifications and conflicting requirements, and poor productivity. In order to manage the risks properly, a model prediction must be determine by an effective technique. This research studied comparative analysis of data-mining techniques, i.e. decision tree, rule-based, Naïve Bayesian and KNN (K-Nearest Neighbor) techniques for finding model prediction of software project risk management. The comparative analysis performed in six steps: 1) Population and group sampling to apply in research; 2) Tools for information gathering; 3) Information gathering; 4) Information analysis; 5) Analysis tool; and 6) 10-fold cross-validation. The results showed that the decision tree and rule-based techniques were the accurate techniques for model prediction of software project risk management.

KEYWORDS : Comparative technique, Data mining technique, Software risk management, Model prediction

1. INTRODUCTION

Software project risk management is a critical issue. The intangible nature and uniqueness of software such that it is the difficult to estimate and setting up schedule accurately. To avoid this type of risk, the project manager must get the team more involved in planning and estimating, and get early feedback and address slips directly with stakeholders. Functional and non-functional requirements are required. As the project progresses more and more features that were not identified at the beginning of the project emerge that threaten estimates and timelines. Thus constant involvement of customers and developers are required to avoid the requirements

inflation. Turnover of key employees is a critical risk for software project management. When Key personnel leave the project taking critical information with them causes significantly delays the project. Therefore, the project manager must Increase collaboration and information sharing on the team. Incomplete specification and conflicting requirements can cause problem when coding and integration software. To avoid this type of risk, a dedicated product manager is required to make critical trade off decisions. The long project timelines may cause poor productivity since the sense of urgency to work in earnest is often absent and resulting to time lost in early project stages. To avoid this type of risk, the software project should be planned as short iterations, right people on team, coaching and team development.

In addition to the risk of project work, there is a risk that there may be a problem with the implementation of the project [1]. As a consequence of the risk event, it may damage and impede the operation of the project, which may lead to the failure of the project. For this reason, risk management of software projects based on modern management approaches [2] is often divided into components of software project management that enables the project to respond to the need for a strategic or organizational level of organization, which is project governance based on obstacles or threats that can be expected, pre-estimation or management of a professional, and experienced in project management.

Businesses organizations today are learning to use data mining to predict the probability of every day's potential data to control and prevent potential future risks. These predictive data are used to improve the system or design new ways of working, managing software projects, or reducing the impact of risk to an acceptable level to diversify risk. By transferring the risk to everyone, they may be responsible for the risks that may arise. However, the purpose of data mining is about risk management. The software project management under the terms of decision, including the budget and time restrictions have the opportunity to software project management errors up to 28% of the demand and the damage that could be caused by leakage of information or unavailability of equipment. And the various organizations or software project management has a chance to succeed in project management at the average of 72% of data mining in this. This paper covers the literature review and relevant researches in section 2, research methods in section 3, result and conclusion in section 4.

2. LITERATURE REVIEW

In our study, we reviewed the principle of software project management, relevant researches.

2.1 Software Project Risk Management.

The overall purpose of risk management is to determine the risk identification to make risk analysis, risk planning, risk monitoring and risk resolving. However, the risk management is about understanding the risk events, assessing their impact on the project, determining the best way to deal with them, developing and executing a plan and monitoring progress.

Risk identification concerns exploration which risk has resulted in the unsuccessful works with goals and objectives including of classifying which risk can make the mistake or make what type of mistake by using the table of Matrix or write in risk statement to specify the risk causes. Risks identification must be related to strategic objectives: risk management committee; participants and riskers by using risk self-assessment; and operational seminar meeting.

Risk analysis concerns assessment and determining the likelihood or the probability that the risk will result in a loss, the impact or the size and cost of that loss if the risk turns into a problem, and the timeframe when the risk needs to be addressed (i.e., risk associated with activities in the near future would have a higher priority than similar risks in later activities)

Risk Monitoring concerns monitoring of the current status of the risks and the measures defined, metrics can be specified for risks. These metrics can be quantitative, such as the probability of occurrence or effort for and cost of control measures. But they can also be qualitative, e.g. an appraisal of project staff's motivation

Risk implementation as a rule, two types of methods are used for identifying risks. Firstly, brainstorming methods, which activate the project staff's creativity. And secondly, there are a variety of risk checklists comprising the typical project risks. These checklists can be used in group or one-to-one discussions to identify risks. One very well-known checklist is the "Taxonomy-Based Questionnaire" [1], containing 194 questions, which are divided into various categories, i.e.: Product Engineering (requirements, design, code and unit test, integration and test, engineering specialties); Development environment (development process, development system, management process, management methods, work environment); and Program constraints (resources, contract, program interfaces)

Risk mitigation is general guidelines for applying risk mitigation handling options. These options are based on the assessed combination of the probability of occurrence and severity of the consequence for an identified risk. These guidelines are appropriate for many, but not all, projects and programs. Two options for risk handling are: (1) Assume/Accept for acknowledging the existence of a particular risk and make a deliberate decision to accept it without engaging in special efforts to control it but the. approval of project or program leaders; (2) Avoid for adjusting program requirements or constraints to eliminate or reduce the risk that could be accommodated by a change in funding, schedule, or technical requirements;
2.2 Related Research

The risk management of software projects in [3], from the Series 1 and Series 2 showed the business damage, reducing the possibility of damage to the business, and the decrease. The analytical result for risk management in the first and second when applied dataset found that the executives of software project had knowledge about risk management in moderate level with averages of 0.61 or 61 percent and for the second and third dataset, it was found that the executive of software project has the knowledge about risk management in moderate level with averages of 0.61 or 61 percent and for the second and third dataset, it was found that the executive of software project has the knowledge about risk management in moderate level also with averages of 0.65 or 65 percent. Thus, according to the comparison result of Table 4.5 - 4.6, the risk management of software projects by the Series 1, Series 2 and Series 3 found that the business will be damage, reducing the possibility of damage to the business, and decrease. The uncertainty of the upcoming and reduce forecast error. The moderate knowledge level is 76 percent and 55 percent respectively. Nevertheless, in the future research, it might bring the technique of Decision Tree, Rule-based and KNN to make comparison for finding the suitability of technique for predicting the software risk management.

Enterprise software project management [4] for the prediction of risk management Risk identification, the Risk quantification, the Risk response development, the Risk control and Risk documentation of software project management under the terms of the decision, including the budget. And time restrictions that corporate executives have the opportunity to software project management errors up to 28 percent of the demand and the damage that could be caused by leakage of information or unavailability of equipment. And the various organizations or software project management has a chance to succeed in project management at the level of 72 percent. The data mining of Naïve Bayesian is made for predicting the software risk management. Moreover, this analyzing is suited for making data classification by using the technique of Naïve Bayesian. Then, with making the certain accurate result, it is based on the attribute and class by analyzing to improve and edit to have more accurate results, especially for class to predicting for a lot of information. Therefore, it should increase much information to be tested although Algorithm has the simple pattern without the complexity to analyze information. However, this technique is suited with using with not many instance numbers of information. Applied Rule - Based to make the finance categories by gathering from online. in other phase to risk management, can divide into the groups from the newspaper as Positivity or Negativity to calculate each overall validity for news. Then, according to the new analyzing result, it has represented of the finance validity with Rule-Based for 75.6 percent.

Applied Naïve Bayesian to classify the document news in groups and then use Naïve Bayesian to calculate for finding the feasibility of words in each content news type [5]. Later, it will find the most feasibility classification result of each news group properly with the learning information set has made the comparison to use the information losing management technique from data mining with classification.

The risk management of software projects of the business will damage, reducing the possibility of damage to the business, and decrease.[6] the analyzing result of risk management in the first and second Data

set to apply, it was found that the executives of software project has the knowledge about risk management in moderate level with averages of 0.61 for 61 percent and the second and third Data set, it was found that the executive of software project has the knowledge about risk management in moderate level also with averages of 0.65 for 65 percent. Thus, the uncertainty of the upcoming and reduce forecast error at moderate level in 76 percent and 55 percent respectively.

3. RESEARCH METHOD

This research employed data mining techniques to process data for predicting information using 5 datasets. According to the risk management information, it consists of the followings: risk implementation, risk identification, risk analysis, risk mitigation and risk monitoring with these operational steps: 1) Population and group sampling to apply in research; 2) Tools for information gathering; 3) Information gathering; 4) Information analysis; 5) Analysis tool; and 6) 10-fold cross-validation.

3.1 Population and group sampling to apply in research

- Population used in this research are 225 executives of software project who are member the software industries associations of Thailand.
- 2) Group Samplings size is 144 according to Taro Yamane formulation
- Methods of group sampling selection by using the specific selection with these standards
 - 1. Selecting the targeted subject field by the group of executives in software project with having

knowledge and capacity of quality software management or software engineering

2. Selecting the group sampling numbers from the field of computer science in branch of

software engineering by letting them to fill in the surveys to gather information and make assessment further

3.2 Tools for information gathering

Tools to gather information is the survey questionnaires to collect information for analyzing the maturity results of risk management. It is online surveys to bring the information for assessment and to analyze information from the respondents obtained from the online surveys.

3.3 Information gathering

Gathering information in quantity research is to bring the results of surveys from the executives of software project to analyze and perform assessment of knowledge and capacity for the executives in software project. And compare with the standard levels of software engineering by using the assessment and analyzed information from the respondents in the online surveys.

3.4 Information analysis

The data collected from the researcher must be data from the researcher for statistical purposes. It can also answer the research problem by analyzing the data in the first step. The data from group sampling may then be used to calculate the statistics and may be used to find the answers of the sampling group. As a result, the data can be summarized or synthesized to produce results.

3.5 Analysis tool

Weka (Waikato Environment for Knowledge Analysis) program: Developed in 1997 by the University of Waikato, New Zealand is used as analysis tool. It is a successful freeware type under the GPL License. The Weka program was developed from the Java language. It is written with emphasis on machine learning and data mining. The program consists of sub-modules for data management that use the Graphic User Interface (GUI) and command to run the software in many operating systems. It is a data mining tool that embraces many algorithms. The algorithm can be used directly from two paths, from a set of algorithms, or chosen one that was written into a set of additional tools. The toolbox has functions for data processing including: Pre-processing, Classification, Regression, Clustering, Association rules, Selection and Visualization, as shown in figure 3.1.



Fig 3.1 Weka GUI Chooser [7]

3.6 10-fold cross-validation

10-fold cross-validation is model for performance testing to yield reliable results. Cross-validation model divide data into several parts, e.g. for 5-fold cross-validation divides data into 5 parts, each with equal quantity, or 10-fold cross-validation divides data into 10 parts. After each part has the same amount of data, then one of the data will be used as the model's performance tester.





For example, according to figure 3.2 the data was divided into five equal parts for training, then use for testing the performance of the model 10 times.

- Round 1: [R1] uses sections 2,3,4 and 5 to model and use model data to test.
- Round 2: [R2] uses data sections 1,3,4 and 5 to model and use the data model Part 2 to test.
- Round 3: [R3] uses data sections 1,2,4 and 5 to model and use model data to test the data
- Round 4: [R4] uses data sections 1,2,3 and 5 to model and use model data to test the data.
- Round 5: [R5] uses part 1, 2, 3 and 4 to model and use data model 5 to test.
- Round 6: [R6] uses sections 7, 8, 9 and 10 to model and use the data model Part 2 to test.
- Round 7: [R7] uses data sections 6, 8, 9 and 10 to model and use model data
- Round 8: [R8] uses data sections 6, 7, 9 and 10 to model and use model data to test the data.
- Round 9: [R9] uses data sections 6, 7, 8 and 10 to model and use model data to test the data.
- Round 10: [R10] uses part 6, 7, 8, and 9 to model and use data model 10 to test.

4. RESULT

Figure 4.1-4.5 showed details resulted for each technique. Each figure showed comparative report for the following perspectives: risk identification; risk analysis; risk mitigation; and risk monitoring for basic software project risk management policy. The comparative analysis was based on Decision Tree, Rule-Based,

Naïve Bayesian and KNN techniques. The comparison concerned the precise prediction by considering of correctly classified, precision, recall, F-Measure and ROC Area.









Fig.4.1 Risk implementation



Fig 4.4 Risk mitigation

Fig 4.3 Risk analysis



Fig 4.5 Risk monitoring

Figure 4.1 showed the analytical result for risk implementation of four data mining techniques, Decision Tree, Rule-Based, Naïve Bayesian and KNN. It was found that the Rule-Based technique yielded the correctness result at 92 percent, while the Decision Tree at 86 percent, the Naïve Bayesian at 86 percent, and the KNN at 82 percent.

Figure 4.2 showed the analytical result for risk identification of four data mining techniques, Decision Tree, Rule-Based, Naïve Bayesian and KNN. It was found that the Decision Tree technique yielded the

correctness result at 71 percent, while the Ruled-Based at 71 percent, the Naïve Bayesian at 69 percent, and the KNN at 84 percent.

Figure 4.3 showed the analytical result for risk analysis of four data mining techniques, Decision Tree, Rule-Based, Naïve Bayesian and KNN. It was found that the Decision Tree technique yielded the correctness result at 89 percent, while the Ruled-Based at 89 percent, the Naïve Bayesian at 51 percent, and the KNN at 62 percent.

Figure 4.4 showed the analytical result for risk migration of four data mining techniques, Decision Tree, Rule-Based, Naïve Bayesian and KNN. It was found that the Decision Tree technique yielded the correctness result at 79 percent, while the Ruled-Based at 62 percent, the Naïve Bayesian at 68 percent, and the KNN at 79 percent.

Figure 4.5 showed the analytical result for risk migration of four data mining techniques, Decision Tree, Rule-Based, Naïve Bayesian and KNN. It was found that the Decision Tree technique yielded the correctness result at 81 percent, while the Ruled-Based at 62 percent, the Naïve Bayesian at 64 percent, and the KNN at 79 percent.

The best method, with values of correctness, precision, recall, F-Measure and ROC Area for each dataset, was summarized in table 4.1.

Data Set	Best Method / Model	Correctness	Precision	Recall	F-Measure	ROC Area
risk implementation	Rule-Based: R5	92.00	0.92	0.92	0.92	0.96
risk identification	Decision Tree: R5	71.00	0.71	0.71	0.71	0.70
risk analysis	Decision Tree: R2	89.00	0.89	0.89	0.88	0.93
risk mitigation	Decision Tree: R5	79.00	0.79	0.79	0.80	0.76
risk monitoring	Decision Tree: R2	81.00	0.81	0.81	0.83	0.90

 Table 4.1 to make comparison of the most accurate technique ordering with each model

The best method, with values of correctness, precision, recall, F-Measure and ROC Area for each dataset, was summarized in table 4.1. According to table 4.1 the Rule-Based technique was appropriate for risk implementation while Decision Tree technique were suitable for risk identification, risk analysis, risk migration, and risk monitoring.

5. CONCLUSION AND DISCUSSION

This research conducted a comparative analysis of data-mining techniques for finding a suitable model prediction for software project risk management. The data used were collected from respondents who are

members of the Association of Thai Software Industry (ATSI). The analytical results found that the decision tree and rule-based techniques were suitable and accurate techniques for prediction of software project risk management.

According to the comparative analysis results, the best analyzing techniques, the Decision-Tree and the Rule-Based techniques can be improved to gain more precision with numerous class information sets. For the Naïve Bayesian technique, although it comprises of the simple algorithm without the complexity, is fitted with the numbers of instance information sets. Therefore, it might not affect to the most accurate analyzing result because of not too several instance results. The KNN technique, although it comprises of the algorithm class classification to be grouped, this technique is fitted for a numbers of information sets with increasing of more times to be calculated with all factorial point numbers. As the result, KNN technique may not affect to the most accurate result with the information test because of not too several information sets to be operated.

For future work, in order to gain more precision and to verify the analytic results, we propose that research shold collect more data for the analysis from other related associations, such as members of the Thai Federation of ICT Technology Association (TFIT), especially those that are involved in the management of software projects.

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THE WATER FOOTPRINT OF ELECTRICITY GENERATION IN THAILAND

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ABSTRACT

Water is important resource for electricity generation. Cooling of power plant is often achieved by water abstractions from the natural environment. The aim of this study is to assess water footprint consumption (WF) of 14 electricity generations in Thailand which are different capacity in energy production, types of fuel supply(using natural gas and biomass) and technologies, in this study 2 categories of assessment were used 1.Cradle-to-Gate(C2G) is a technique to assess water footprint from fuel supply and operation, 2.Gate-to-Gate(G2G) is a technique to assess only an production. According to this study, the water footprint 546.82⁽¹⁾ L/GJ and 317.60⁽²⁾ L/GJ was found in independent power producer or IPP, the water footprint 667.99⁽¹⁾ L/GJ and 418.36⁽²⁾ L/GJ was found small power producer or SPP, the water footprint 99,891.92⁽¹⁾ L/GJ and 1029.02⁽²⁾ L/GJ was found in very small power producer or VSPP, which are 166 times and 3 times higher than other types of power production.

($^{\scriptscriptstyle (1)}$ WF in Cradle to Gate assess $^{\scriptscriptstyle (2)}$ WF in Gate to Gate assess)

KEYWORDS: Water footprint assessment, Life cycle management, Water management

1. INTRODUCTION

Water is a limited natural resource which is very important for any types of organism in term of usage and consumption, also it has been widely used as a process in producing other types of product and services. Currently, water consumption is not sustainable within the context of the global availability of fresh water and the earth's assimilation capacity.(P. Torcellini. et al., 2003) The demand of water is rising higher as the increase number of population and economy growth, In United States, Thermoelectric energy (including coal, nuclear and natural gas) is the fastest growing use of fresh water resources in the country. The U.S. Geological Survey (USGS) reports that 53% of all of the fresh, surface water withdrawn from the environment for human use in 2005 went to operating our thirsty electrical grid.(Wendy W. et al., 2012) and these water may contact high temperature contaminated by chemical which caused a lot of waste in natural water resource. With the growth of electricity demand by over 70% between 2010 and 2035, over half in China (38%) and India (13%) alone,(IEA.,2012) it can be expected that the WF for cooling will rise accordingly with increased pressure on water resources. Another issue is that river water temperatures increase due to global warming, decreasing the capacity of power plants due to cooling problems.(M. T. H. Van. et al.,2012)

The availability of fresh water of sufficient quality is an important issue on present policy agenda, whereby the relation to energy security has received increasing attention.(UN Water.,2011) In Thailand, Shabbir and organization has applied the water footprint theory to evaluating the water stress index (WSI) of 25 important river basin in Thailand. It has been found that Thailand has high water stress in many area, especially in Northeast region and Central region, which has a lot of power generating business.(Shabbir H. et al.,2014) As a result, the effective way of water usage in both direct and indirect way has become significant issue and must be taken seriously, also consumer, all business production field, government field and international operation are needed.

Thus, the assessment of water usage or water footprint that following the water footprint assessment manual (A.Y. Hoekstra et al.,2011) has been used as a significant tool to indicate amount of water usage in process of energy production, which will improve in term of water management in specific area and preventing of high water stress index problem in the future.

2. RESEARCH OBJECTIVE

(1) Assessment of 3 different factor effect on the amount of water usage in electric power plant, which are production capacity, fuel and production technology.

(2) Assessment of Blue water footprint and Grey water footprint.

3. RESEARCH FRAMEWORK

(1) Data collection from 14 power plants were made. Monthly water usage were recorded in 2016

(2) The Water Footprint Assessment Manual has been used to calculate. 2 categories of Life Cycle Assessment(LCA) which are Cradle-to-Gate(C2G) and Gate-to-Gate(G2G).

(3) Biochemical oxygen demand (BOD) is used to assess of grey water footprint as it is the main parameter that use for wastewater standard comparison.

4. WATER FOOTPRINT CONCEPT

Water footprint (WF) has been introduced as a method to indicate the water use and impacts of

production systems on water resources measured as the total volume of freshwater used to produce products and service(A.Y. Hoekstra et al.,2011, Chapagain.,2014) in both direct water use and indirect water use. Calculating from the amount of water usage in full production and supply chain. expressed in m³ per unit of net energy, as well as per year.



Figure 1: Diagram shows the configuration of water footprint(A.Y. Hoekstra et al., 2011)

In order to water footprint assessment, according to The Water Footprint Assessment Manual: Setting the Global Standard has been classified into three components, i.e., green, blue and grey water which are specified geographically and temporally. By considering both direct and indirect way of water usage, excluding the loss of water from water withdrawal, water footprint in the process of producing energy can be calculated by following formula (1)

$$\sum_{s=1}^{k} WF_{prod}[s] = WF_{blue} + WF_{green} + WF_{grey}$$
(1)

4.1 BLUE WATER FOOTPRINT: WF_{blue}

Blue water footprint refers to the volume of surface and groundwater consumed (evaporated and incorporated) into the production of a product. The following factors has been used to calculated blue factors:

- 1. Raw water
- 2. Amount of rain water and evaporated water in the pond.
- 3. Water usage in input production, containing
 - Chemical usage in water treatment plant and cooling plant.
 - Fuel supply
 - External electricity

 Blue water footprint = [Raw water + (Rain water - Evaporation) + Blue water with input production
 (2)

 By blue water of input production = Amount of input × Ratio of water usage in input production by 1 unit

4.2 GREEN WATER FOOTPRINT: WF_{oreen}

The green water footprint refers to the volume of rainwater consumed during the production process of a product. This is particularly important for agricultural and forestry products, where it refers to the total rainwater evapotranspiration plus the water incorporated into the harvested crops and wood. Become form of moist, such as humidity.

However, in study of water footprint of power plant, humidity or rain water are not use directly in the process, so green water footprint is not considered.

4.3 GREY WATER FOOTPRINT: WF_{grey}

Grey water footprint refers to the volume of freshwater required to assimilate the load of pollutants based on existing ambient water quality to comply with the defined water quality standards. or in the other word "Dilute water"

Considering grey water by calculating the amount of water that drainage from power plant by following formula(4)

$$WF_{proc,grey} = \left(\frac{Q_e \cdot \left(C_{e(p)} - C_{\max(p)}\right)}{\left(C_{\max(p)} - C_{nat(P)}\right)}\right)$$
(4)

 $WF_{proc,grey}$ is grey water footprint in the process (m³)

 Q_{e} is amount of drainage water (m³) $C_{e(p)}$ is BOD of drainage water (mg/l) $C_{\max(p)}$ is Maximum Allowable Concentration of BOD according to standard which is not to exceed 20 mg/l $C_{nat(p)}$

is natural background BOD concentration in the receiving water (mg/l)

4.4 WATER FOOTPRINT OF PRODUCT

Water footprint of the product will show the amount of water usage in 1 unit of product by following formula (5)

$$WF_{prod}[p] = \frac{\sum_{s=1}^{k} WF_{prod}[s]}{P[p]}$$
(5)

 $WF_{prod}[p]$ is water footprint (volume/weight) of last product. $WF_{prod}[s]$ is water footprint of sub-step S P[p]is producing amount of the product p

However, in case of power plant that generate more than 1 type of energy such as electricity power (kilowatt/hour), stream power (ton-stream) or chilled water (RT), will use Kilo-joule as energy allocation that produced, ration to overall energy.

5. RESEARCH FINDINGS

5.1 BLUE WATER FOOTPRINT

Overall water footprint assessment come from 100% blue water footprint, which relevant to water usage behavior by 1.Pumping raw water 2.Amount of water in pond 3.Input blue water (Chemical, fuel, external electricity). In table 1, shown the amount of water footprint from 14 power plant which calculated from annual water usage record in 2016

Table 1: Annual water footprint result.

N		Capacity	WF with Cradle-to-Gate Assessment	WF with Gate-to-Gate Assessment
Name	Raw Material	(MW)	(m ³)	(m ³)
А	Natural Gas	1,468	4,921,010.24	2,713,907.72
В	Natural Gas	1,700	10,551,159.79	6,555,521.13
С	Natural Gas	1,600	8,506,824.09	4,798,031.87
D	Bark of para rubber	20	58,319,902.76	600,774.44
Е	Natural Gas	127	1,813,682.90	1,033,874.26
F	Natural Gas	121	2,169,882.57	1,293,751.07
G	Natural Gas	115	1,841,983.92	1,174,282.81
Н	Natural Gas	115	1,624,790.88	942,157.60
Ι	Natural Gas	121	2,702,035.49	1,915,890.85
J	Natural Gas	107	2,119,326.55	1,371,596.07
К	Natural Gas	114	1,770,103.28	1,111,159.62
L	Natural Gas	117	1,591,031.03	947,975.37
М	Natural Gas	114	1,863,722.81	1,180,571.32
N	Natural Gas	120	1,788,771.74	1,101,262.83

The result of water footprint assessment in 14 power plants can be classified into 2 categories, found that water footprint 7,992,998.04⁽¹⁾ m³ and 4,689,153.57⁽²⁾ m³ A,B and C, which is IPP, water footprint 1,928,533.12⁽¹⁾ m³ and 1,207,252.18⁽²⁾ m³ was found in power plant E-N, which is SPP, water footprint of 58,319,902.76⁽¹⁾ m³ was found in power plant D, which is VSPP that produce electricity by para rubber bark fuel, which is the highest of all 14 power plants and 600,774.44⁽²⁾ m³(power plant D) which is the lowest comparing among 14 power plants. However, annual water footprint assessment did not show water usage ratio clearly, as a result, water footprint of product need to be calculated.

($^{(1)}$ WF in Cradle to Gate assess $^{(2)}$ WF in Gate to Gate assess)

5.2 GREY WATER FOOTPRINT

Calculated by using formula (4), which used maximum allowable concentration at 20 mg/L according to wastewater standard that define a calculated value very low to be zero. Found that negative grey water footprint in all 14 power plants

5.3 WATER FOOTPRINT OF PRODUCT

Formula (5) has been used to calculated the water footprint of product, in case the power plant produce only product. For some power plant that produce more than 1 type of product, energy allocation was done before in order to relate the result of calculated water footprint with the product. According to analysis of 14 power plant, found out that most water is being used in electricity generate process (85.5-97.6%) in power plant which relate to principle of co-generation system that has stream or chilled water as by-product.

Water footprint of product in overall product from every power plant shown in figure 2. It has been found that IPP power plant (A,B and C) has the water footprint equal to $546.82^{(1)}$ L/GJ and $317.60^{(2)}$ L/GJ. SPP power plant (E-N) has the footprint equal to $667.99^{(1)}$ L/GJ and $418.36^{(2)}$ L/GJ. VSPP power plant has the water footprint equal to $99,891.92^{(1)}$ L/GJ and $1029.02^{(2)}$ L/GJ which is 166 times and 3 times higher than other types of power plant because using biomass as the source.

(⁽¹⁾ WF in Cradle to Gate assess⁽²⁾ WF in Gate to Gate assess)



Figure 2: Water footprint of product

6. DISCUSSION

From the assessment of power plant's water footprint, found out that the factor that has impact on the evaluated number is come from only blue water, which is direct variation to amount of electric generated. Also found that the amount of blue water is likely to gets higher as amount of electric produce gets higher. For grey

water, which depends on volume and quality of wastewater, found that the number of grey water is very few after calculated or equal to zero, so grey water or dilute water is not related to evaluated water footprint.

The ration of evaluated blue water is shown in figure 3. In case of cradle-to-gate, IPP power plant has amount of raw water drained in process at 57.29%, SPP 62.01% and VSPP 1.03%. From the result, after calculated blue water footprint from raw material product has indirect water that comes with raw material in fairly high amount, as clearly shown in VSPP which achieve 98.97%



Figure 3: Ration of blue water footprint

For Gate-to-gate, which blue water from raw material production is not included in calculated process, has amount of water footprint for raw water of 96.7 - 99.97% by D power plant (biomass) has the lowest yearly water usage because it has the lowest production capacity, which related to B power plant which has highest number in both water footprint and production capacity. However, after calculated water footprint of product, found out that D power plant has the highest WF of product in both C2G and G2G, which means the small power plant that has low production capacity but used the highest amount of water in process, because a lot of water has been use for machine cleaning and maintenance which usually gets dirty from biomass process, also the technology in each power plant is different, specifically in cooling water system recirculation wet which has cycle of concentration (COC) that has direct impact to amount of raw water abstraction according to figure 4.



Figure 4: Relationship between COC in Cooling system and Blue water footprint

Comparing the result of water footprint of power plant in America (Wendy W. et al., 2012) that used natural gas as fuel and used cooling tower: recirculation wet, found that if considered only the amount of withdrawal water, will have water footprint equal to 288 (Gal/MWh) or 304 L/GJ (1 Gal = 3.785 Liter) while power plant in Thailand has evaluated water footprint equal to $640.03^{(1)}$ L/GJ and $395.11^{(2)}$ L/GJ (Not included D power plant), which after comparison found that power plant in Thailand has $52.50 \%^{(1)}$ and $23.06\%^{(2)}$ higher in water footprint, respectively. For biomass power plant(plant D), although the value of water footprint is very high but when compared to the global average water footprint by firewood fuel for the period 2008–2012 have water footprint approximately 156,000 L/GJ (Mesfin M. et al.,2015) while the D power plant has water footprint equal to 99,891.92⁽¹⁾ L/GJ and 1029.02⁽¹⁾ L/GJ, found that has $35.97\%^{(1)}$ and $99.34\%^{(2)}$ lower than the global average value, respectively. Many factors has impact on this issue, such as product of organization, production technology, raw water sources, law or water quality which cause differences in water footprint.

($^{(1)}$ WF in Cradle to Gate assess $^{(2)}$ WF in Gate to Gate assess)

7. SUGGESTION

(1) If we want to lower the amount of water usage, we should increase the cycle of cooling water concentration in the system with cost more chemical expense to improve cooling water quality such as the corrosion inhibitor.

(2) For grey water assessment, other parameters can be used, to suit for each power plant.

(3) Water footprint assessment show the exact amount of water usage in an organization which promote the organization to realize of highest efficiency on water usage. To reduce fresh water abstraction from nature. Furthermore, yearly water footprint assessment can be used as an indicator for water usage reduction in an organization

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EFFECT OF COMMERCIAL GAME-BASED VIRTUAL REALITY TRAINING WITH KNOWLEDGE OF PERFORMANCE FEEDBACK ON COMPENSATORY MOVEMENT OF SHOULDER IN INDIVIDUALS WITH STROKE

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ABSTRACT

In commercial game-based virtual reality (VR) training of upper extremity, individuals with stroke adapt to use compensatory movement especially in frontal and transverse planes to complete the game. Therefore, providing Knowledge of Performance (KP) feedback, information about movement pattern, may benefit for reducing compensatory movement. The purpose of this study was to investigate shoulder angular motion in the affected upper extremity in individuals with stroke after VR and VR+KP feedback training. Six individuals with stroke (n=6) were matched in pairs by gender, age, stroke onset, and Modified Ashworth Scale. Participants were block randomized into 2 groups; VR+KP (n=3) and VR (n=3) groups. Participants were assessed the range of motion of maximum shoulder flexion, angular motion in frontal plane (shoulder abduction/adduction), and angular motion in transverse plane (shoulder internal/external rotation) at maximum shoulder flexion. They were assessed before training (PRE), after training (POST), and 1-month follow up (FU) by using electromagnetic tracking system. Both groups were trained the affected upper extremity with VR bowling game for 60 trials in each session, 3 sessions per week, for 4 weeks. The VR+KP group was provided KP feedback from physical therapist whereas VR did not receive any feedback. The result showed no significant different between and within groups in maximum shoulder flexion, angular motion in frontal and transverse planes at maximum flexion.

However, both groups had tendency to increase maximum shoulder flexion after training (POST). The VR+KP group tended to reduce compensatory movement by decreasing shoulder abduction and internal rotation ,whereas VR group tended to use more compensation by increasing shoulder abduction and internal rotation after training. In conclusion, this study showed tendency of improvement maximum shoulder flexion and angular motion in the frontal and transverse planes at maximum shoulder flexion after VR training with KP feedback. Clinician should concern about movement pattern during VR training to prevent compensatory movement.

KEYWORDS: Compensatory movement, Virtual Reality, Knowledge of Performance feedback, Stroke

1. INTRODUCTION

Stroke is a common neurological disease that causes functional disability to the patient (Gurr and Muelenz, 2011). In Thailand, the age range of individuals with stroke is 45-84 years and the mean age is 65 years (Suwanwela, 2014). After stroke, the percentage of 85 of individuals with stroke have motor impairments of upper extremity including muscle weakness, abnormal muscle tone, and abnormal muscle synergy (Cirstea et al., 2003). These impairments contribute to develop compensatory movement (Cirstea and Levin,2000). In general, compensatory movements of upper extremity includes increased shoulder abduction, internal rotation, and trunk displacement (Liu et al., 2013) (Takeuchi and Izumi, 2012). Although the compensatory movement may help individuals with stroke to perform daily activities, it can cause maladaptive brain plasticity in long term of motor recovery (Takeuchi and Izumi, 2012)

Rehabilitation with commercial game-based virtual reality (VR) is an effective intervention to improve motor recovery after stroke (Saposnik and Levin, 2011).VR can provide motivation for individuals with stroke to improve their performance (Saposnik et al., 2010). However, individuals with stroke who received commercial game-based VR training might adopt compensatory movement, especially shoulder and trunk movements to win the game. Those individuals with stroke may need some feedbacks to correct movements. Thus, providing the augmented feedback is necessary to enhance movement control and to minimize compensatory movement during the VR training (Saposnik et al., 2010).

Knowledge of Performance (KP) feedback is a concurrent feedback about movement pattern (Schmidt and Lee, 2011). Previous study showed significant improvement in shoulder flexion and shoulder horizontal adduction and tendency to improve compensatory movement of trunk and elbow after repetitive pointing movement training with KP feedback (Cirstea and Levin, 2007). Thus, it is possible that KP feedback may reduce compensatory movement in VR training.

Due to the movement problems in individuals with stroke, KP feedback from physical therapist accompanying with VR training may reduce compensatory movement of upper extremity in individuals with stroke. Therefore, the purpose of the study is to investigate shoulder angular motion in the affected upper extremity in individuals with stroke after VR and VR+KP feedback training.

2. RESEARCH OBJECTIVE

To investigate shoulder angular motion in the affected upper extremity in individuals with stroke after VR and VR+KP feedback training.

3. RESEARCH HYPOTHESIS

There was significantly greater improvement in shoulder angular motion in the VR+KP group than VR group.

4. RESEARCH METHODOLOGY

4.1 Research Design

The study was matched- pairs design and the assessor was blinded.

4.2 Population and Sample

Individuals with stroke were recruited from Physical Therapy center, Faculty of Physical Therapy, Mahidol University. The inclusion criteria were: age 45-65 years old, first right hemiparesis within 6 month onset, right handedness, mild spasticity (Grade 1-2 of Modified Ashworth Scale) in 2 of 3 muscle groups of shoulder adductor, shoulder internal rotator ,and elbow flexor, able to move arm to touch the chin ,and able to understand and communicate. Participants were excluded if they had cyber-sickness, obesity, shoulder stiffness, shoulder pain or other problems affecting the study. Participants gave the inform consent approved by Ethics Committee for Human Subject Research of Mahidol University.

Six individuals with stroke (n=6) were divided into 2 groups by randomized block design; VR+KP group (n=3) and VR group (n=3). Participants were matched by gender, age (±5 years), stroke onset (± 1 month) and Modified Ashworth Scale (shoulder internal rotator, shoulder adductor, or elbow flexor groups). Both groups were trained affected arm with VR. The VR+KP group were provided KP feedback by Physical Therapist whereas the VR group were not provided any feedback.

4.3 Data collection

Participants were assessed range of motion (ROM) of maximum shoulder flexion before training (PRE), after training (POST) and 1-month follow up (FU). At maximum shoulder flexion, angular motion in frontal (abduction/adduction) and transverse planes (internal rotation/external rotation) were evaluated. Data were assessed by electromagnetic tracking system with Motion Monitor[™] software program (Innsport inc., Illinois, USA). The sampling frequency was 100 Hz and each data was low-pass filtered at 20 Hz. The 3 sensors were attached at sternum, superior flat surface of scapula, and distal humerus using thermoplastic cuff to represent

thorax, scapula, and upper arm, respectively. Participants sat on unsupported chair with their arms at the sides as a starting position. Then, participants were instructed to move their arm backward and then forward at their self-selected speed. The instruction was "Place your arm beside the body, Try to keep your back straight, start record, move your arm backward and then forward with preferred speed and as far as you could similarly to when you throw a bowling ball and then continuously back to starting position ,and stop record ". Participants were allowed to practice only 1 trial before performing 3 actual trials.

4.4 Training program

In training session, they were instructed to play tenpin bowling game using the XBOX360 with Kinect (Microsoft Inc., Redmond, Washington, USA). They sat on unsupported chair 2 meters in front of a TV monitor. The expected position of the VR training was the shoulder external rotation and extension, elbow extension ,and forearm supination during moving arm backward; shoulder flexion and external rotation, accompanying with elbow extension during moving arm forward; the trunk kept in straight upright position. Participants were trained bowling for 60 trials in each session, 3 sessions per week, for 4 weeks.

To provide KP feedback for VR+KP groups, KP feedback was movement pattern and information how to improve movement; for example "your arm raised too low, move higher than shoulder level", "your arm turned in too much, try to turn it out". In the first 20 trials, feedback was given in all trials. In the next 20 trials, feedback was given in every 2 trials. In the final 20 trials, no feedback was provided.

4.5 Data Analysis

The Statistical Package for the Social Sciences (SPSS) version 19 (IBM Corporation Inc., Armonk, New York, USA) was used to analyze data. Descriptive statistic was used to determine demographic data. Shapiro-Wilk test was used to test normality of data. All data were normal distribution except maximum flexion at FU and angular motion in transverse plane at POST. The independent t-test was used for baseline comparability. The two way mixed model ANOVA was used to investigate angular motion in transverse plane in group and between groups. For maximum flexion and angular motion in frontal plane, Kruskal-Wallis test was used to determine between groups and Friedman's test was used to determine within group. Significant level were at p < 0.05.

5. RESEARCH FINDINGS

Six participants completed the study. Each group had 3 participants including 2 males and 1 female, averaged age 59.17 ± 2.6 years and averaged stroke onset 2.16 ± 0.83 months. There were no significant difference between groups in gender, age, body mass index, education, time since stroke, type of stroke, Modified Ashworth Scale (shoulder adductor, shoulder internal rotator, and elbow flexor muscles) and maximum ROM of shoulder flexion at baseline (Table 1).

Variable	VR+KP	VR
	(n = 3)	(n = 3)
Male/Female (n)	2/1	2/1
Age (years)(mean ± SD)	59.33 ± 2.08	59.00 ± 3.61
Body mass index (Kg/m ²)(mean \pm SD)	23.69 ± 1.70	19.74 ± 5.33
Education		
- No education (n)	-	-
- Under junior high school level (n)	1	2
- Junior high school level (n)	-	-
- Senior high school level (n)	2	-
- Bachelor degree or higher level (n)	-	1
Time since stroke (month)(mean \pm SD)	1.85 ± 0.53	2.47 ± 1.07
Type of stroke (n)		
- Ischemic stroke	3	2
- Hemorrhage stroke	-	1
Modified Ashworth Scale (score)		
- Shoulder adductor	2.00 ± 00	2.00 ± 00
- Shoulder internal rotator	2.00 ± 00	1.33 ± 1.16
- Elbow flexor	2.33 ± 0.58	2.33 ± 0.58
Maximum ROM at baseline (degree)		
- Shoulder flexion	104.08 ± 19.13	128.42 ± 5.19

Table 1 Characteristics of participants receiving virtual reality (VR) training with and without Knowledge of

 Performance (KP) feedback

ROM; range of motion

For maximum shoulder flexion (Table2), no significant different in maximum shoulder flexion at PRE, POST and FU was observed between the VR+KP and VR groups. There was no significant improvement in maximum shoulder flexion within group.

Table 2 The maximum shoulder flexion in the group of virtual reality (VR) training with and without Knowledge
of Performance (KP) feedback before training (PRE), after training (POST) and 1-month follow up (FU).

Group	PRE (mean ± SD)	POST (mean \pm SD)	FU (mean \pm SD)
VR+KP $(n = 3)$	104.08 ± 19.13	111.87 ± 24.04	106.56 ± 21.75
VR $(n = 3)$	128.42 ± 5.19	144.63 ± 7.80	134.08 ± 3.63

Maximum Shoulder Flexion

In the frontal plane, there were no significant difference in angular motion at maximum shoulder flexion between VR+KP and VR groups (Table 3). No significant improvement in angular motion in the frontal plane at maximum shoulder flexion within group was observed (Table 3). In the transverse plane, there was no significant improvement in angular motion at maximum shoulder flexion between groups and within groups (Table 4).

Table 3 The angular motion in the frontal plane at maximum flexion in in the group of virtual reality (VR) training with and without Knowledge of Performance (KP) feedback before training (PRE), after training (POST) and 1-month follow up (FU)

Angular Motion in the Frontal Plane at Maximum Shoulder Flexion

Group	PRE (mean \pm SD)	POST (mean \pm SD)	FU (mean \pm SD)
VR+KP (n = 3)	-15.18 ± 10.34	10.31 ± 16.46	-6.51 ± 2.62
VR (n = 3)	10.75 ± 14.26	-7.97 ± 18.03	-11.47 ± 16.79

(+); shoulder adduction. (-); shoulder abduction.

Table 4 The angular motion in transverse plane at maximum flexion in each group before training (PRE), after training (POST) and 1-month follow up (FU)

Angular Motion	in the	Transverse	Plane at	Maximum	Shoulder	Flexion
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Group	PRE (mean ± SD)	POST (mean \pm SD)	$FU(mean \pm SD)$
VR+KP ($n = 3$)	26.41 ± 18.88	19.59 ± 7.34	29.30 ± 16.38
VR (n = 3)	36.74 ± 30.22	54.65 ± 33.11	45.68 ± 8.41

(+); shoulder internal rotation. (-); shoulder external rotation.

6. DISCUSSION

The purpose of this study was to investigate effect of KP feedback on shoulder angular motion when training affected upper extremity with VR in individuals with stroke. The hypothesis was that KP feedback could help to increase ROM of shoulder flexion and reduce compensatory movement such as decreased shoulder abduction and internal rotation during shoulder flexion. The result showed no significant improvement between and within groups in maximum flexion as well as angular motion in frontal and transverse planes at maximum flexion.

Even though there was no significant improvement in maximum shoulder flexion after training within group, both groups tended to improve maximum shoulder flexion after training. Previous study (Sin and Lee, 2013) showed significant improvement in shoulder flexion in individuals with stroke receiving upper extremity training with VR bowling game. However, no significant improvement in maximum shoulder flexion of the VR+KP and VR groups may result from no significant improvement in angular motion in the frontal and transverse planes at maximum shoulder flexion. The present study demonstrated no effect of KP feedback on angular motion in the frontal and transverse planes at maximum shoulder flexion. However, it seemed to have a tendency to improve the angular motion in both planes for the group of receiving KP feedback, showing reduced shoulder abduction and internal rotation after training. On the other hand, the group which no receiving KP feedback tended to compensate by increasing shoulder abduction and internal rotation after training. A training in non VR, repetitive pointing movement, with KP feedback showed significant improvement in shoulder flexion and tend to reduce the compensatory movement of trunk and elbow and no significant reduction in compensatory movement of trunk and elbow (Cirstea and Levin, 2007). In case series, non-VR reaching with KP feedback show improvement in elbow extension and decreased in trunk flexion in 3 of 5 participants (Chen et al., 2016). A suggestion of using KP feedback to avoid development of compensatory movement had been noted (Levin et al., 2015).

After 1-month training, the present study showed no improvement in maximum shoulder flexion, and angular motion in the frontal and transverse planes at maximum shoulder flexion in both VR+KP and VR groups. The possible reason is small sample size in both groups. Thus, a large sample size is suggested to future study and may lead to observe significant effect of KP feedback on the VR training.

In conclusion, the present study showed tendency of improvement maximum shoulder flexion and angular motion in the frontal and transverse planes at maximum shoulder flexion after VR with providing KP feedback. In order to investigate the effect of KP feedback, a larger sample size study is suggested to further study. However, clinician should concern movement pattern during VR training in order to prevent compensatory improvement.

7. SUGGESTION

(1) with VR training, KP feedback should be provided to individuals with stroke to reduce compensatory movement.

(2) A larger sample size should be in future study to observe the significant effect of KP feedback on VR training.

8. ACKNOWLEDGEMENT

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A FACT-FINDING SURVEY ON SMARTPHONE JAPANESE LANGUAGE LEARNING APPLICATIONS FOR THAI JAPANESE-LEARNERS: TARGETING JAPANESE MAJOR STUDENTS AT SRIPATUM UNIVERSITY

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ABSTRACT

The purpose of this paper is to clarify the actual condition of smartphone Japanese learning applications by conducting a questionnaire survey that consisted of 6 items targeting on 34 Japanese major students at Sripatum University. The number of valid responses was 24. The number of applications was 68, the number of types – 20, and the number of applications was 2.83 per person. Cronbach's coefficient alpha was 0.93. As a result, it was found that the translation and dictionary applications were used most frequently; however, *Kanji* or communication-related applications were also used by a small number of students. Applications that were expected in the future covered a wide range of applications from vocabulary, grammar, sentence patterns and expression (language knowledge) to conversation and listening and speaking skills (language behavior). Regarding learning applications as one of learning resources, it should be discussed on how applications are used in the learning process and how applications affect, either directly or indirectly, learning outcomes.

KEYWORDS: Japanese language, learning application, Thai learners, learning-resources, Sripatum University

1. INTRODUCTION

The Spread of the *Internet* after the mid-1990s has changed our social life dramatically and the promotion of IT (information technology) or ICT (information and communication technology), including diversified interactive forms of communication, has also brought epoch-making changes to our daily life. The rise and practical use of cell-phones will be cited as an example of changes they made in daily lives. In recent years, particularly, the use and dissemination of smartphones have been pointed out as a kind of mobile devices with advanced OS (operating system) for portable devices. As of February 2016, according to a survey of the smartphone usage rate in the world (38 countries and regions of 40 countries), it turned out to be the data of more

than 50 % in 33 countries and regions in the world (Aun Consulting, Inc.). Examining the smartphone penetration rate in Thailand, there was 64 % corresponding to 43,552,000 people of the entire population (= 68,050,000 people) and the usage time for smartphone comprised 3 hours and 53 minutes per capita (We are social). Computer programs or, in other words, application software (hereinafter called application) can be utilized in the function of smartphone that is incorporated as well as Personal Computer (PC). Smartphone application is one of digital contents downloaded using such distribution platforms as *Google Play, App Store, Windows Phone Store,* and so on. The number of applications in *Google Play* or *App Store* was published in the amount of more than 2 million, respectively (Statista and meetLabo, Inc.). Although various categories are included in the application are also accounted for fair quantity. This paper considered and focused on the Japanese language learning applications targeting non-native speakers.

2. BENEFITS OF RESEARCH

The applications for Japanese language learning as a foreign / second language have been developed in harmony with a wide spectrum of language skills (reading, listening, speaking, and writing) and a variety of purposes (studying abroad, business, interpretation, translation, preparing for certification exam, or clarifying tests like *Japanese Language Proficiency Test*; JLPT and *Business Japanese Proficiency Test*; BJT, etc.). In this paper, we assume that the concrete grasping of the kinds of used applications is beneficial to understanding the advantage of their use in the voluntary initiative, efficiency, or learning effectiveness by conducting a usage survey on Japanese language applications for Thai Japanese-leaners. The number of Japanese language learners in Thailand was 173,817 in 2015, being the world's sixth largest (Japan Foundation). Although it didn't mean that all of them used smartphone learning applications at all, they will be much-anticipated to become valuable tools in the total learning process in the light of usage rate and utilization time, as was mentioned above. In that sense, this research will provide a better opportunity to determine what necessary or important applications are used as learning-tools through this fact-finding survey on the language learning applications, or the applications that language-learners are actually using. In addition to the significant qualitative improvement of Japanese language learning, it is also expected to provide some suggestions to the application development.

3. RELATED RESEARCH

It was found that there had been no studies and researches aimed at mobile phone/smartphone applications in Japanese language education. However, a number of recent articles introduced applications to Japanese language learning. There is a tendency to regard computer programs installed in OS for personal computers or mobile devices as application software in the research or reports on Japanese language learning applications, and its perspective was divided into 3 categories, that is, 1) a standpoint of learning methods or means for learners

(application users), 2) a standpoint of educational tools to utilize Japanese language education applications, and 3) a standpoint of educational material development by the individuals concerned and those engaged in Japanese language education. There were quite a few survey reports in 1). For example, NINJAL (2003) conducted an extensive questionnaire survey in Bangkok, Thailand, and calculated the usage rate of Internet or computer software as one of the resources for Japanese language learners by receiving over 5,000 responses from them. Leung (2009) carried out a current situation survey for 240 Japanese major students at the universities in Canton, China, focusing on the Internet. Mikuni, Taniguchi et al. (2011) surveyed the actual condition of media use as information resources in six countries, including Thailand. Ito, Ishi et al. (2016) investigated the reality of Internet use and the necessity of assessment of Japanese learning sites for 1,683 learners in 11 countries, including Thailand (limited to Bangkok). As actual cases from the Japanese language education field in 2), it was cited that Iwashita, Ishizawa et al. (2014) discussed the usability of vocabulary learning application and Suzuki (2016) focused on dictionary applications for Japanese learners. Such discussions were based on the usage and availability of Internet, websites, software, or programs in Japanese learning. In relation to application development in 3), Yoon (2016) conducted a survey on learning applications for each OS and Web-based learning resource as Japanese language learning tools for learners. A number of higher education institutions, like Osaka University (2016), engaged in the development of learning-supporting tools and original application development by the institutions meant to improve IT teaching materials or e-Learning contents centering around online and offline learning websites. In any case, it is thought to be the areas of the studies that are considered to be of certain interest and significance in the current situation or developments in Japanese language education.

4. RESEARCH OBJECTIVE

The purpose, or objective, of this research is to clarify on what applications Thai learners of the Japanese language use and what kinds of applications they utilize after confirming whether they possess their own smartphone or not. Moreover, it is also surveyed on the concerns, needs, or expectations of Thai learners. Another purpose is also to consider how applications are utilized effectually in the learning process inside or outside of classroom by the data that was obtained through this research.

5. RESEARCH METHODOLOGY

5.1 TARGET GROUP

The target group in this research consisted of second-year students enrolled at the Japanese for Business Communication (Japanese major course) Department of Sripatum University, Bangkhen Main Campus, Bangkok, Thailand (herein referred to as SPU) in the academic year of 2016. There were 34 students (13 males: 38.24 % and 21 females: 61.76 %, rounded to the second decimal place, hereinafter the same shall apply), who registered under *JBC225 Business Japanese Reading* (3 credits) in the first academic semester of 2017 (August - December, 2017).

5.2 INSTRUMENT

A questionnaire was adopted as an instrument of this research; the number of questions consisted of 6 items in Thai language. The items from No.1 to No.3 were face sheets and the ones from No.4 to No.6 contained opened-ended questions, namely, free-answer questions.

5.3 DATA COLLECTION

The questionnaire was distributed among 30 students, who attended the classes of *JBC225 Business Japanese Reading* on August 28, 2017 in the first semester of the 2017 academic year (4 absentees). It took about 10 minutes to answer the 6 questions. The valid respondents were 28 (9 males: 32.14 % and 19 females: 67.86 %), excepting 2 male students who did not possess smartphones; thus, the percentage of valid responses was 93.33 % and Cronbach's coefficient alpha was 0.93 from statistics (Casio Co., Ltd).

5.4 DATA ANALYSIS

As to OS for smartphone that 28 students possess and use on a daily basis, *Android* Platform amounted to 19 students, 67.86 % (8 male students: 28.57 % and 11 female students: 39.29 %) and *iOS* Platform – 9 students, 32.14 % (1 male student: 3.57 % and 8 female students: 28.57 %). Of these 28 students, on the one hand, 24 students answered that they had installed the Japanese language learning application, which is 85.71 % (6 male students: 25.00 % and 18 female students: 75.00 %); on the other hand, 4 students' answers, or, 14.29 %, mentioned no applications in use. The cumulative total number of applications that 24 students included into their replies from free description types was 68. The number of application per student is as shown in the following table 1. The standard deviation (SD) was 2.67 in table 1.

No. of Applications	1	2	3	4	5	6	7	8	68
Male	4	2	0	0	0	0	0	0	6
%	16.67	8.33	0.00	0.00	0.00	0.00	0.00	0.00	25.00
Female	2	3	7	3	1	1	0	1	18
%	8.33	12.50	29.16	12.50	4.17	4.17	0.00	4.17	75.00
Total	6	5	7	3	1	1	0	1	24
%	25.00	20.83	29.16	12.50	4.17	4.17	0.00	4.17	100.00

Table1. The number of applications per person

The number of students and applications in the rank order was 7 students / 3 applications (29.16%), 6 students / only 1 application (25.00%), 5 students / 2 applications (20.83%), and 3 students / 4 applications (12.50%). The percentage of the total figure in 4 ranks above accounted for 87.49%. Although the most applications per person were 8, the average was 2.83 applications per capita.

6. FINDINGS

The number of applications per person in the data analysis was tallied through a perspective of the 24 respondents. The following discussions were advanced from the three viewpoints, that is to say, 1) the name of each application that the respondents installed on their own smartphones (item No.4 in questionnaire), 2) the categorizations based on the contents of applications, and 3) the kinds or types of the applications that the respondents want or expect (item 6 in the questionnaire).

6.1 Names of applications installed on the respondents' smartphones

The respective name of applications is shown in table 2 (write-in answers). The names of applications were counted to 20.

		No. of			
	Application Name	students (%)			
1	Google Translate	22 (32.35)	11	Obenkyo (Studying)	1 (1.47)
2	Japanese Thai Dictionary (JTDic)	10 (14.71)	12	Dictionary English-Japanese	1 (1.47)
3	Japanese Thai Dictionary	10 (14.71)	13	JLPT Level N5	1 (1.47)
4	Hello Talk	5 (7.36)	14	JLPT Level N4	1 (1.47)
5	Learning Basic Japanese	2 (2.94)	15	Kanji Study	1 (1.47)
6	Thai Japanese Translation	2 (2.94)	16	Kanji Recognizer	1 (1.47)
7	JLPT Level N1-N5	2 (2.94)	17	Kanji	1 (1.47)
8	Japanese Thai Dic. (J-Doradic)	2 (2.94)	18	Search Kanji	1 (1.47)
9	Learn Japanese language	2 (2.94)	19	Japanese Kanji	1 (1.47)
10	Wa-Translation Thai Japanese	1 (1.47)	20	Learning with Bucha	1 (1.47)

The most frequently installed application was *Google Translate* (No.1) that occupied 22 respondents or 32.35 % in the total number of applications. As for translation applications in No.6 and No.10 (application names were different), it was equivalent to 36.76 %. Secondly, dictionary applications were installed most commonly. Considering the applications-related dictionary as a whole (No.2, No.3, No.8 and No.12), it accounted for 33.83 %. Accordingly, translation and dictionary made up a majority of applications. When there was no Thai translation for a Japanese word, the English-Japanese Dictionary in No.12 was to be used for that purpose. In other words, with respect to translation and dictionary applications from the viewpoint of Table 2, as might be expected, the crucial importance for Japanese learners was confirmed once again. In addition, in the case of *Kanji* (logograms in Chinese characters were also used in writing and reading Japanese) that is required in Japanese learning, though the name application was different, it accounted for 7.35 % (No.15 - No.19) alongside of *Hello*

Talk (No.4). In particular, in case of a necessity to know Japanese reading or the stroke order of *Kanji*, *Kanji* applications are indispensable for Japanese learners. Of course, *Kanji* is one of Japanese words and is covered in dictionaries; however, without knowing Japanese reading, it is impossible to search for a meaning of *Kanji*. In fact, as a result, almost all of the respondents described applications that were related to translation and dictionary among the top three applications with a great frequency (item 5 in the questionnaire).

6.2 Categorization of applications

In keeping with the contents of applications in Table 2, the categorization of applications is shown in Table 3 below. The categorization was divided into 6 types, that is, 1) Kanji-related, 2) dictionary-related, 3) general Japanese learning, 4) translation-related, 5) Japanese language proficiency test (JLPT), and 6) conversation-related.

	Category of application	Item No.	Total (%)
1	Kanji	No.15, No.16, No.17, No.18, No.19	5 (25.00)
2	Dictionary	No.2, No.3, No.8, No.12	4 (20.00)
3	General Japanese learning	No.5, No.9, No.11, No.20	4 (20.00)
4	Translation	No.1, No.6, No.10	3 (15.00)
5	JLPT	No.7, No.13, No.14	3 (15.00)
6	Conversation	No.4	1 (5.00)
		Total	20
			(100.00)

Table 3. Categorization of the 20 applications

Needless to explain on 1), 2), 4) and 5), general Japanese in 3) was a learning application that incorporated vocabulary, grammar, sentence patterns, and expressions in response to various levels, and it was also characterized by an application to acquire reading, listening, and writing skills. Conversation-related in 6 like *Hello Talk* (No.4 in table 2) was the application to be designed to promote two-way communication in Japanese; it was also found that some learners had thought of wanting to practice conversation (speaking and listening) and to improve speaking skills.

6.3 Applications that were wanted or expected by learners

Many requests for Japanese wordbooks or vocabulary lists were received, as well as exercise books or workbooks for JLPT in each level from N5 up to N1, including key answers, grammatical explanations, correct translations by unit of longer sentences, pronunciation-check, practice for listening and speaking, and the stroke order of *Kanji* characters as learning applications as the most wanted or expected through item 6 in the questionnaire. By the way, the search results on the key word of *learning Japanese* in English included 250 applications on *Google Play* and 100 ones on *App Store* respectively. All of these applications do not necessarily mean Japanese learning applications for non-native speakers; in addition, there were some available applications for learners in certain countries; however, it was thought that students who answered the questions in the questionnaire could not find appropriate applications according to their purpose as yet, that the qualities of the applications were still incomplete, or that the applications were hard to use for Thai learners. A related finding comprises two tendencies, namely, one was that the applications could improve *language knowledge (or capacity)* and the other was that the applications could promote *language behaviour* as putting language communication into practice.

7. CONCLUSION AND SUGGESTIONS

As this research has shown, the Japanese major students at SPU used mainly translation and dictionary-related applications. There was some activity on the other applications, *Kanji* or language communication tools, but there were only a handful of students proving this. The number of applications per person was 2.83 that could not be considered to be large or less. It was, however, expected to provide learning applications in response to each category or genre in Japanese learning, because there were a wide variety of applications that students wanted or requested. In addition, there is a significant demand for developing Japanese learning applications targeting Thai learners. Although this research was limited to a fact-finding survey on the number of applications and the names of applications, there is a perspective for content-rich or high-quality applications for learners assessed by surveying their usability or the degree of satisfaction and by including developer's applications perspective in the future. In addition to the fact that the applications for Japanese learning were regarded as one of the learning resources, it is obvious that digital contents such as character information, images, and videos accessed via internet are also available and valuable learning resources for language learners. Finally, it will be necessary to discuss how language learners use digital contents on the Internet, including applications in the learning process (availability) and how they affect learning outcomes (benefits).

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THE BUSINESS PERFORMANCE OF DIGITAL BUSINESS TRANSFORMATION ON SMALL AND MEDIUM ENTERPRISES

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Abstract

The purpose of this research is to study whether digital business transformation significantly affect SMEs to increase the business performance including the financial perspective, customer/marketing perspective, internal process perspective, and learning and growth perspective. The research design is designed as a quantitative research. Structural equation modeling (SEM) is used to analyze the survey responses. Using SME is to specify, test, and modify the measurement model. The results of measurement model analysis and path model analysis are presented. The data set of 500 samples are collected. The results of structural path analysis indicate that two hypotheses are statistically significant and positive.

KEYWORDS: Digital Business, Transformation, Small and Medium Enterprises, Business, Performance

1. INTRODUCTION

One of the crucial of Thailand 4.0 model is to help Thai industries in every sectors such as agriculture, SMEs, and services, to adapt to global competitive pressures by increasing the technological base through the development and integration of enabling innovation, and digital technologies. For example, agriculture sector will reconfigure their advantage, which is cost is no longer a key success factor. They need to adapt some part of innovation and technology into their production process by the support of biotechnology and argritech, also called "smart farming." Meaning that farmers should no longer be the poorest segment of the population. They should or might become entrepreneurs instead of being subjected to the vagaries of changing weather and the dictates of merchants and middlemen (Yoon, 2016). Moreover, the increasing recognition of the role of innovation and digital technology, which are enable the interactions among partnership such as consumers, and suppliers as an important co-value creation has derived the implications of these interactions in numerous settings, including online activities. Thailand 4.0 also is considered the backbone of the digital economy. 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. Therefore, the objectives of the study are to 1) examine the level of digitalization of Thai small and medium enterprises, 2) to examine whether digital business transformation significantly affect business performance, and 3) to explore the advantages and disadvantages of digital business transformation as a source of competitive advantage to create business performance.

The framework proposes that digital business transformation will have an impact on business performance. The practice is conceptualized as a four-dimensional construct. The four dimensions are technology acceptance model (TAM), digital readiness, digital business transformation, and business performance. The hypotheses were stated as the followings:

1. Hypothesis 1: Perceived of technology acceptance is positively associated with the digital business transformation of the Thai small and medium enterprises.

2. Hypothesis 3: digital readiness is positively associated with the digital business transformation of the Thai small and medium enterprises.

3. Hypothesis 3: Digital business transformation is positively associated with the business performance of the Thai small and medium enterprises.

2. LITERATURE REVIEWS

Since the change of technologies and widespread diffusion of the digital economy, it led to innovation in business models, which in turn allows consumers and businesses to connect around the world any time (Harris & Rae, 2009). The digital economy provides business an ability of the transformational effects of new way to use the data as in the fields of information and communication. It gives rise to certain form of new business models, which is important to the business to adapt in the new environments. Thailand attempts transforming nations through creativity and innovation, also known as Thailand 4.0. Thailand 4.0 is a new economic policy to develop Thailand into a valued-based economy or digital-based economy. However, Thailand is confronting many challenges, such as a labor shortage and an aging society. Thai labor is still lagging behind in terms of manufacturing technology. New businesses in Thailand still lack the ability to find new sources of investment. Therefore, Thailand is attempting to change the country from traditional farming to smart farming, traditional business to digital business, and traditional services to high-value services. It is envisioned to change the country's traditional farming to smart farming, traditional SMEs to smart enterprises, and traditional services to high-value services.
Digital Economy

Typically, the digital economy involves with five parts, including hardware infrastructure, software infrastructure, service infrastructure, promotion and innovation, and society and knowledge (Boonnoon, 2014). Hardware infrastructure refers to information-technology infrastructure that is used to support a digital economy such as high speed broadband Internet, and digital gateways. Software infrastructure refers to online channels, online transactions such as verification systems to identify individuals online and cyber-security in order to boost up e-Commerce transactions. Service infrastructure would create a platform to support the private sector, while the promotion and innovation part is the developing the digital skills of entrepreneurs to improve their productivity and workflow process efficiency through the supply chain, which will utilize digital tools and go along with banking system, services and manufacturing. Society and knowledge refers to the universal access ability, which allows people various online channels with an affordable price. The integration of activities at various levels generates the value that make specific business models profitable (Boonnoon, 2014).

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 Readiness

Generally speaking, the efficiency, whereby ventures can utilize digital business through highly scalable infrastructures. Thus, the digital decade has seen businesses taking advantage of lower price/performance levels of computing (hardware and software) as well as global connectivity through standard protocols such as the Internet, mobile web, and application to adapt their business infrastructure to the new digital era. Therefore, digital transformation challenging for traditional businesses require hardware infrastructure, software infrastructure, and digital literacy (Boonnoon, 2014; Bharadwaj, El Sawy, Pavlou, and Venkatraman, 2013; Eshet-Alkalai, 2004; Huerta and Almazan, 2007; Mutch, 1997; Wanda and Stian, 2015; and Ziphorah, 2014).

Business 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. The types of business expand to several varieties of e-commerce, app stores, online advertising, cloud computing, participative networked platforms, high speed trading, and online payment services. 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).

Business Performance

Once the business is transformed to digital business, it is expected to achieve better results, which is able to compare to traditional performance. Possibly one of the most well-known models for strategic planning and management, is the Balanced Scorecard. The Balanced Scorecard (BSC) is used to provide management with a quick, but thorough overview of the company's performance on a strategic level (Kaplan, and Norton 1993). The BSC was developed by Robert Kaplan and David Norton in 1992 as an alternative to traditional performance measurement approaches that focus solely on financial indicators and are based purely on a business's performance. It is used as a strategic planning and management system, integrating business activities based on the vision and strategy of the businesses, to make effective internal and external communication processes and to

monitor and improve organization performance against the overall strategic goals, providing sufficient feedback about both internal processes and external business outcomes to endlessly modify strategic performances.





4. RESEARCH METHODOLOGY

The research design is drawn from quantitative research methodology. The survey is used to establish a baseline on current perception and readiness of Thai SMEs for business transformation to Thailand 4.0. The total sample for this study consists of 500 samplings. The survey is expected to be responded by top management level because they are most likely to be the one who involves in business planning, and makes the final decisions about implementation in the business. The participants in this study are voluntary and anonymous. Structural equation modeling is used to analyze the survey responses.

5. RESULTS

A total of 500 usable questionnaires are obtained. The results of this study show that the SMEs expect digital business transformation provides the customer service and feedback. Enhance business's image, customer / marketing data insight, keep the business cost down, and enable to online business are the second, the third, the forth, and the fifth expectations of digital business transformation by SMEs.

Table 1 - 4 show the SMEs perceived usefulness of digital technology that it helps the business in better performance (mean = 3.53), and they agree that it is easy to plan and implement the digital business transformation

process (mean = 3.94). Generally, the SMEs agree that they are ready for the infrastructure; including hardware infrastructure (mean = 3.78), software infrastructure (mean = 3.90), and digital literacy (mean = 4.12).

Furthermore, the SMEs is changing their business by getting ready and becoming mobility business (mean = 4.13). They concerned and used the data for the business planning, and view the value of the data (mean = 4.19). Additionally, the SMEs start conducting the business in the digitalization (mean = 4.02), collaborating with new business model (4.10).

Respondents agree that digital business helps the business to increase the growth of sales (mean = 4.08), digital business increase revenue (mean = 4.03), digital business helps the business increase return on investment (mean = 4.15), digital business helps the business reduce operational costs (mean = 4.05), digital business helps the business reduce business costs (mean = 3.97), and the average (mean = 4.06), which has an agree mean response.

Table 1 Means, Standard Deviations, and Median Response with Items for Perceived of Digital Technology

Perceived of Digital Technology	Mean	SD.
Perceived Usefulness	3.53	0.94
Perceived Ease of Use	3.94	0.69

Table 2 Means, Standard Deviations, and Median Response with Items for Digital Readiness

Digital Readiness	Mean	SD.
Hardware Infrastructure	3.78	0.86
Software Infrastructure	3.90	0.74
Digital Literacy	4.12	0.61

Table 3 Means, Standard Deviations, and Median Response with Items for Digital Business Transformation

Digital Business Transformation	Mean	SD.
Mobility	4.13	0.65
Value of the Data	4.19	0.57
Digitalization	4.02	0.79
Business Model	4.10	0.71

Digital Business Performance	Mean	SD.
Financial Perspective	4.06	0.62
Customer/Market Perspective	3.96	0.67
Internal Process Perspective	3.79	0.63
Learning and Growth Perspective	4.05	0.45

Table 4 Means, Standard Deviations, and Median Response with Items for Digital Business Performance

Table 5 The Results of Adjusted Model Fit Index

Chi-Square	P-Value	CMIN/DF	GFI	AGFI	NFI	IFI	CFI	RMSEA
97.398	0.000	2.705	0.971	0.927	0.964	0.977	0.977	0.058

According to Table 5, the results exhibit that all the measurements have significant loadings to their corresponding construct. Overall, the model has a satisfactory fit with GFI = 0.971, AGFI = 0.927, NFI = 0.964, IFI = 0.977, CFI = 0.977, and RMSR = 0.058. Those are all very good, which is representing a reasonable model-data fit. Therefore, the model fix indexes for the path model indicated an acceptable approximation of the proposed relationship among the constructs and the results should be interpreted meaningfully.

Table 6 Estimates of Regression Weights

			Estimate	S.E.	C.R.	Р	Label
Digital Business	/	Technology	0.006	0.013	0.426	0.67	par_10
Transformation	<	Acceptance	.0.000				
Digital Business	/	Disital Das dinasa	2 405	1 001	2 402	0.01*	
Transformation	<	Digital Readiness	gital Readiness 2.495	1.001	2.492	0.01*	par_11
Business	,	Digital Business	0.419	0.149	2 8 2 0	0 00**	12
Performance	<	Transformation	n 0.418		0.146 2.829 0.0		par_12

Note: * shows p-value < 0.05 ** shows p-value < 0.01

The hypotheses were tested by using SEM to analyze the structural relationship between constructs. The results of hypothesis testing are reported in terms of z-value (Critical Ratio) at the level of significance of 0.05 or lower as shown in Table 6.

The results indicate that all hypotheses are supported. All construct relationships are found to be positive. The results suggest that there is a significant relationship between digital readiness and digital business transformation (p < 0.05) as the direction of the relationship is positive as the study proposed (Hypothesis 2). Hypothesis 3 is supported as the results show a significant relationship between digital business transformation and business performance (p < 0.01). This indicates that digital business transformation has a positively influence the business performance in terms of financial perspective, customer/market perspective, internal process perspective, and organizational learning and growth perspective.

Among the significant relationships, the standardized coefficients are 2.495 (digital readiness to digital business transformation), and 0.418 (digital business transformation to business performance). The paths represent directly link in the proposed model. It can be concluded that effective digital business transformation will greatly lead to improve business performance.

6. RECOMMENDATION

Digital transformation is not just about embracing new technology, it is about a change in thought and organization culture. There is a need for organizations to address the change in business scenarios, dynamic business demands and innovate ways to quickly cater to these changing needs. Digital business is supposed to improved productivity and a concomitant increase in business opportunities and business performance.

The SMEs should well prepare for their employees' skill in business data analysis. They should be able utilize a data and information, consisting of a group of statisticians, technologists and business subject matter experts, to collectively solve problems and provide solutions. The needed ability is to determine how to transform large amounts of data into information which can be assimilated into the daily business processes in a timely manner with high quality information.

The SMEs should well prepare for their employees' skill in business data analysis. They should be able utilize a data and information, consisting of a group of statisticians, technologists and business subject matter experts, to collectively solve problems and provide solutions. The needed ability is to determine how to transform large amounts of data into information which can be assimilated into the daily business processes in a timely manner with high quality information.

Lastly, SMEs should be enable the connected digital business approach, across all functions, and a connected interaction with the ecosystem of the business can only happen if SMEs are connecting the value dots and docs well, regardless of job function.

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THE ELEMENTS OF MARKETING MIX AFFECTING THE REPURCHASE ELECTRONIC MARKETPLACE (E-MARKETPLACE) IN THAILAND

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ABSTRACT

This study attempts to study the relationship between marketing mix and repurchase intention of online customers on e-marketplace in Thailand. A total of 400 usable samplings of e-marketplace customers are obtained. The findings reveal that the predictor variables of product ($\beta = 0.375$, t = 3.556, P = 0.001), price ($\beta = 0.448$, t = 4.697, P = 0.000), place ($\beta = 0.366$, t = 4.227, P = 0.000), are achieved significance at the 0.05 level, while promotion ($\beta = 0.024$, t = 0.886, P = 0.569) does not reach the 0.05 significant level.

KEYWORDS: Marketing Mix, Electronic Marketplace, Online Shopping, Repurchase Intention

1. INTRODUCTION

Electronic commerce (e-commerce) in Thailand is one of the largest growth in Southeast Asia countries (Potkin, 2016). Thai government expects the value of e-commerce in Thailand to exceed US\$30 billion annually by 2016 (Thailandfocus, 2016), as the established national digital economy committee to coordinate policies to foster the growth of the country's digital economy. Thai government has established the Ministry of Digital Economy to offer citizens and businesses the opportunity to complete a vast array of related transactions through many channels; i.e., Electronic-Procurement (e-Procurement), Electronic-Auction (e-Auction), and Electronic-Taxation system (e-Taxation). Typically, e-commerce is changing the way customers think about shopping, becoming a major part of the shopping culture in Thailand. The value of the e-commerce market was 2.56 trillion

baht in 2016, a 14.03 percent raise from 2015, reported the Electronic Transactions Development Agency (ETDA, 2017). Especially, electronic marketplace (e-marketplace) offers a whole new world of opportunities and standards to wholesalers, and retailers platforms. The general key to growing one of the top online marketplaces is: high-quality vendors draw in more customers, while a growing client base attracts more vendors. The Thailand well-known e-marketplaces in Thailand include Lazada, 11th Street, and Shoppee (EcommerceIQ, 2016). Furthermore, since e-marketplace offers real convenience to consumers, over the traditional marketplace, including shopping mall and department store, all the products being sold by suppliers are available to consumers and there is real-time information about the products being presented to consumers on an online marketplace's site or application on mobile phone, it is a much broader assortment than any store could offer. Furthermore, as department stores and shopping mall appeal declines, marketplaces appear to be one of the places that are replacing the multi-brand retailer. To track consumer patterns will involve more than focusing on the official retail sales and revenue; therefore, this study attempts to study the repurchase intention of online customers on e-marketplace in Thailand.

Retailing Business Disruption

The threat of digital disruption is one of the most concerning issues for businesses around the world (Noronha, 2017). Retailing business is one of the greatest disruption as the high level of competition among industry. Along with 50 years ago, retailing business, including shopping mall, modern department store had been growing rapidly. Unfortunately, retailers relying on earlier formats either adapt or die out as the new ones pull volume from their stores and make the remaining volume less profitable, and the industry lined with specialty retailers were dotting the newly forming suburbs and challenging the new platform of shopping; thus, currently retailing undergoes business disruption (Rigby, 2011).

Like most disruptions, digital retail technology got off from internet-based retailers in the 1990s such as Amazon, eBay, and Yahoo shopping, which embraced online shopping or e-commerce. These businesses ran wild and economic reality is well established. Digital retailers drive innovation by spending budget heavily on recruiting, social networks and online advertising, and digital technology (Rigby, 2011). Furthermore, digital technology provides sales associates nearly infinite information about customers, describing the way they like to be matched to their personal. It can change pricing and promotions accurately and instantaneously. Thus, consumers have the ability to find a cheaper option efficiently which price is no longer the only key success factor in the consumer decision-making to purchase (Carroll, 2015; and Howland, 2015). According to Thomas (2017), Amazon has a market capitalization of over \$430 billion, while Walmart's market cap sits below \$220 billion, which Amazon's market cap is now worth almost twice that of Walmart.

Electronic Marketplace (E-Marketplace)

Competition in the online business is typically high opportunities in the market. E-commerce is certainly growing and increasingly including both large and small retailers, and the growth of e-commerce platforms such as Alibaba and Amazon is strongly influencing the competitive business environment (Hagberg et al., 2016). E-marketplace is one of the e-commerce platform that is very popular today, making everyone move faster and more efficient. E-marketplace currently is offering products of its own and other companies' while also providing a platform for buyers and sellers to transact through the e-marketplace. E-marketplace typically can be a website or app that facilitates shopping from many different sources. The operator of the marketplace does not own any inventory. Some example well-known worldwide e-marketplace are eBay, Amazon, and Alibaba. One reason that increased the consumers' interesting to shop on e-marketplace is that there are many retailers offering product ranges broader than one store can offer (Kestenbaum, 2017). E-marketplace platform affects the traditional retail store business processes (Pantano and Viassone, 2015). For example, the shopping cart have favored shopping activity that is less of an individual activity and more something conducted by a "cluster" of people and mobile devices (Cochoy, 2008).

Types of e-marketplaces

1. Vertical e-marketplace

Vertical e-marketplace sells products from many sources but they are all of one type. Vertical emarketplace is business niche where the vendor serves a specific audience and their set of needs. Typically, vertical e-marketplace relies on being able to sell the product better. Since they focus on one, or few, product categories, they are able to underline the user experience in a way that highlights the special features of the product category.

2. Horizontal e-marketplace

Horizontal e-marketplace sells products of many types but they all share a characteristic. Consumers can view the products from different retailers or sellers all together and at the same time in the same app. Furthermore, the application features are able to focus on a type of customer and offers them multiple products across many types of retailers.

E-Marketplace Competition

The penetration of e-commerce in Southeast Asia compared to the traditionally retail market is between 1-3 per cent, while in mature market like the US, China, Japan, Germany, and European countries, e-commerce markets are double digital penetration (Pornwasin, 2016). In Thailand, e-commerce market is estimated reaching 2.8 trillion bath by the year of 2017, which gains of almost 10 per cent from 2016 (Boonnoon, 2017). A crucial factor leading the growth in e-commerce is the support from the government sector, with promotions targeting small and medium-sized businesses (SMBs). However, e-commerce market is very hypercompetitive. The three biggest e-marketplace in Thailand from international companies are Lazada, 11street and Shopee. According to

Iprice (2017), Lazada is now the number one in e-marketplace platform in Thailand. They have the highest traffic in Thailand, approximately 41,680,000 visitors through website and application, as well as they have the highest number of apps installed, approximately 50,000,000 downloads. However, Lazada needs to be ready for the entry of Amazon into Southeast Asia. Amazon recently has announced that it is entering Southeast Asia, starting in Singapore. This may imply that the entry could alter the e-commerce market, not only in Singapore but also the whole region. Moreover, 11street, another player in e-marketplace platform from Korea. 11street extends the integrated marketing communication channels, using outdoor advertisements in Siam BTS stations, ad displays on commuter routes, the brand has rapidly gained recognition in Thailand and has given the company the second highest rank in traffic. Shopee is mostly likely customer-to-customer in e-marketplace platform. Shopee focuses on mobile e-marketplace, allowing customers to sell items online. Therefore, e-marketplace in Thailand is growing strongly, having have higher penetration rates, and the potential to grow quickly.

Marketing Mix

Marketing Mix variables are the drivers of the revenue stream. Kotler (2005) states that the 4Ps model still provides a valuable framework for marketing planning. The main point beside selling and generating the revenue is that specific elements contained in the marketing mix should deliver more value, build a long-term and mutually profitability relationship with customers. McCarthy (1971) introduced the number of elements in the marketing mix to four basic ones and defines marketing mix as mix of four marketing variables (4Ps), namely, product, price, place, and promotion. Product considers both tangible (goods) and intangible (services) products which include services quality, service facilities, branding, packaging, standardization and grading. Price decisions affect both a firm's sales and profits, so price is always a consideration. Price is defined as any transaction in our modern economy can be thought of as an exchange of money-the money being the price-for something. The function of place is to match supply capabilities to the demands of the many target markets, moving goods wherever they are needed, including the factors that go into providing the time, and place, and possession utilities needed to satisfy target customers. Promotion considers that is communication between seller and buyer, including advertising, personal selling, sales promotion, tools of publicity, public relations, and various other forms of promotion. Promotion is vital, but not the only element of marketing strategy.

Repurchase Intention

Repurchase intention is the likelihood that a customer will continually buy a particular product/service (Dodds, Monroe, & Grewal, 1991). The repurchase intention typically comes from a particular brand, product or service requires assessment of all brands, products or services offered by competitors (Teng et al., 2007).

2. RESEARCH METHODOLOGY

The research design is drawn from quantitative research methodology. The survey is used to establish a baseline on the relationship between marketing mix and repurchase intention of Thai consumers on e-marketplace in Thailand. The total sample for this study consists of 400 samplings. 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.

3. RESULTS

A total of 400 usable questionnaires are obtained. The results show the distribution of usable responses by gender; consist of 209 males (46.3%), and 191 females (53.7%). The respondent response by age; 24.5% report their age to be between 18 and 32; 53.3% report their age to be between 33 and 40; 18.4% report their age to be between 41 and 50; 2.3% report their age to be between 51 and 60; and 1.5% reports his/her age to be over 61. The respondents report their average spending each time on the market place, 26.85% report that the company revenue is less than 500 baht; 32.02% report that the company revenue are between 501 - 1,000 baht; 24.43%report the company revenue are between 1,001 - 2,000 baht; 11.14% report that the company revenue are between 2,001 - 3,000 baht; 3.71% report that the company revenue are between 3,001 - 5,000 baht; and 1.85% report that that the company revenue are over 5,000 baht. The results show the distribution of usable responses by emarketplace shopping frequency per month; 10.5% report that they purchase a product on e-marketplace once a month; 39.3% report that they purchase a product on e-marketplace 1-3 times a month; 27.9% report that they purchase a product on e-marketplace 3 – 5 times a month; and 22.3% report that they purchase a product on emarketplace over times a month. The result presents the frequency of the main product category they purchase mostly; 34.4% report that they purchase mostly on electronic product category; 27.4% report that they purchase mostly on toys and kids' product category; 24.7% report that they purchase mostly on fashion and cosmetic product category; 8.5% report that they purchase mostly on sport and outdoor product category; 3.3% report that they purchase mostly on home appliance product category; and 1.7% report that they purchase mostly on pets' product category. The result also presents the frequency of the primary e-marketplace that respondents visit. 54.2% report that they frequency visit and purchase is Lazada; followed by 11th street (30.7%), and shopee (15.1%).

Table 1 shows the respondents are asked their opinion regarding product factor in marketing mix element that they have experienced in the e-marketplace. The most frequency endorsed responses is many seller and stores are available (mean = 3.96), followed by several brands are available to choose (mean = 3.90), good packaging and visual appearance (mean = 3.78), customer service is helpful to solve the problem (mean = 3.76), and products are returnable and refundable (mean = 3.62).

Product	Mean	SD.	Ranking
Many sellers and stores are available	3.96	0.56	1
Several brands are available to choose	3.90	0.63	2
Good packaging and visual appearance	3.78	0.54	3
Customer service is helpful to solve the problem	3.76	0.62	4
Products are returnable and refundable	3.62	0.64	5
Average	3.81	0.53	

Table 1 The Mean for Product Factor in Marketing Mix Element

Table 2 shows the respondents are asked their opinion regarding price factor in marketing mix element that they have experienced in the e-marketplace. The most frequency endorsed responses is product's price is cheaper than traditional market (mean = 3.82), followed by product's price is cheaper than other e-marketplaces (mean = 3.75), product's price is included free shipping (mean = 3.71), varieties of payment methods are available (mean = 3.69), and cash on delivery is available (mean = 3.64).

Table 2 The Mean for Price Factor in Marketing Mix Eler	nent
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Price	Mean	SD.	Ranking
Product's price is cheaper than traditional market	3.82	0.65	1
Product's price is cheaper than other e-marketplaces	3.75	0.65	2
Product's price is included free shipping	3.71	0.64	3
Varieties of payment methods are available	3.69	0.68	4
Cash on delivery is available	3.64	0.60	5
Average	3.72	0.56	

Table 3 shows the respondents are asked their opinion regarding place factor in marketing mix element that they have experienced in the e-marketplace. The most frequency endorsed responses is product's price is website/application is easy to access (mean = 4.12), followed by website/application is stable (mean = 3.96), website/application is easy to navigate to find products (mean = 3.92), providing the tracking system to track the order status (mean = 3.66), and rpoviding clear and detailed delivery schedule (mean = 3.61).

Place	Mean	SD.	Ranking
Website/application is easy to access	4.12	0.78	1
Website/application is stable	3.96	0.77	2
Website/application is easy to navigate to find	3.92	0.75	3
products			
Providing the tracking system to track the order	3.66	0.90	4
status			
Providing clear and detailed delivery schedule	3.61	0.87	5
Average	3.85	0.61	

Table 3 The Mean for Place Factor in Marketing Mix Element

Table 4 shows the respondents are asked their opinion regarding promotion factor in marketing mix element that they have experienced in the e-marketplace. The most frequency endorsed responses is product's price is Flash deal draws the attention to keep coming to the e-marketplace (mean = 3.64), followed by e-marketplace provides coupons/codes for extra discount (mean = 3.58), finding banner ads on other websites (mean = 3.43), having notifications alert for new promotion on the mobile phone (mean = 3.42), and having rewards points programs (mean = 3.29).

Table 4 The Mean for Promotion Factor in Marketing Mix Element

Promotion	Mean	SD.	Ranking
Flash deal draws the attention to keep coming to the	3.64	0.84	1
e-marketplace			
E-marketplace provides coupons/codes for extra	3.58	0.80	2
discount			
Finding banner ads on other websites	3.43	0.92	3
Having notifications alert for new promotion on the	3.42	0.88	4
mobile phone			
Having rewards points programs	3.29	0.87	5
Average	3.47	0.69	

Table 5 shows the respondents are asked their opinion regarding the customer repurchase intention through the e-marketplace. The most frequency endorsed responses is I will try to buy from this e-marketplace again (mean = 3.90), followed by this e-marketplace is my first choice to buy through online channel (mean =

3.82), this e-marketplace is my favorite online shopping (mean = 3.81), and I recommend this e-marketplace to my friend for purchasing (mean = 3.80).

Table 5 The 1	Mean foi	Repurchase	Intention t	hrough E	E-marketplace
		1		0	1

Repurchase Intention	Mean	SD.	Ranking
I will try to buy from this e-marketplace again	3.90	0.73	1
This e-marketplace is my first choice to buy through	3.82	0.77	2
online channel			
This e-marketplace is my favorite online shopping	3.81	0.72	3
I recommend this e-marketplace to my friend for	3.80	0.88	4
purchasing			
Average	3.83	0.57	

Table 6 shows the significance of each coefficient for each independent variable. It reveals that the predictor variables of product ($\beta = 0.375$, t = 3.556, P = 0.001), price ($\beta = 0.448$, t = 4.697, P = 0.000), place ($\beta = 0.366$, t = 4.227, P = 0.000), are achieved significance at the 0.05 level, while promotion ($\beta = 0.024$, t = 0.886, P = 0.569) does not reach the 0.05 significant level. Therefore, the regression equation for predicting the dependent variable from the independent variable is

Repurchase Intention = 1.343 + 0.124(Product) + 0.262 (Price) + 0.266 (Place)

Table 6 The Relationship between Marketing Mix and Repurchase Intention

The Relationship between	Regression	Standardized	t	Р	
Marketing Mix and Repurchase	Coefficient	Coefficient			
Intention	(b)	(β)			
Product	0.124	0.375	3.556	0.001*	
Price	0.262	0.448	4.697	0.000*	
Place	0.266	0.366	4.227	0.000*	
Promotion	0.024	0.033	0.886	0.569	
Constant (a)	1.343		7.997	0.000*	
R = 0.669, R2 = 0.667, SEE = 0.290, F = 50.142, P = 0.000*					

*P < 0.05

4. DISCUSSIONS AND RECOMMENDATIONS

According to the finding, customers are willing to repurchase a product through e-marketplace once they can find the product of what they are looking for; therefore, the e-marketplace providers should pay close attention on the developing the website/application interface, which is significantly important to consider design elements as tools to guide the user into the shopping experience and make customer feel good not confused (Gutierrez, 2016). According to Worldpay (2012), they found that customers left the shopping website because the navigation on the website was too complicated. Furthermore, the result found that effective pricing is essential for the e-marketplace competition. Pricing has been using for creating marketing strategies in decades. According to Shankar, Rangaswamy, and Pusateri (1999), they found that price is important and influence purchase decision. It may imply that customers who perceive price to be an important attribute will spend the time and effort to find the lowest price. Therefore, online business environment, pricing is particularly important that the online sellers have to pay attention on the customer behaviors and insights into price search behavior providing a managerial basis for improving the value of the product or service. Yulisetiarini, Subagio, Paramu, and Irawan (2017) also found that price in online shop was very affordable and customers tended to come back to purchase again. Furthermore, self-purchasing system might cause some problems, especially for new customers who first come to shop online. Thus, the unexpected experiences of online purchasing may impact on future purchases. Good customer service can increase personal and business purchases. Yulisetiarini, Subagio, Paramu, and Irawan (2017) found that service quality is a crucial factor that interpreted the customers' effort to fulfill the needs and wants. Kim and Na (2015) found that service quality was the attribute affecting on customer repurchase intentions in online fashion shopping mall. Although it seems that online customers are unique which is not loyal to one particular e-marketplace, the customer repurchase intention is likely based on their experience during the first transaction. The possibility of repurchasing in the same e-marketplace are depending on the perceived of ease of use, including user interface, the searching and navigating system of the application/website, customers service or sale representation which are available and helpful, and price competitiveness. Therefore, the recommendations are suggested as the followings:

1. E-marketplace providers should not change the application/website theme or design, causing the customer confused and difficult to find products they look for. Furthermore, to make purchases simple will increase the quick purchasing transaction, since the customers do not need to fill out some basic information again such as name, address, and credit card numbers.

2. E-marketplace providers should focus on customer support services, especially first and foremost on the shopping experience to provide friendly assistance, and preventing buyer's remorse.

3. E-marketplace providers should attempt to turn customers to be the reviewers. Online shopping, customers decide to purchase a product or service based on its reviews; thus, e-marketplace providers should

encourage their customers to provide constructive feedback regarding product, service, and so forth, to get extra discount for further purchase.

4. Although research result found that there is no relationship between promotion and repurchase intention, special event promotion such as birthday can be a very retention tactic.

5. Lastly, to improve better service, logistics and trade efficiency should be concerned. E-marketplace provider should encourage partnerships between e-retailers and logistics players can help overcome these challenges.

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THE DEVELOPMENT OF A SCALE TO MEASURE FOGIVENESS IN EARLY ADOLESCENTS

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ABSTRACT

The purposes of this research were to study the factors of forgiveness and develop a reliable scale to measure forgiveness in early adolescents. The samples were 520 early adolescents, aged 13-15 years, in Bangkok and in the vicinity. They were selected randomly by multistage random sampling. The results showed that the scale to measure forgiveness in early adolescents consisted of 72 items in 3 factors; cognition, affect and behavior. The scale used was a six-point Likert scale with the discrimination value ranging from .230 to.625 and the reliability coefficient (alpha) of 72 items was .94. The confirmatory factor analysis was used to validate the construct validity of the scale, and the result was quite well. ($\chi^2 = 1654.299$; df = 1500 ; Sig = .197 CMIN/df = 1.103;n.520; CFI = .994 ; NFI=.997; AGF = .942 ; IFI = .990; RMR = .020; RMSEA = .012)

KEYWORDS: forgiveness, scale, early adolescent

1. INTRODUCTION

Forgiveness plays an important role in human relationships and is an important value for society. But forgiveness has long been a topic of conversation in both religious (McCullough & Worthington,1999) and

philosophical circles. Recently, however, forgiveness has also been viewed as a legitimate topic of study and becoming an increasingly important issue in psychology which has made forgiveness studies in the psychological field to be on the rise.

With the emergence of positive psychology, which emphasizes the fostering of human strength (Selingman & Csikszentmihalyi, 2000), forgiveness has received increased research attention. However, most forgiveness studies have been conducted with adults in a western setting, with an implicit assumption that forgiveness is identical for people of different cultures. There has been increased interest in studying forgiveness across culture. In this growing area of research, two concerns repeatedly raised by many researchers are the need of conceptual clarity and the development of appropriate measurement devices. Therefore, it is critical to have a tool which can measure this type of psychological change and facilitate further progress.

Definition of forgiveness

The measurement of forgiveness is built upon clear definition but the definition of forgiveness is quite broad. Most researchers in forgiveness agree with the definition proposed by Enright and Coyle (1998):

"Forgiveness is a willingness to abandon one's right to resentment, negative judgment, and indifferent behavior toward one who unjustly injured us, while fostering the undeserved qualities of compassion, generosity and even love toward him or her."

Enright and his colleagues define forgiveness as interpersonal process (Enright & Coyle,1998). Their conceptualization integrates the affective, cognitive, and behavioral aspects in the forgiveness process, and emphasizes the replacement of negative sentiment with positive affect, thought and behavior.

The operational definition of forgiveness in this research is "Forgiveness is the response of the offended toward the offender with cognition, affect and behavior both positive and negative. When the offended forgives the offender there will be a change in the offended's thoughts, emotions and behavior. The positive thoughts toward the offender will increase while the negative thoughts will decrease. The negative emotions and feeling toward the offender will decrease gradually and the positive or neutral emotion will increase although it will not suddenly increase. And the negative behavior toward the offender will decrease, while the positive behavior will increase."

2. RESEARCH OBJECTIVES

(1) To study the factors of forgiveness in early adolescent students.

(2) To develop a reliable scale to measure forgiveness in early adolescent students.

3. RESEARCH FRAMEWORK



Figure 1 Research Framework

4. RESEARCH METHODOLOGY

4.1 Research Design

Since this research is to study the factors of forgiveness in early adolescent students and develop a scale to measure forgiveness, therefore the research design is that of a research and development study.

4.2 Population and Sample

The population of this research comprised of early adolescent students, aged 13-15 years, who were studying in Mathayom Suksa 1-3 in Bangkok and in the vicinity during the 2017 academic year. The sample consisted of 520 early adolescent students, aged 13-15 years, in Bangkok and in the vicinity. They were selected randomly by multistage random sampling.

4.3 Variable

The studied variable is forgiveness in early adolescents. It is composed of three factors: cognition, affect, and behavior.

4.4 Research Instrument: A scale to measure forgiveness in early adolescents.

4.4.1 The development and quality verification of the research instrument.

- 1. Literature Review regarding the concept and theory of forgiveness.
- 2. Survey the opinion of 100 early adolescent students regarding the definition and factors of

forgiveness with open-ended questionnaires.

3. Group interview with 30 early adolescent students regarding the problems of forgiveness.

4. In-depth interview with four experts who are in charge of early adolescent students: one monk, two catholic priests and one imam, a leader of a local muslim community, regarding the definition and factors of forgiveness. All information obtained from literature review, survey with open-ended questionnaires, group interviews, and in-depth interviews was analyzed and classified into three relevant factors: cognition, affect, and behavior.

5. The operational definition of forgiveness in the research was written covering three factors: cognition, affect, and behavior.

6. The first draft of the scale to measure forgiveness in early adolescents was developed using 120 items with three factors. Each factor consisted of 40 items, both positive and negative, and submitted to the Dissertation Control Panel to consider for suggestions.

7. To validate the validity of the scale, it was submitted to the three professional experts to evaluate the correspondence and consistency index of item-objective congruence between question and purpose (IOC).

8. The 104 items within the IOC score range of .67-1 passed the evaluation of the professional experts which were then collected and adjusted with the suggestions of the professional experts

9. The adjusted scale was tried out with 100 early adolescents who were similar with the sample, but were not the sample.

10. The data was analyzed for the power of discrimination of each item by using Item-Total Correlation. The items with scores ranging between .230 and .625 were selected and the Cronbach coefficient (α -Coefficient) was used for the reliability of the scale, and the result was .95.

11. Finally, with the suggestion of the Dissertation Control Panel and the three professional experts, the scale to measure forgiveness in early adolescents was adjusted from 97 items to 72 items covering three factors of forgiveness. And the Cronbach coefficient (Ω -Coefficient) was used again for the reliability of the new adjusted scale, and the result was .94.

12. Confirmatory Factor Analysis (CFA) was used to validate the construct validity of the scale to measure forgiveness in early adolescents.

4.5 Data Collection

The scale to measure forgiveness was administered to 520 early adolescent students. All data were collected and checked.

4.6 Data Analysis

Descriptive statistics were used to analyze the data with SPSS, and Amos Progam was used to analyze confirmatory factor analysis to validate the construct validity of the scale.

5. RESEARCH FINDINGS

1. The first step of the research was to develop a scale to measure forgiveness in early adolescents, the item objective congruence (IOC) indices were assessed by the three professional experts. The 16 items under .67 IOC score were eliminated.

2. The second step: 104 items of the scale were administered to 100 early adolescent students for finding the power of discrimination and the reliability of the scale. The result was shown on Table 1:

Table 1: Reliability statistics of the scale

Cronbach's Alpha	Cronbach's Alpha Based on Standardized items	N of items
.95	.95	104

After that, seven items with r < .20 were eliminated along with 18 items with the recommendation of the professional experts and the Cronbach's Alpha was used again for 72 items. The result was .94 and details were shown on Table 2:

Cronbach's Alpha	Cronbach's Alpha Based on Standardized items	N of items
Cognitive .94	.94	24 (Item 1-24)
Affective .94	.94	24 (Item 25-48)
Behavior .94	.94	24 (Item 49-72)
Over all .94	.94	72 (Item 1-72)

Table 2: Reliability statistics of the scale classified in each factor.

3. The result of confirmatory factor analysis of forgiveness of early adolescents showed that forgiveness in early adolescents was consistent with empirical data:



 χ^2 = 1654.299; df = 1500 ; Sig = .197 ; CMIN/df = 1.103; n.520; CFI = .994 ; NFI=.997; AGF = .942 ; IFI= .990; RMR = .020; RMSEA = .012 .

The results analysis has validated the construct validity of the scale to measure forgiveness in early adolescents because the confirmatory factor analysis is a good technique and way to validate the construct validity

6. DISCUSSION

1. The Cronbach's Alpha Coefficient (α) was used to measure the reliability of the scale to measure forgiveness in early adolescents and the result is .94 The internal consistency of the scale should be \geq .70 (Thaweerat, 2000). This means that the internal consistency of the scale to measure forgiveness in early adolescent in this research is excellent.

2. The study of the factors of forgiveness in early adolescents found that the forgiveness in early adolescents consists of three factors: cognition, affect, and behavior. The highest factor loading of forgiveness in early adolescents is cognition (.95), affect (.84), and behavior (.66) respectively. And the factor loading of cognition with the observed variables, item numbers 1-24, was between .41and.72; for affect, item numbers 25-48, was between .42and.76; for behavior with the observed variables, item numbers 49-72, was between .44 and.82. So the scale to measure forgiveness in early adolescents has been developed consistently with the result of the data analysis.

7. SUGGESTION

(1) The research results validated the consistency of the forgiveness in early adolescents model with the empirical data, so these factors should be taken for consideration in doing the experimental research to develop forgiveness in early adolescents.

(2) The results of this study yield the scale that measures forgiveness in early adolescents. The scale is three-dimensional with cognitive, affective and behavioral dimensions. In addition, measurement occurs both positively and negatively. This scale will be useful in a developmental guidance field and in a school setting. It will measure the changes when used before and after interventions as well as assess areas to focus on. It will be useful in workshops and educational setting in terms of defining and describing forgiveness, and as a preventive measure.

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THE SHIFT OF JAPANESE OVERSEAS ENGLISH STUDY PROGRAMS TO ASIA PACIFIC NATIONS: FACTORS AND CONSEQUENCES

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ABSTRACT

The patterns of Japanese short-term overseas English study have changed markedly in recent years. Due largely to a growing preference for "cheaper, closer, and shorter" programs, there has been a shift away from Western venues (the USA, the UK, Canada, Australia, and New Zealand) in favor of Asia-Pacific nations such as the Philippines, Malaysia, Singapore, and Thailand. If this trend persists, two possible results with considerable socio-linguistic and economic significance could be: 1) a radical transformation in Japanese attitudes toward English as the principal medium of international communication, likely impacting areas ranging from educational policy to Japan's foreign relations; 2) the increasing commodification of English as entrepreneurs in the Asia-Pacific region attempt to profit from the situation by aggressively marketing their "hit product" : the cheap, short-term, intensive English-study program.

This paper begins with an outline of the principal factors influencing the shift toward short-term English study in the Asia-Pacific region by Japanese and a description of the current situation in this area. It then proceeds to an examination of 1) and 2) above, focusing on how exactly Japanese attitudes toward English may change, what the precise impact of such a change may be on Japan and the region, and what the larger socio-economic implications of the commodification of English may be. The paper concludes with a consideration of possible outcomes in the event that this study-abroad trend persists.

KEYWORDS: study abroad, outer- and expanding circles of English-speaking nations, language attitude, commodification of English study

1. INTRODUCTION

Japanese have been studying abroad in significant numbers for the purpose of improving their foreign language skills and familiarizing themselves with other cultures for the better part of half a century. As a result of Japan's rapid and substantial economic growth during the 1960s and the 70s, by the mid-1980s study abroad had transformed from an activity long limited to a tiny elite into something akin to a mass phenomenon, engaged in by tens of thousands of mostly middle-class citizens each year. While annual totals have declined somewhat from a peak of 82,945 in 2004 (Ministry of Education, Culture, Sports, Science and Technology, 2014), they are still impressive enough to demonstrate that the popularity of study abroad remains very high among the Japanese.

Until quite recently, the overwhelming majority of Japanese studying English overseas—the most common purpose of study abroad for Japanese— opted for venues in what Kachru (1996) famously termed the "inner circle" of English-speaking nations, and almost exclusively confined their choices to just five of those nations: the USA, Canada, the UK, Australia, and New Zealand. Since the late 2000s, however, interest has steadily grown in alternative venues located (once again using Kachru's formulation) in the "outer circle" and "expanding circle" of English-speaking nations⁽¹⁾, primarily in the Asia-Pacific region. The reasons for this, as for any social phenomenon, are undoubtedly varied and complex, but in order for such a dramatic shift to have occurred, there logically must have been at some point a significant reconfiguration of the requirements and expectations of Japanese regarding study abroad (particularly of younger Japanese, who make up the vast majority of those engaging in this activity). These new requirements and expectations would appear to have been adjudged by an increasing number of Japanese to be better satisfied by venues in "outer/expanding-circle" nations of the Asia-Pacific region than by traditional Western venues.

The importance of the growing popularity among Japanese of Asia-Pacific venues for English study cannot be overstated. It extends well beyond just the impact the trend is having on international-education patterns (as significant as that undeniably is). The language attitudes of Japanese (and the nation as a whole) are highly likely to be affected in the long term, as a result of exposure to varieties of English that differ significantly from what Japanese have long believed was the only "correct", "standard" English—American or British RP English. Perhaps even more significantly, the nature of English-language study and, in a sense, even the nature of the English language itself are already being affected, as the increasingly-popular "expanding circle" venues market English study purely as a kind of "product" in the absence of any natural ties between the language and mainstream local culture/society. In addition, this trend could conceivably have a degree of long-term economic impact on venue nations, depending on the scale that it assumes there, and the extent to which it persists.

2. OBJECTIVES

The objectives of the current study are as follows:

(1) to clarify the principal factors influencing the shift in Japanese preferences for Overseas shortterm English-study venues, and characterize the current state of affairs;

(2) to consider the possible long-term effects of English study by Japanese in "outer-" and "expanding circle" nations on a range of Japanese attitudes, particularly those regarding what constitutes "correct" English;

(3) to examine some possible socio-economic effects of the "commodification" of English study.

3. TOPIC (1): The Changing Equation in Overseas English Study by Japanese

Socio-economic conditions in the Japan of the early 21st century appear to have led the average studyabroad "consumer" to take a significantly different view of the activity than hitherto prevailed among Japanese. Earlier "consumers" seemed to be largely resigned to study abroad being an inherently costly, time-consuming, arduous, and highly-stressful undertaking, apparently adopting the stance that these formidable downsides would be outweighed by the considerable benefits of study abroad. Today, however, just as Japanese consumers in general have been showing themselves to be more demanding, more assertive of their supposed rights as consumers, many of those considering studying English overseas seem to be requiring more from providers, suggesting that they are less willing to meekly accept the notion that study abroad must necessarily have the above negative characteristics. The first of the following three conditions has been determined to clearly be one of the current requirements of study-abroad programs. In addition, it would logically be quite conceivable that the other two also figure large in the calculations of many of today's study-abroad "consumers":

- 1) <u>"An-Kin-Tan"</u> (lit. 'cheap, nearby, brief', a term coined by study-abroad industry personnel). Decades of economic doldrums have made Japanese consumers of all stripes hyper-conscious of cost and aggressively determined to get their money's worth out of every investment, however modest. At the same time, the pace and pressures of 21st-century life severely restrict the amount of time the average consumer has to engage in any given activity. In the study-abroad context, this means that the consumer will seek out programs which have the lowest possible prices while being maximally efficient in terms of use of time (including travel time to and from the venue).
- 2) <u>maximally effective/efficient approaches to instruction</u>. If the underlying principle in 1) is ultimately maximum cost-effectiveness, the study-abroad "consumer" could easily be expected to not merely be concerned about price and brevity, but also about how well the very limited amount of time available to

him/her for study abroad is utilized, i.e., how much improvement in English ability the local educational institutions can bring about regardless of the length of a student's stay.

3) learning conditions which minimize "language anxiety". A substantial amount of research in the field of foreign-language acquisition over the years has been devoted to the issue of "language anxiety": how insecurity related to lack of ability in a target language, an unfamiliar learning environment, and the like can affect learning outcomes. Even the most demanding study-abroad "consumer" would likely be rational enough to accept the logical impossibility of finding an English study venue at which there would literally be no language anxiety whatsoever, particularly if the learner were not at a very advanced level of proficiency. Yet it is only natural and quite understandable that any learner would desire an environment in which the anxiety could at least be kept to an absolute minimum—for example, an environment in which the communicative competency of those interacting with the learner was not significantly greater than his/her own, or one in which the learner would not have to expect negative/hostile reaction from interlocutors due to his/her errors in expression.

Such conditions as these prove to be largely satisfied by "outer/expanding circle" nations in the Asia-Pacific region. Costs are commonly no more than half of those in traditional Western venues; the geographical proximity to Japan of most of the nations in question is significantly closer than that of any "inner-circle" English-speaking nation. As for approaches to instruction, intensive one-on-one- and small-group lessons ensuring the best possible gain for the time invested have been the norm at most venues from the outset testimony to the business acumen of local and foreign entrepreneurs who seem to have quickly determined what could help most to attract substantial numbers of Japanese customers. Finally, even the language anxiety issue is effectively addressed—in fact, largely rendered a non-issue—by the objective linguistic reality in those nations, i.e., the reality that the vast majority of inhabitants are not speakers of English as their first/only language (so-called "native speakers") and therefore are highly unlikely to harbor narrow/strict views of "correct English" or any sort of superiority complex toward those who speak other varieties of English (or have only limited proficiency).

The result of this has been a steady increase, since the late 2000s, in the number of Japanese engaging in English study (particularly short-term study) in the Asia-Pacific region, as the reality of its advantages has become more widely known (largely via aggressive marketing on the Net and a plethora of books and newspaper/magazine articles on the subject). The Philippines, the most popular of the venues up to now, has seen the most dramatic increase, with the number of Japanese officially registered with the Philippine Board of Tourism as engaging in short-term English study reaching approximately 35,000 in 2015 (although the real numbers are believed to be considerably higher, as many appear to ignore the legal formalities and simply study on tourist visas). (*Nikkei MJ* 11/11/2016) Precise figures are difficult to obtain for most of the countries

concerned, due to factors ranging from government unwillingness to release such information, to a lack of record-keeping systems which distinguish between those in-country specifically for short-term English study and those in-country for other purposes. While researchers are thus left largely dependent on indirect and/or anecdotal evidence, such as Japanese study-abroad agency reports, information on the websites of language schools in these countries, and interviews with participants, the picture that emerges seems to suggest that this is a region-wide phenomenon of considerable scale, engaged in by tens of thousands of Japanese each year, and impacting to varying degrees the economies of a full 10 Asia-Pacific nations.

4. TOPIC (2): Possible Long-Term Effects of Studying English in "Outer/Expanding

Circle" Nations of the Asia-Pacific Region

If the popularity among Japanese of studying English in the "outer/expanding circles" of Englishspeaking nations persists and grows, it could over time have a very profound impact on a range of important issues.

The initial—and perhaps the most obvious—impact would likely be on *Japanese perceptions of the English language*. A sizeable body of research in the field of language attitude conducted in recent years has for the most part convincingly demonstrated that prolonged exposure to a given variety of a language generally results in greater tolerance of /positive attitude toward that variety, even acceptance of it as "legitimate" in many cases⁽²⁾. Up to now, it has been considered intuitively obvious by most Japanese that English is "owned" by the nations of Kachru's "inner circle"—particularly by the USA and the UK—and that, consequently, only the varieties used in those countries are "correct" forms of the language, the standards against which all other forms must be measured, and the desired goals of English study. All forms of English found elsewhere—including Japan itself—are nothing more than sub-standard, broken English, the result of insufficient effort and/or opportunity to learn the language properly. If, however, an increasing number of Japanese were to experience lengthy and in-depth exposure to other varieties of English by studying the language in "outer/expanding circle" nations and interacting in those varieties with locals, their perceptions of English could be expected to radically shift, conceivably to the point where they would accept all variants, even "Japanese English", as wholly legitimate, and (as a natural consequence) reject "inner circle" English as the benchmark of correctness and ultimate goal when studying the language.

Once fundamental Japanese perceptions of the English language were altered, a veritable domino effect (or chain reaction) could be expected, with *Japanese approaches to teaching English* certain to be impacted next. The disappearance of a standard for "correct" English resulting from the acceptance of all (or at least multiple non-"inner circle"-) variants as equally legitimate, and the rejection of American or British English as the sole correct variants, would necessitate a thoroughgoing revision of longstanding approaches to the teaching of English in Japanese grade schools and colleges/universities. One major component of this would be a drastically different way of presenting English to learners: as a language "belonging to everyone", including Japanese, subject to reshaping and remolding over time by their entirely legitimate ways of using it, and utilized primarily as a means of communicating not with Americans, Britons and people from other "inner circle" nations, but rather with non-native speakers like themselves. As a consequence of this, there would then have to occur a profound change in methodology, particularly with regard to such issues as error-correction and the determination of the precise goals of study: in the absence of the clear guidelines hitherto provided by the American/British model of correctness, the very term "incorrect" would be rendered largely meaningless, as would debates over what might constitute evidence of mastery of (or even a high level of proficiency in) the language. Educators would essentially be embracing something very similar to the "English as a Lingua Franca (ELF)" conception of English for international-communication purposes, according to which (in the formulation of Seidhofer, Jenkins, Cogo, and other leading researcher-proponents) *functional effectiveness* is the sole concern—if a given grammatical construction, intonation pattern, or way of pronouncing a word does not prevent or seriously hinder conveyance of the intended message, then it is entirely "legitimate", regardless of how significantly it may differ from "inner circle" English.⁽³⁾

Over time, the considerable psychological impact of the two major shifts described above could then conceivably bring about changes in outlook and behaviour on the part of the Japanese related to how they interact with the outside world. Only speculation is possible at this early juncture, but it would not seem unreasonable to imagine, for example, Japanese (and Japan as a nation-state) acquiring a greater degree of self-confidence in its dealings with the nations of the "inner circle" once the latter's privileged status as "owner" of the de-facto international language (and the aura of superiority that has accompanied it) was lost. It would also seem quite possible that embracing the ELF concept (as well as, of course, the experience of study-abroad in the Asia-Pacific region that ultimately led to this) would strengthen feelings of kinship with other nations of the "outer/expanding circles" of English-speaking nations in the region, thus leading to even stronger and more extensive cultural and economic ties, and a subsequent reconfiguration of politico-economic power structures there.

5. TOPIC (3): The "Commodification" of English

Often pointed out as the principal unique features of studying English in "outer/expanding circle" nations of the Asia-Pacific region are: 1) its relatively low cost; 2) the proximity of the venue nations to Japan, helping to minimize travel time and expenditure; 3) the availability of programs as short as a week or even a day; 4) the ease of combining study with tourism and/or "down time"; and 5) a greater degree of freedom from language anxiety than can be expected in "inner circle" nations. From the "convenience and ease of participation" point of view, it can probably be said that these features constitute distinct advantages. However, continually and exclusively emphasizing just these aspects of studying English in those nations runs the risk

of creating the impression that the sole value of this study option lies merely in its "convenience" and "ease of participation".

To be sure, promoters of the "Asia-Pacific option" must grapple with a formidable obstacle: the unease and skepticism of the Japanese rooted in negative images of nations in that region. Stressing the above features as "surprising advantages" of this study option—something which multitudes of books, articles, and other promotional materials do— is a way of convincing the average Japanese that concern and doubt are in fact unwarranted. Ironically enough, another commonly utilized way is to equate the language experience that can be had in Asia-Pacific nations with that in the "inner circle". An example of this can be found in how promoters typically address the issue of accent, i.e., the worry that "local" (read: non-native/sub-standard) English accents will be picked up by those studying at Asia-Pacific venues. Prospective customers are not only told that such accents cannot be acquired in a short period of time, but are even assured (perhaps for good measure) that all of the teachers involved speak "beautiful, standard" English (Hoshino [2013] is one representative work in this vein). At the root of this is likely a preconceived notion among Japanese that nations of the Asia-Pacific region are not part of the English-speaking world, and therefore the English used there is not "authentic" English; the only option for promoters is thus to adopt a two-pronged approach, assuring their target audience that the English they will learn is wholly "authentic" and "standard" while at the same time strongly emphasizing the advantages listed above.

Nevertheless, if "good value for the money" is pitched as the principal reason Japanese should opt for Asia-Pacific study venues, then English study is essentially reduced to the status of a commodity, something that can be bought and sold anywhere, with cultural contexts and the understanding of (or interaction with) local societies that usually accompanies study abroad being of purely secondary importance. Once English study in the "outer/expanding circle" becomes such a commodity—the mere equivalent of an LCC in the air-travel industry—the question arises of what purpose is even served by engaging in such an activity. Overseas English study detached from local society and devoid of any components allowing for interaction with local people would seem to be largely meaningless and certainly unnecessary in the Japanese context, since intensive study of the language alone can easily be pursued in Japan without sacrificing any of the above perceived advantages of study in the Asia-Pacific region. Ultimately, it can probably be said that the issue of the relevance—and therefore the persistence—of this trend, "Ajia Eigo Ryugaku" (studying English in outer/expanding circle nations of the Asia-Pacific region), will be determined by the attitudes of would-be participants toward such central elements in the equation as language and culture, i.e., whether they choose to value other aspects and potential benefits of the experience. (Higuchi and Naka [2016] provide a detailed examination of the "commodification" issue and some related proposals.)

6. CONCLUSION AND SUGGESTIONS

The number of Japanese opting for short-term study of English in "outer/expanding circle" nations of the Asia-Pacific region such as the Philippines, Malaysia, Thailand, and Singapore has steadily grown over the past ten years, with tens of thousands now pursuing courses of anywhere from one day to two months in length every year in those countries. At present, this trend shows no signs that it will dissipate anytime soon. The trend has the potential to significantly impact a range of important issues by altering many long-standing and deep-rooted Japanese perceptions of them. Foremost among these issues is the nature and status of the English language itself: what constitutes "correct" English, who has the right to determine what forms are correct, who "owns" the language. Depending on the persistence of this trend's popularity, it seems entirely possible that Japanese will come to consider English as their "possession" as well, rather than that of a small elite of "native speaker" nations, and adopt an attitude toward utilization of it not unlike that of proponents of English as a Lingua Franca (ELF), according to which every variation is equally legitimate, and the sole criterion for "correctness" is *functionality*: simply whether or not a given message is conveyed correctly. Once this seismic shift occurs, a number of issues arise. How will English education in Japan change? How will the status and use of English in Japan change? What would happen to English in the inner circle if English in the outer/expanding circle were totally embraced? The increased confidence in their international-communication abilities likely to accompany this shift would over time almost certainly affect nothing less than Japan's interactions with the outside world as well. Will a Japan that has shed itself of any feelings of inferiority in relation to nations of the "inner circle" of English-speaking nations be emboldened to assume a wider range of responsibilities and leadership roles? At the same time, however, this trend could also bring about a commodification of English study which would severely hinder-or even operate at cross purposes to-the rich cross-cultural experiences that should logically be a primary goal of study abroad, regardless of program length, content, or venue. Particularly if we view the shift in attitudes toward the English language as a positive development, and therefore hope for the persistence of this study-abroad trend, it would seem prudent to make strenuous efforts to avoid commodification of English study, with its counterproductive potential, by emphasizing the extra-linguistic benefits of English study in "outer/expanding circle" nations of the Asia-Pacific region.

7) END NOTES

- "Outer circle" refers to nations in which English (for historical reasons) plays a significant role as a second language; "expanding circle" refers to nations with no particular historical ties to the language--essentially all nations not in the "inner circle" or "outer circle".
- As recent examples in the Japanese context, see such studies as: McKenzie, R., *The Social Psychology of English as Global Language*, Springer, 2010, 41-71; Yoshikawa et al., "Eigo Tahenshu to no Sesshoku ga

Gakushuusha ni Ataeru Eikyou" [How Contact with Varieties of English Influences Learners], in *The Journal of the Japan Association of College English Teachers (JACET)*, 2012, 55-80; Hanamoto, H., "How Does the Experience of Exposure to Non-Native English Varieties Relate to Learners' Language Attitudes Toward EIL?", in *Ajia Eigo Kenkyuu* [Asian English Studies] 15, 2013, 125-139.

3) The core ELF position is introduced and discussed at length in works such as: Seidlhofer, B., Understanding English as a Lingua Franca (Oxford University Press, 2011); Jenkins, J., English as a Lingua Franca: Attitudes and Identity (Oxford University Press, 2007); Smit, U., English as a Lingua Franca in Higher Education (de Gruyter Mouton, 2010).

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