An Examination of the Effects of Government's Strategy on SMEs' Decision to Adopt ICT in Thailand

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Abstract

As Small and Medium Enterprises (SMEs) continue to play a bigger role in Thailand's economic growth, increasing SMEs productivity and competitiveness with the use of Information and Communication Technology (ICT) has become an important strategy of the Thai government. Thailand's Department of Industrial Promotion (DIP) has launched a program which aimed to boost ICT adoptions by SMEs by providing necessary ICT solutions. The program consisted of cost-free provision of Enterprise Resources Planning (ERP) and Business Intelligence (BI) systems, consultation and training services, and subsidy of initial investment. This paper aims to investigate the effect of these strategies on SMEs' decision to adopt ICT and to examine that factors that influence their decision. The study used a mixed method of survey questionnaire and semi-structured interview to understand the business nature of participating SMEs, and to gain insights on the factors that affect their decisions respectively. A number of external and internal factors were listed from literature review and were discussed with the top level management of SMEs. The results showed that almost every SMEs were willing to adopt ICT after participating in the program due to expected benefits of improved productivity and cost reduction. The analysis also revealed that the factor that positively affected SMEs' decision to adopt ICT is the consultation and training services. This paper argued that training and consultation actually increased SMEs' confidence that ICT benefits will be realized which led to their decision to adopt ICT. Providing ICT solutions that are simple and cost effective is another important influence in the SMEs decision-making. Findings of this paper can be used as a guideline to refine ICT strategies. In addition, future research can examine the relationship between SMEs' confidence in ICT benefits realization and ICT adoption decision.

Keywords: Information and communication technology, small and medium enterprises, ICT adoption

1. Introduction

Small and medium-sized enterprises (SMEs) play a vital role in a country's economic growth in many aspects. SMEs generally employ the largest percentage of the workforce and are responsible for income generation opportunities (Apulu & Latham, 2010). These enterprises can be described as one of the main drivers for poverty alleviation (Singh et al., 2009) and can even diversify economic activities (Ongori & Migiro, 2010). With increasing competition between regional and international markets, and widespread globalization, government of many countries are under pressure to increase SMEs productivity and competitiveness to improve national economic growth (Singh et al., 2009). To solve this problem, most countries utilize Information and Communication Technology (ICT) since it is widely considered as one of the strategies that improves productivity and competitiveness.

Based on the Office of SMEs Promotion of Thailand, SMEs are defined as businesses with employees less than 50

people and with a fixed asset value less than 200 million Thai baht (5.7 million USD). In Thailand, there are about 2.74 million SMEs accounting for 39.6% of Thailand's GDP, of which, 27.8% belonged to small enterprises and 11.8% to medium enterprises (OSMEP, 2015). The use of ICT among Thai businesses is relatively low. Out of 2.2 million businesses surveyed, only 24.9% are using computers, 20.6% are connected to the internet, 6.8% have their own web sites, and only 1.9% provide online services to their customers (NSO 2015). In order to boost ICT utilization among Thai SMEs, especially those in the manufacturing and service industries, the Department of Industrial Promotion (DIP), a Thai government agency under the Ministry of Industry, has launched a program that provides Enterprise Resources Planning (ERP) and Business Intelligence (BI) software, alongside with professional consultation and training, to assist in its implementation. All of these are free of charge to SMEs during the first year; thus, it is important to understand and assess the impact of these strategies for academic and practical purposes. This research aims to investigate the effect of these strategies and examine the factors that affect the decision to adopt ICT by SMEs in Thailand.

This paper consists of five parts: introduction, literature review, research methodology, results and analysis, and conclusions, implications and limitations.

2. Literature Review

In many economic studies, SMEs play an important role for economic development especially in developing countries (Singh et al., 2009). SMEs are envisaged to grow, expand and mature, and to contribute to the improvement of the country's national economy (Yonazi & Marondo, 2014). SMEs provide the seedbed for employment, and innovations; hence, contribute to the general income of the national economy (Rutashobya & Jaensson, 2004). Ongori and Migiro (2010) argued that SMEs do not only help improve living standards, but also bring about substantial local capital formation. SMEs are known to contribute to the development of several economies in terms of output of goods and services, creation of jobs at relatively low capital cost. In addition, they provide a vehicle for the reduction of income disparities thus developing a pool of skilled or semi-skilled workers for future industrial expansion (Vijayakumar, 2013; Singh et al., 2010)

Recognizing the importance of SMEs to countries' economic growth, many nations around the globe have formulated strategies (e.g. policies) to increase their SMEs competitiveness and productivity. ICT is considered as one of the potential strategies as there are many evidences of the positive impacts of ICT on the business performance firm (Bentahar & Namaci, 2010). Research by Ongori and Migiro (2010) found that ICT allows SMEs to boost their efficiency and competitiveness. ICT provides SMEs with opportunities such as increased productivity and profitability. ICTs are associated with higher productivity, increased customer satisfaction, and improved organizational capacity and overall performance (Bhatt & Grover, 2005). Further, there is theoretical evidence that the adoption and assimilation of ICTs by SMEs is critical to the economic growth of a country. ICT provides SMEs with the potential of overcoming globalization barriers and the capabilities to compete in the global economy (Yonazi & Marondo, 2014). ICT also ensures the management of important information for decision-making. It has also been found that the use of ICTs provides the fundamentals of competitiveness and economic growth for companies and countries that are able to exploit those (Ollo-López & Aramendia-Muneta, 2012).

Though many researches show significant positive relationship between ICT and firms' performance, adoption of ICT by SMEs has been low due to several reasons. One of which is the limited ICT literacy and knowledge on how to integrate ICT into business processes of both SME own-

ers and employees (Consoli, 2012; Sin Tan et al., 2010). Similarly, Arendth (2008) identified the skill deficiencies present in SMEs which include technical abilities and management skills. Unfamiliarity and fear of investing in sophisticated technologies (Bhaskaran, 2013) and perceived high cost of ICT implementation and maintenance are also identified as one of the challenges that hinder the adoption of ICT (Sin Tan et al., 2010). Further, ICT cost contribute to higher percentage of SME's operating budget, which could rather be invested on other resources or used as capital for other purposes that would bring about faster and tangible returns. Moreover, SMEs also perceive ICT as complex, and difficult to understand and apply to their business functions (Consoli, 2012; Tan, et al., 2008). SMEs also find it difficult to cope with the rapid changes in technological advancement (Makiwa & Steyn, 2016). Taylor and Murphy (2004) also pointed out that many SMEs are unaware of the potential of ICT to enhance their business operations by applying it to their products and services leading to low adoption of ICT. Another barrier to the utilization of ICT was identified by Abdullah and Murphy (2015) as the lack of government support in terms of policy and measures that encourage ICT adoption. These issues have been shown to be highly prevalent in SMEs and impede high adoption of ICT in the organization. The situation highlighted above needs to be addressed. Governments and SMEs themselves need to understand and strategize on how ICT can be adopted for growth and sustainability of SMEs; otherwise, adoption of ICT by SMEs may continue to be low. This may lead to missed opportunities, low economic growth, or decreased competitiveness of the country. Both industry and government bodies have a role to play in promoting and supporting small business networking and ICT (Alam & Noor, 2009).

Recognizing these issues, the Thai government has pledged and provided support for the promotion of Thailand's ICT sector through a series of strategies aimed at developing related infrastructure, accelerating innovation, and transforming the country's economy into one that is based on digital technologies.

Various projects have been planned under the initiative, including the delivery of affordable broadband internet access nationwide, improvements in the national e-commerce platform, and deployment of ICT to improve public services offered by state agencies and digital government. In addition, the country's Cabinet officially approved a project entitled "Thailand Economy 4.0" which aims to move Thailand's economy to the next level by facilitating the trade in goods and services through e-commerce (MICT, 2016)

Thai government has issued measures to help increase the adoption of ICT in various business sectors including SMEs. This contributed to 39.6% of the country's GDP according to Thailand's Office of SME Promotion. To support Thailand's government's policy, the Department of Industrial Promotion (DIP) under the Ministry of Industry launched a program that provided SMEs with Enterprise Resource Planning (ERP) and Business Intelligence (BI) software that assisted in different business functions such as budgeting and resource investment.

Enterprise Resource Planning (ERP) is a system that allows a seamless flow of real time information in an organization through integration of its business processes to facilitate information sharing among its various operating units. With globalization and intense competition, many SMEs in developing countries, despite lacking the needed capabilities and resources, are pressured to replace their legacy systems with more sophisticated information systems, such as the ERP system (Kharuddin et al., 2015). Nicolaou and Reck (2004) found that firms adopting enterprise systems exhibit higher differential performance after only two years of continued use.

Business intelligence (BI) comprises a set of tools that transform data into infor-

mation to be used for decision-making. It can refer to any set of software platforms that support organizations in collecting, storing, analyzing and retrieving valuable information and knowledge to support business operations. Several benefits of BI have been highlighted in previous researches including its ability to transform data into meaningful information for decision making, to integrate business information across organizations which improves transparency and speeds up the decision making process, to recognize patterns or trends to improve business forecasting, and detect fraud (Marchand et al., 2002). By analyzing the performance of an organization, BI enables organizations to increase revenue and competitiveness, formulate new strategies, and make informed and effective decisions (Rubin & Rubin, 2013).

Combining both ERP and BI, SMEs should be equipped enough with necessary ICT solutions. ERP helps in terms of planning and control, scheduling and allocating project resources, and forecasting and supporting business processes across functions. BI, ont the other hand, helps streamline information flow for operational and strategic business decision-making. The program also includes consultation and training on how to use and maintain ERP and BI systems. Consultants will work closely with SMEs to understand business requirements and help explain and set up the systems to meet those requirements. Providing technical supports and trainings are identified as critical factors to the adoption of ICT solutions including ERP (Kharuddin et al., 2015). To provide further incentive, the cost of ICT usage and consultation and training for the first year will be free of charge to SMEs with no contractual obligations.

3. Research Methodology

The study employed a mixed method case approach to facilitate deeper understanding of the effects of ICT (ERP and BI) on SMEs provided by Thailand's government and the factors that SMEs considered in adopting the ICT program.A mixed research method can lead to new insights and modes of analysis that are unlikely to occur if only one method is used (Mingers, 2001). According to Silva (2007), researchs on ICT adoption requires explanatory theories and methods which can help explain and understand the phenomena. The qualitative approach serves as a useful alternative and provides rich insights and results (Lee et al., 2003); therefore, this study employed two different data collection methods which include distribution of survey questionnaires and semi-structured interviews.

The survey questionnaire aimed at revealing the profiles of companies and their ICT use and current/future decision to adopt the ICT provided by the government agency. The questionnaire is divided into two sections and contained a total of 31 questions based on literature review. The first section consisted of questions aimed to gather firm-specific information and roles of respondents, and to understand the current use of ICT in their companies. The second part consisted of a series of questions on the factors and aspects in the government's program that the company considered for their current/future decision to use ICT. Likert scale *(1 for strongly disagree; 2 for disagree; 3 for neutral; 4 for agree; and 5 for strongly agree*) was used to measure the respondent's level of agreement. Two main variables were used which are: the awareness of ICT benefits and current/future decision of ICT adoption. The questionnaires were given to a total of 244 SMEs representatives who participated in the ERP and BI program either in the training. consultation sessions or both. Questionnaires were then collected at the end of the sessions. Semi-structured interviews were scheduled and were conducted at the SMEs' facilities with a total of 68 representatives to understand the factors in the program that lead to their current/future decision to adopt ICT.

All the responses received were entered, processed and analyzed using the software application Atlas.ti that allows for processing of textual data for qualitative studies. The software supported complex coding of data and also facilitated manipulation and management of coded statements for further analysis. The software's search procedures allowed the researcher to locate all the occurrences of a particular code, set of codes or categories and retrieve them with corresponding original text segments. Using multiple code searches, it was possible for the researcher to analyze and confirm previously discovered patterns, which served as a form of reliability assessment on the foregoing analyses. Finally, it allowed the better presentation and communication of results.

4. Findings and Analysis

A total of 244 responses (100%) from the SMEs who participated in the DIP program were collected. Out of 244, 194 companies (79.5%) are in the manufacturing industry and 50 companies (20.5%) are in the service industry (see Figure 1).

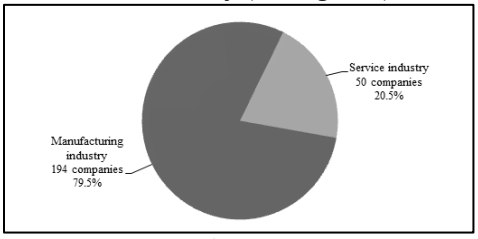

Figure 1: Industries of SMEs that Participated in the DIP Program

Based on revenue, the SMEs included in the study comprised of the following:: 62% or 151 companies have an annual revenue less than 50 million baht; 15% or 36 companies have an annual revenue between 51 million baht to 200 million baht; and 23% or 57 companies have an annual revenue more than 200 million baht. The distribution of SMEs based on business size is shown in Figure 2.

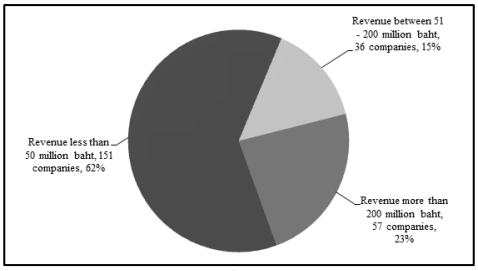

Figure 2: SMEs Classified by Revenue Groups

From the 244 survey questionnaire respondents, 47.06% are involved or responsible for the company's ICT (e.g. IT managers), 39.3% are company owners, and 13.63% are major shareholders of the companies (see Figure 3). The 68 respondents for the semi-structured interview are composed of the following: 82% owners and 18% are responsible persons for company ICT.

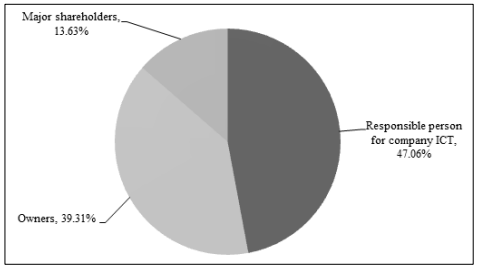

Figure 3: Roles of Respondents who Completed the Questionnaires

All of the SMEs that participated in the study already have an ICT to support its business but each have different objectives: 52.73% uses ICT to support sale and marketing functions; 45.45% to support manufacturing function; and 3.64% uses ICT for general administrative purposes. None of them has neither ERP nor BI systems.

As shown in Table 1, out of 244 companies, 236 companies or 96% strongly agreed to continue the use of both ERP and BI systems provided in the program even after the end of the program.

Table 1: SMEs Responses if They Intend to Continue to Use ERP and BI Systems

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Number of responses	0	0	1	7	236

Table 2: The Second Part of the Questionnaire Was Used to Measure Current/Future Decision to Adopt ICT and the Factors in the Program that They Considered in Their Decision for Current/Future ICT Use.

1.	ERP can reduce operating cost
2.	ERP can reduce redundant business processes
3.	ERP can improve customer satisfaction
4.	ERP can increase revenue
5.	BI can reduce operating cost
6.	BI can reduce redundant business processes
7.	BI can improve customer satisfaction
8.	BI can increase revenue
9.	ERP should be easy to use
10.	BI should be easy to use
11.	ERP cost is an important deciding factor
12.	BI cost is an important deciding factor
13.	Cost is the most important deciding factor when considering ICT
14.	Ease of use is the most important deciding factor when considering ICT
15.	Business return is the most important deciding factor when considering ICT
16.	Having an experienced consultant is the most important deciding factor when considering ICT
17.	Financial subsidiary is the most important deciding factor when considering ICT
18.	Do you intend to continue using and investing in ICT after the program finishes?

The survey questionnaire also asked participants to identify their anticipated benefit from the use of ERP and BI systems. Results showed that the expected reduction in operating cost and decrease in redundant business processes are the two most important anticipated benefits with 42.8% and 35.7% of respondents respectively. Only 15.1% and 6.4% of SMEs anticipated improvement in customer satisfaction and increase in revenue as shown in Table 2.

Further analysis by industry type, revenue group, and roles of respondents also revealed similar results in which reduction in operating cost and decrease in redundant business processes are the two most important anticipated benefits; however, the service industry and revenue group between 51-200 million baht stated that the most important benefit from ICT is the increase in customer satisfaction.

This finding is similar to the study of Bhaskaran (2008) which indicates that the vast majority of SME owners/operators believe that ICT is unlikely to contribute to strategic objectives such as expanding to new markets and increasing penetration in existing markets. This finding has also confirmed the government's assumption that ICT could have a positive impact on SME productivity, hence enhancing the country's competitiveness.

Analysis from interviews revealed several important insights that lead to better understanding of SMEs' current/future decision to use ICT and the effects of the program. While SMEs already have ICT solutions to support their business to a various extent, SMEs only use ICT with rudimentary capabilities such as stand-alone software, Microsoft Office, Email and Internet. During the discussion about the adoption of ICT, they were all aware of the potential benefits from its use especially cost reduction; however, they perceive that the implementation and maintenance of the ICT are costly or even considered as burdens to the business. One common cause for this was that the benefits they expected from their investment on ICT have not yet been fully realized. These findings are similar to other researches which identified ICT cost, perceived complexity of ICT, and negative perception towards ICT of SME

manager and owners are common ICT adoption barriers (Consoli, 2012; Tan et al., 2008; Makiwa & Steyn, 2016).

Table 3: Anticipated Benefits from Using ERP and BI Systems

	Number of SMEs	% of Responses
Reducing operating cost	101	42.8
Reducing processes	84	35.7
Improving customers satisfaction	36	15.1
Increasing revenue	15	6.4
Total number of SMEs	236	100

Table 4: Anticipated Benefits from Using ERP and BI Systems in Manufacturing Industry

	Number of SMEs	% of Responses
Reducing processes	103	53
Reducing operating cost	85	44
Improving customers satisfaction	3	2
Increasing revenue	3	2
Total number of SMEs	194	100

Table 5: Anticipated Benefits from Using ERP and BI Systems in Service Industry

	Number of SMEs	% of Responses
Improving customers satisfaction	22	44
Increasing revenue	20	40
Reducing processes	5	10
Reducing operating cost	3	6
Total number of SMEs	50	100

Table 6: Anticipated Benefits from Using ERP and BI Systems by Revenue more than 200 Million Baht

	Number of SMEs	% of Responses
Reducing operating cost	45	79
Improving customers satisfaction	7	12
Reducing processes	3	5
Increasing revenue	2	4
Total number of SMEs	57	100

Table 7: Anticipated Benefits from Using ERP and BI Systems by Revenue between 51- 200 Million Baht

	Number of SMEs	% of Responses
Improving customers satisfaction	15	42
Reducing processes	11	31
Increasing revenue	5	14
Reducing operating cost	5	14
Total number of SMEs	36	100

Table 8: Anticipated Benefits from Using ERP and BI Systems by Revenue less than 51 Million Baht

	Number of SMEs	% of Responses
Reducing operating cost	99	66
Reducing processes	32	21
Improving customers satisfaction	14	9
Increasing revenue	6	4
Total number of SMEs	151	100

Table 9: Anticipated Benefits from Using ERP and BI Systems by Owners Role

	Number of SMEs	% of Responses
Reducing operating cost	21	62
Reducing processes	9	26
Improving customers satisfaction	2	6
Increasing revenue	2	6
Total number of SMEs	34	100

Table 10: Anticipated Benefits from Using ERP and BI Systems by Major Stakeholder Role

	Number of SMEs	% of Responses
Reducing operating cost	18	53
Improving customers satisfaction	12	35
Reducing processes	2	6
Increasing revenue	1	3
Total number of SMEs	33	100

Table 11: Anticipated Benefits from Using ERP and BI Systems by ICT Responsible Person

		% of Responses
Reducing processes	100	87
Reducing operating cost	11	10
Increasing revenue	3	2
Improving customers satisfaction	1	1
Total number of SMEs	115	100

This paper identified three key strategies of the program for analyzing its effects on the SMEs and the factors that SMEs considered for deciding current/future adoption of ICT. These are: (1) availability of ERP and BI systems for SMEs; (2) free training and consultation services; and (3) subsidy of first year cost.

Quality and responsiveness of consultants was the most important deciding factor for SMEs to continue or acquire future ICT. Respondents perceived that the training and consultation provided in the program can ease their concerns on ICT adoption. Consultants were perceived as skillful and knowledgeable. They were able to help them understand how ICT can be applied to their business. The consultants also worked closely with SMEs for the installation and set-up of the ICT and for training their staff on how to use ICT tools effectively.

After the program, all respondents agreed that they have better understanding of the potential benefits from ERP and BI systems especially on cost control, and on process organization. They claimed that they obtained better visibility of business performance on a timely manner. Though successful ICT implementation, particularly ERP, has been found difficult in many research studies as it requires careful planning, dedicated and specialized resources, and buy-in from top management and employees (Holland & Light, 1999), respondents still emphasized the important roles of consultants in helping them successfully implement the ICT system. It can then be construed that the expertise of consultants significantly increases the confidence of SMEs in ICT making it an important decision-making factor to continue or to adopt ICT in the future. This result is consistent with the findings of previous researches in developing countries. Ramayah et al. (2007) stated the important roles the consultants play in the success of ERP implementation which include: effectively managing the plan, fitting the business requirements to the system, and training users to use the system.

Easiness to use and implement the ICT platform provided in this program was considered as the next important factor that affects SMEs decision to adopt ICT. The ERP system in the program provided all

basic business functions with user friendly interface including sale order processing, inventory control, order purchasing and accounting functions. All of these adequately meet most SMEs requirements. The BI system provided a user experience similar to Microsoft Excel or Access but with more powerful database management and better visualization. SMEs did not feel that the systems are complex to learn and use. In addition, both systems run on cloud technology which can shorten the installation time and reduce maintenance efforts as all the hardware and software are readily available, pre-set up and well maintained by service providers. While SMEs may not understand the technology well, they perceived that the ICT platform provided is easy to use and implement.

While many researches referred to the high-cost of ICT investment as one of the key barriers of ICT adoption, one-year financial support by the agency in this program did not show strong effects on SMEs decision or current/future decision to adopt ICT across clusters of SMEs by revenue or industry. Many SMEs perceived that the subscription fee of the ERP and BI systems, which is at 9.99 USD (356 Baht) per month per user, is insignificant or even negligible in deciding for ICT adoption. This means that participants gave more interest on quality of consultant support and easiness of the ICT systems to use and implement. They only considered the one-year cost subsidy as an incentive to participate in the program; however, without this approach, SMEs also agreed that they may miss the opportunities in realizing the benefits of ICT.

5. Conclusion, Implications and Limitations

The major contribution of this study is to understand the factors that influence the ICT adoption of SMEs in Thailand and the effects of government initiative on the matter. The findings revealed that providing skillful and knowledgeable consultants and experts to help SMEs implement ICT solutions significantly affects the positive decision or current/future decision to adopt ICT. Another important influence is the type of technology that must fit in the nature of the SMEs' business and be simple and cost effective at the same time. With these two factors combined, SMEs were more confident in adopting ICT as they better understood the benefits of ICT and felt positively toward the successful use and implementation of ICT to grow their business. Perceived challenges noted in this study are consistent with previous researches such as: perceived complexity of ICT, lack of ICT benefits, and lack of resources and support (Taylor & Murphy, 2004). This study, however, did not find strong relationship between a one-year cost-free offering to the adoption of ICT. SMEs perceived it as only an incentive to participate in the government program.

This paper also contributes to both practical and academic knowledge. The findings can be used as a guideline for government agency to refine strategies on how to effectively increase the adoption of ICT. In addition, authors of the study argue that providing qualified consultation service actually increases the confidence of SMEs owners or managers on the use of ICT and allow them to fully realize the its benefits. Future researches can further investigate the relationship between SMEs confidence in ICT benefits and their decision to continue or to adopt ICT in the future.

It should be noted that this research also has limitations. Majority of SMEs in who participated in this research are in the manufacturing industry. As pointed out by Yonazi and Marondo (2014), each SME and industry segment has its own nature and focus which influence the way SMEs adopt ICT. SMEs from manufacturing sector may focus on cost reduction while SMEs in the service sector may focus more on customer satisfaction. SMEs in the ICT industry may even adopt ICT differently as they already have technological knowledge. Future research can be carried

out with more balanced proportion of sample data in various industries to examine if the findings in this research are still applicable. Another limitation of this study is its sample size. It has to be increased in order to improve the existing result.

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