

The Adoption of Digital Technology in SMEs

Anyanitha Distanont and Orapan Khongmalai

College of Innovation, Thammasat University, Bangkok, Thailand

anyacitu@tu.ac.th

okhongmalai@yahoo.com

Abstract: This research aimed to study the factors affecting the adoption of digital technology in SME entrepreneurs. Questionnaire were used as a tool to collect data from 375 samples of SME entrepreneurs in the northern region. The data were analyzed using the Structural Equation Model (SEM). The results showed that the factors of digital technology adoption among SMEs consisted of 3 main components: (1) technological context, (2) SMEs context, and (3) environment context. Technological context is a key factor contributing to the perceived usefulness of using digital technology. The environmental context is the main factor that contributes to the perceived ease of use of digital technology and lead to the adoption of digital technology by entrepreneurs. The research results can be used as a guideline to promote and support the use of digital technology among Thai SME entrepreneurs to increase their competitiveness in the current business environment and get ready for the digital economy era.

Keywords: technology adoption, SMEs, digital technology

1. Introduction

Digital technology has increased the efficiency of work and life, resulting in the transformation of the economic structure into the digital economy that creates opportunities for growth and radically transforms business processes, leading to the 4th Industrial Revolution. The emergence of digital technology has changed the concept of doing business from mass production to reduce costs to personalized production or to create opportunities for virtual products and services in a virtual world. The World Economic Forum predicts that by 2030, global gross product (GDP) about 70% comes from doing business under the digital economy. This forecast reflects that digital technology has played an important role in shaping the future global economy. A digital economy can be defined as an economy in which consumers, manufacturers, and governments apply digital technologies to increase economic value. In the ASEAN region, the survey conducted by EY (2019) found that 81% of the ASEAN entrepreneurs plan to invest in digital technology-related factors, and 80% of the sample are trying to train personnel in the organization to have up-to-date knowledge, while the proportion of entrepreneurs who invest in fixed assets or traditional technology has decreased to about 75%. In addition, according to the data of World Manufacturing Production, in 2019, the world's manufacturing sector had a 2.5% increase in productivity compared to 2018 from 2.3%, due to the application of digital technology by entrepreneurs.

Although digital technology is an important tool in creating competitive advantages for entrepreneurs, for SMEs, there are still problems and obstacles in applying digital technology. The Office of Small and Medium Enterprises Promotion (OSMEP) has divided the problems and obstacles of Thai SMEs into 12 problems. One of the major problems or obstacles of SMEs is the barriers to production technology. This is a problem that directly affects production efficiency (productivity). The government has a policy to support and focus on SMEs in using digital technology to modify and apply in business operations to create speed of adjustment and release new products and services to meet customer needs to create cost leadership, which is the use of technology to reduce costs such as solving problems of overstock, reducing production errors, reducing delivery time to customers, and differentiating in products and services by applying technology to the business.

However, from the data, it was found that the survey data of the Office of Small and Medium Enterprises Promotion (OSMEP) in 2019 found that one of the weaknesses of Thai SMEs is that entrepreneurs in traditional businesses are not aware of the importance and use of digital technology. At present, the old business model may not survive in the long run. Adoption of digital technologies to be used in business operations, therefore, is an important variable for existence in the market. It is also an important part that makes Thai SME entrepreneurs have more competitiveness or at least be able to maintain competitiveness on par with competitors in the market. Therefore, upgrading SMEs with the application of digital technology is important to act that leads to the research question "What are the factors affecting the adoption of digital technology in SMEs?" with an objective to study the factors affecting the adoption of digital technology in SMEs.

2. Literature Review

Technology Acceptance Model (TAM) is a theory that is widely used in the field of technology and innovation management for technology and innovation that occurs, spreads, or is widely accepted and used in society (Davis, 1989). In this study, Technology Acceptance Model (TAM) was applied to study the factors affecting the adoption of digital technology among Thai SMEs (Nurqamarani, Soegiarto & Nurlaeli, 2021). The principle of TAM is the study of factors that influence the adoption and use of new things, whether new products to the market, technology, and innovation, etc. External variables refer to the influence of various external variables that affect the perceived usefulness (PU) of technology, information technology or innovation and the perceived ease of use (PEOU) of such technology, information technology or innovations. If both perceptions occur, it will result in attitude towards using and will result in the adoption of the technology, information technology or innovation eventually (King & He, 2006). There are external variables that affect the perceived usefulness of technology, information technology or innovation, and the perceived ease of use of technology, information technology or innovations.

This study also used Tornatzky and Fleisher’s concept of Technology-Organization-Environment (TOE) that defined the components of technology adoption or technology adoption decision-making processes. There are 3 main components: technology, organization, and environment (Tornatzky & Fleisher, 1990; Chong & Olesen, 2017). These three components are considered external factors that affect the perceived usefulness of technology, information technology or innovation, and the perceived ease of use of technology, information technology or innovation that leads to the adoption of digital technology among Thai SME entrepreneurs. The conceptual framework can be summarized as shown in Figure 1.

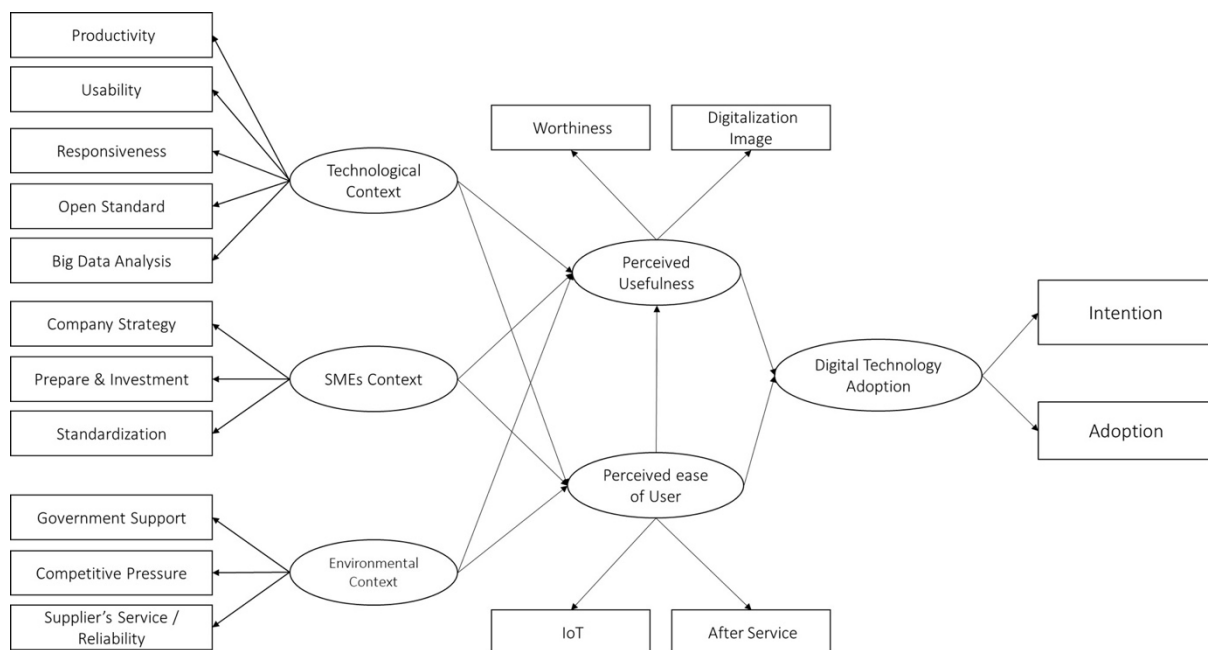


Figure 1: Research Model

3. Methodology

The process of the study can be divided into 4 main steps as follows:

1. Literature study of the main theories and concepts used in this study includes Technology Adoption Theory Model (TAM) and Technology-Organization-Environment concept for developing a research model.
2. A questionnaire was developed as a tool for collecting data. The questionnaire was created and modified by studying various related documents, as well as interviewing with experts relevant to the study. The questions in the questionnaire consisted of closed-ended questions. The use of factors from the conceptual framework and research modeling process to create research tools or design questionnaire. Then, the index of item congruence (IOC) was then taken to test content validity with 3 experts who have experience in policy and teaching. They are digital technology professionals and entrepreneurs who

have successfully applied digital technology. The IOC (Item Objective Congruence Index) was at .50 or higher which is considered consistent with the research objective and can be used (Orapan Khongmalai and Anyanitha Distanont, 2018). The questionnaire was tested with a virtual group of 30 people (pilot test), in order to test its reliability by means of determining the appropriate Cronbach's Alpha coefficient, which must be at least .7 (Lunneborg, 1979).

3. Data Collection and Data Analysis: This study is quantitative research. The population consisted of Thai SME entrepreneurs who were selected by random sampling method. The population includes 375 Thai SME entrepreneurs in the northern region who participated in the Small Entrepreneur Upgrading Project with Digital Technology in 2021. The sample size was determined by using Maximum Likelihood according to the criteria of Lindeman, Merenda & Gold (1980). The research data was analyzed using the data collected from the questionnaire distribution. Exploratory factor analysis (EFA) was used to study the structure of variables by grouping variables and increasing or decreasing existing variables to have a clearer combination and structural equation modelling (SEM) analysis.
4. Conclusion: After the data were analyzed, the research results were synthesized and concluded.

4. Results and Discussion

Exploratory Factor Analysis (EFA) is a correlation test that shows that observed variables can be divided into how many groups of factors that reflect latent variables. The criteria used in the analysis were: (1) the Kaiser-Meyer-Olkin Measure of Sampling Adequacy or KMO, which was used to show the suitability of the data. The value obtained must be at least .5. (2) Total Variance Explained is a confirmation of how much a component can describe the data. (3) Rotated Component Matrix is a value that describes how variables should be in the composition. The value obtained must not be less than .5. All of the values obtained were according to the specified criteria. It can be inferred that the data was suitable for use. The analysis results were divided into 7 components: 1) technological context, 2) technological context, 3) company SMEs context, 4) environmental context, 5) perceived usefulness, 6) perceived ease of use, and 7) adoption to use. All of the components complied with the Exploratory Factor Analysis (EFA) criteria. The data are shown in Table 1.

Table 1: Results of EFA analysis

Factor	KMO (>0.5)	Approx. Chi-Square	Total Variance Explained (>65)	df	Sig.
Technological Context	.618	3647.15	73.065	55	.000
SMEs context	.684	2614.640	85.315	28	.000
Environmental Context	.654	4469.147	90.879	28	.000
Perceived Usefulness	.762	923.196	71.547	6	.000
Perceived ease of use	.773	2509.316	81.672	6	.000
Digital Technology Adoption	.780	847.388	69.422	6	.000

After using the exploratory component analysis, the obtained factors were entered into the Structural Equation Model (SEM), which is a type of statistical analysis. It was used to confirm the research hypothesis, in order to show the relationship in the form of path analysis and evaluation of the relationship both directly and indirectly between observed variables and latent variables by using exploratory component analysis to examine the relationship between variables, in order to create consistency with the studied model. The suitability analysis of the model can be seen from the Goodness-of-fit which is a model indicator created to be consistent and appropriate to the context of the study. It must consist of various values which makes the model fit accordingly. The criteria include CMIN/df must be less than 2 (Ozlem et al., 2017), GFI is greater than .9 (Zhengwei et al., 2017), AGFI must be greater than .9 (Yildirim et al., 2017); RMSEA must be less than .05 (Kwon, and Shin, 2016), and p-value must be .05 (*), .01 (**), .001 (***). The coherence of the models was assessed by adjusting the statistical values to fit between an empirical model and a theoretical model (Tathem et al., 2006) as shown in Table 2.

Table 2: Goodness-of-fit-indices and measure

Measurement indices	Recommended value	Value
CMIN/df	< 2	1.953 (acceptable)
GFI	≥ 0.9	0.921 (acceptable)
AGFI	≥ 0.9	0.964 (acceptable)
RMSEA	< 0.05	0.038 (acceptable)

After that, the model was analyzed using the structural equation modeling technique to test the hypothesis according to this model which will be determined from the Regression Weights table by considering the P-Value at the significance level of .001 (***) and the Standardize Regression Weights less than 1.00. The results of the model adjustment by using advanced statistical program can be used to show the relationship among variables as shown in Table 3.

Table 3: Results of EFA analysis

	Parameter	Standardized	Sig.
PU	<--- Technological Context	.458	***
PEOU	<--- Technological Context	.269	***
PU	<--- SMEs Context	.340	**
PEOU	<--- SMEs Context	.269	***
PU	<--- Environmental Context	.142	***
PEOU	<--- Environmental Context	.355	**
PU	<--- PEOU	.509	***
Digital Technology Adoption	<--- PU	.247	***
Digital Technology Adoption	<--- PEOU	.492	***

Note: *** >.001, ** >0.1, * >.05

Path analysis is an analytical technique to study the causal relationship between independent variables and dependent variables. The relationship between observed variables and latent variables can be summarized as follows: 1) perceived usefulness and perceived ease of use together affects digital technology adoption 31% (R² = 30.59), with the perceived ease of use having the highest coefficient with a coefficient of .492*** and followed by the perceived usefulness with a coefficient of .247***. 2) Technological context, SMEs context, and environmental context together affect the perceived usefulness 51% (R² = 51.40). 3) Technological context, SMEs context, and environmental context together affect the perceived ease of use 39% (R² = 39.10). The details are shown in Figure 3.

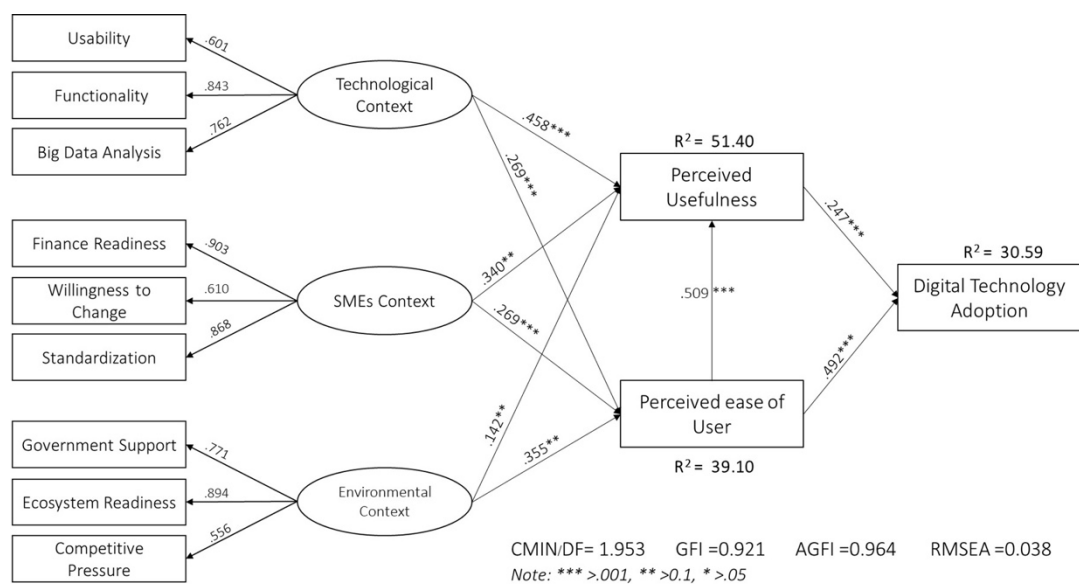


Figure 3: Relationship of Digital Technology in SMES

5. Conclusion and Recommendation

This research aimed to study the factors affecting the adoption of digital technology among SME entrepreneurs. The results of the statistical analysis showed that government agencies or the private sector involved in the policy of promoting and supporting the application of digital technology of SMEs should focus on communicating and educating SMEs on the use of each type of digital technology that is appropriate for each SME in order to achieve recognize the usefulness of using that digital technology, as well as the government should support both in terms of knowledge skill development, access to funding, and the development of ecosystems to be ready for the application of digital technology by SMEs in order to create awareness of the ease and not to see that digital technology as an obstacle or burden that SMEs have to bear. If both of them can be implemented, it will lead to

upgrading the old business to a new business model that will help increase efficiency and make better operations. It can also reduce costs, as well as increase productivity and business revenue.

The approach to implementing it may start from 1) the efficiency and performance of digital technology. It should encourage SMEs to recognize and realize the importance of digital technology that can effectively help solve problems, reduce costs, as well as increase efficiency and income in business. The government should also support in providing such training and knowledge to entrepreneurs and help SMEs in choosing digital technology that is suitable for the type of SMEs and the size of the business in order to avoid increase the burden on entrepreneurs. 2) The government sector should have the expertise to provide knowledge and advice to SMEs during the digital transformation by helping to analyze the problems of the existing system and give advice on the transition to the new system. 3) Recommend the full utilization of digital technology. In addition to the use of digital technology, knowledge of data collection and analysis must also be introduced, as well as storing various data in a database to be analyzed and processed in the form of big data analysis for use in business planning that meets the needs of the market and customers.

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