

# Preliminary Research on Adoption and Diffusion Model of SMEs E-Learning in Thailand

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**Abstract** - The contribution of SMEs to economic growth is widely recognized and Thailand is one of the countries where SMEs have always played a primary role in digital economy environment. This paper is a research-in-progress which aims to construct a conceptual framework to understand adoption and diffusion of e-learning among small and medium-sized enterprises (SMEs) in Thailand. Various models of technology acceptance and adoption are reviewed in this research to analyze and apply for developing the conceptual framework of the research. The future work of the research is explained. The results of the research in this paper will provide recommendations to support SMEs to utilize e-learning to foster the economic impacts to the country. Analysis in this research is based on quantitative approach.

**Keywords** - SMEs, E-Learning, Adoption, Thailand

## I. INTRODUCTION

In Thailand, the pool of SME workers requiring further education and training is significant. However, SMEs often find it difficult to support formal learning activities due to their low critical mass. Economically, e-learning allows for reducing total training costs by eliminating various transportation and accommodation fees which sometimes exceed half of the total costs [1, 2]. Despite these advantages, recourse to e-learning is not often accepted by end users. Therefore, it would be important to determine the factors that

influence the implementation of e-learning among the training practices of SMEs in Thailand. Understanding determinants of e-learning adoption assumes the analysis of the manner with which trainees perceive, express and use this training technique. The objective of this paper aims at constructing a conceptual framework to understand adoption and diffusion of e-learning among SMEs in Thailand.

In this paper, section 2 presents the review of the literature. In the section 3, the paper presents the research framework and hypotheses. The section 3 discusses data analysis methodology. Finally, future works are presented in the last section.

## II. LITERATURE REVIEW

In economic terms, diffusion represents the equilibrium between supply) and demand. If the innovation is successful, demand will increase as the advantages of the product are identified, and equilibrium is reached over time as both demand and supply adjust to meet business needs, supplier costs, and buyers' willingness to pay. Early in the life of an innovation, it is not easy to see where the balance between demand and supply will lie. Innovation theory provides some insight into the processes that occur prior to adoption as potential buyers of new products and services recognize and evaluate them [3].

In the past decades, a number of studies have provided some theoretical frameworks for research in the acceptance of information

technology and information system (IT/IS) [4,5,6]. Among them, the technology acceptance model (TAM) is believed most robust, parsimonious, and influential in explaining IT/IS adoption behavior. Davis (1989) [5] developed the technology acceptance model (TAM) in 1989 to explain the computer usage behavior in 120 users at an IBM research facility. The study revealed that two powerful factors that influence the adoption of technology are perceived usefulness (PU) and perceived ease of use (PEOU).

**Perceived usefulness (U)** - was defined as the degree to which a person believes that using a particular system would enhance his or her job performance and effectiveness.

**Perceived ease of use (EOU)** - was defined as the degree to which a person believes that using a particular system would be free of effort. It relates to the intrinsic characteristics of the technology e.g. ease of use, easy to learn, flexibility; in other words, the degree to which an individual believes that using a particular Information System will be free of effort.

These two determinants serve as the basis for attitudes toward using a particular system, which in turn determines the intention to use, and then generates the actual usage behavior.

TAM was applied to many different sample sizes and user groups within or across organizations, analyzed with different statistical tools, and compared with competing models [7]. However, many researchers have also recognized that the generality of TAM fails to supply more meaningful information on user's opinions about a specific system. There is the need for TAM to incorporate additional factors or integrate with other IT acceptance models for improvement of its specificity and explanatory utility [6,8,9].

Another theory that is widely used as a theoretical framework for various studies of adoption of technological innovation user adoption is Rogers' innovation diffusion

theory (DOI) [10].

Roger and Shoemaker (1971) [11] constructed five innovation characteristics from the summary of previous research, consisting of relative advantage, compatibility, complexity, trialability, observability.

However, analysis of the observability items indicated that the original construct quite complex. Moore and Benbasat (1991)[12] then segregated Roger's observability as comprising two separate constructs, result demonstrability and visibility. They also concluded that each characteristic affects the rate of adoption of an innovation differently.

Rogers' five characteristics of an innovation can be describes as follow:

- **Relative advantage (R)** - is the degree to which an innovation is perceived as better than the idea its supersedes.
- **Compatibility (C)** - is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and media of potential adopters.
- **Complexity (CX)** - is the degree to which an innovation is perceived as difficult to understand and use. Complexity of an innovation can function as an inhibitor to adoption; therefore, the easier to use, the more people tend to adopt them.
- **Trialability (T)** - is the degree to which an innovation may be experimented with on a limited basis. Roger and Shoemaker (1971) [11] suggested that innovation will be adopted and implemented more often and more quickly if they can be tried on the installment plan.
- **Result demonstrability (R)** - is defined as the degree to which the results of adopting/using the innovation are observable and communicable to others.
- **Visibility (V)** - is defined as the degree to which the innovation is visible for anyone to see them on daily usage.

Rogers' relational model is important in providing practical implications and analytical guidelines for research on innovation adoption. However, as five attributes measure different perception of the potential adopters, the predictive power of perceived innovation attributes was found to be different.

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### III. A PROPOSED RESEARCH FRAMEWORK AND HYPOTHESES

TAM and DOI have been proven to be highly successful theories in explaining innovation adoption in many empirical studies [13,14]. Even if these two approaches explain the adoption behavior of individuals differently, the theories share some of the principal constructs.

Moore and Benbasat (1991) [12] concluded that relative advantage is similar to the concept of perceived usefulness in the technology acceptance model and the complexity construct in DOI is very similar to perceived ease of use in TAM.

Thus, this paper proposes the theoretical framework for SMEs e-learning adoption in Thailand based on TAM of Davis (1989) [5] and DOI of Rogers (1995) [10], as shown in fig. 1.

#### A. Measures

According to the ten years information communication technology research for university students made by Macleod et al. (2002) [15], the percentages of users that were expected to use information communication technology frequently increased from 15%-30% to 65%, and the percentages of emphasize on self-use also increased from 20%-35% to 73%, which showed that most learners had more desire to use information communication technology. Therefore, the sample in this study is selected from the learners who were enrolled in the e-learning system, expecting to be a good representative for the study.

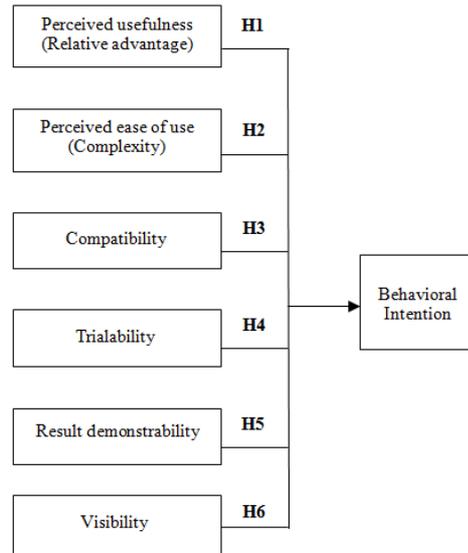


Fig1. Research Framework

In order to gather the data of the student SMEs e-learning adoption, a self-administered questionnaire is used as an instrument to acquire several aspects of respondents' perception. All of the questions are applied and developed from the previous research [5, 6, 14] and measured on a five-point Likert scale with anchors ranging from strongly (1) to strongly disagree (5).

#### B. Research Hypotheses

The research hypotheses for this paper are made according to research model as shown below:

H1: Perceived usefulness will have a positive effect on user intention

H2: Perceived ease of use will have a positive effect on user intention

H3: Compatibility will have a positive effect on user intention

H4: Trialability will have a positive effect on user intention

H5: Result demonstrability will have a positive effect on user intention

H6: Visibility will have a positive effect on user intention

## IV. DATA ANALYSIS

### A. Reliability Analysis

Before gathering the data, overall questions are processes to find out the value of reliability by using the Cronbach's Alpha scores. The reliability analysis verified the precision of the survey instrument and the internal consistency of the measure. The Cronbach's  $\alpha$  coefficients for perceived usefulness, perceived ease of use, compatibility, trialability, result demonstrability and visibility toward user intention to use mobile learning are tested with the cut-off of 0.7 to access the reliability of each construct. As all the values are above 0.7, the reliable of all constructs are acceptable, as recommended by Nunnally (1994) [16].

### B. Correlation Analysis

The averaged item scores are used as a measure of their posited construct.

### C. Hypotheses Testing

The research examined the effect of innovation attributes and user adoption, where two factors in TAM and five characteristics of DOI are independent variables and user intention to accept e-learning is the dependent variable.

To explain and predict relationships between variables, regression analysis is used to test the research hypotheses. The regression analysis is more suitable for descriptive research to predict relationship between independent variables and dependent variable [17].

## V. FUTURE WORK

In the next step of the research, the research methodology in this paper will be conducted and analyze the results. All factors that impact on the adoption of SMEs e-learning systems will be described. Having explored the factors that affect to e-learning adoption will give contribution to the development of guidelines.

1. for organizations and institutions who want to enable their employee or users to learn on the move,

2. for instructors who want to support their learners in their e-learning efforts, and

3. for learners who want to take advantage of technologies to enhance their learning experiences.

For theoretical contribution, the proposed model in this paper by integrating two renowned theories should be helpful for the e-learning designers to improve the effectiveness of SMEs e-learning systems.

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(Arranged in the order of citation in the same fashion as the case of Footnotes.)

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