International Journal of Business, Human and Social Sciences
ISSN: 2517-9411
Vol:10, No:12, 2016

Customers' Intention to Use Electronic Payment System for Purchasing

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Abstract**—**The purpose of this research was to study the factors of characteristic of business, website quality and trust affected intention to use electronic payment systems for online purchasing. This survey research used questionnaire as a tool to collect the data of 300 customers who purchased online products and used an electronic payment system. The descriptive statistics and multiple regression analysis were used to analyze data. The results revealed that customers had a good opinion towards the characteristic of the business and website quality. However, they have a moderate opinion towards trust and intention to repurchase. In addition, the characteristics of the business affected the purchase intention the most, followed by website quality and the trust with statistical significance at 0.05 level. For particular, the terms of reputation, communication, information quality, perceived risk and word of mouth affected the intention to use the electronic payment system. In contrast, the terms of size, system quality and service quality did not affect intention to use an electronic payment system.

Keywords**—**Electronic payment, intention, online purchasing, trust.

I. Introduction

THE current global economy has developed into a modern digital society. The advancement of Internet technology as a rapidly borderless communication tool with a lower cost is continuous. The Internet has played an important role in human life more and more each day. Thailand is one of the countries, where the number of Internet users has been increasing steadily. People began using the Internet to carry out various activities including data searching, communicating and product purchasing. In 2015, the number of Internet users was over 38 million people representing 56% of the total population [1]. The business sector recognizes the new commercial channel that is gaining popularity from consumers since starting e-commerce has lower operating costs compared to the traditional store. This new trend of doing business is suitable for investors with limited funds and entrepreneurs who are starting their businesses. Thus, electronic commerce becomes the channel that businesses develop in order to meet customers' needs fully, where buyers and sellers can carry out business transactions through electronic devices of all types such as the computers, tablets, cell phones, etc.

A survey of the Thailand Electronic Commerce value in the year 2015 of Electronic Transactions Development Agency [1], found that in 2014 the value of e-commerce totaled 58.1 thousand US dollars (2,033,493.36 baht) and in 2015 the value of e-commerce was 60.2 thousand US dollars (2,107,692.88 baht), an increase of 3.65%. The key factors to support the high business value to e-commerce in Thailand compared to other countries in the same region, was the introduction of the 3G and 4G mobile network, and the rapid development of the telecommunications network infrastructure. As a result, the Internet came into the daily lives of more people along with the driving growth of e-commerce businesses. Also, the prices of PC and mobile smartphone are lower as compare to the past. Today, the rate of online users is rapidly increasing to over 30 million. As a result, the entrepreneurs in Thailand recognize the importance of online business and increase investment in e-commerce.

The rapid expansion of trade through electronic commerce and technological progress are the factors that result in the constantly evolving payment services and led to the rapid development of payment systems. As a result, consumers have the opportunity to use a new payment system which is diverse and more complex. The service is quick and more agile with more new service providers, as well as bringing the electronic payment system, as a money transfer, through electronic means such as fax, Internet, computer, telecommunications, mobile phones, etc. Although traditional payment methods, such as via a credit or debit cards continues to be the main channel for online payment, it is expected that the proportion of new payment channels such as real-time transfer or via mobile phones will increase globally from 43% in 2012 to 59% in 2017. This will create business opportunities for new payment service providers in the future. In addition, a survey of the payment services [1] found that operators of retail and wholesale trade give priority to and provide more payment online service than ever before, and more than any other industry at 93.27%. The most popular payment channel are the e-banking services which are payments through Internet banking, mobile banking, and an ATM, which accounts for 54.25%, followed by payments through credit cards and debit cards (22.39%) and payment through a mobile payment aggregator such as M-Pay, True Money, Paysbuy, 2C2P, etc. (14.53%), respectively.

The continued growth of online businesses has led to the rise of online payment system as well. Entrepreneurs and credit card business owners realize that the increase in the number of online payments can increase the efficiency of business management and reduce the use of paper. Studies in the past have found that there are several factors that affect the intention to use the payment system such as trust [2], the perceived risk affects intention or determination in using an

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online payment system [3]-[5]. A model of technology adoption was employed to study attitudes about acceptable forms of online payment and found that the perceived utility and the perception of comfort had a positive correlation with behavioral intention to accept the use of electronic payment systems [4]. As each consumer has different characteristics and the website's system differences have led to the recognition and technology that affect the adoption of online payments. The perception of the quality of system and quality of service have direct effect on the willingness to purchase products over the Internet and repurchase, as well as the innovation adopters affecting the acceptance of Internet purchases [6]. Moreover, researchers also found that the characteristics of the organization on reputation and size had positive correlations with credibility. A large company is likely to be perceived as having more credibility than a smaller one. The correlation between the quality of information, transaction security, communication and word of mouth, have a positive relationship with the credibility and intention to carry out online transactions [7]. Thus, the researcher was interested to study the factors of awareness about E-commerce systems that affect the intention to use payment services through electronic commerce. The research results will be beneficial for the business to create consumer's trust in order to encourage the use of payment services through electronic commerce, which will offer even greater convenience of shopping for consumers. This will create a sustainable competitive edge for the electronic commerce business. This paper aims to focus on the study of the characteristics of the business, website quality and trust in the website which affect the intention to use electronic payment systems for online purchases.

II. The Conceptual Framework and Hypotheses

There are many ways of making payments for purchases in E-commerce both online and offline. Most of the websites of retail business take payments online, where customers can pay through the Internet directly via credit card, electronic cash, and smart card. For offline payments, customers can not pay directly through the Internet, and instead they have to use other means of payment such as bank transfer, payment at the post office and payment for a delivery. Since payment is a critical stage and needs greater security, it should have a way to provide customers with the most confidence to pay. Entrepreneurs need to study the payment system and select the appropriate payment system which allows customers ease of completing a transaction. Also, the criteria for the proper system should be a payment system that is required by law that can be checked, confirm the payment and provide appropriate services to prospective customers. In addition, the agency that acts as an intermediary in the payment must be reliable, effective and credible.

It can be said that payment by credit card is widespread and is currently the most popular for payments on the Internet. The process is that the buyer's credit card number is encrypted and then sent to the seller's website to be decoded to read the card numbers. Basically, it uses Secured Socket Layer (SSL) to encrypt and decrypt. However, buyers may be at risk since the sellers have access to the credit card numbers of all purchasers and may use them in an unauthorized manner, or the hackers may hack into inefficient payment system of sellers. How to solve a weakness of this approach is payment through trusted third party services, where the seller does not know the buyer's credit card number. This can reduce customer concerns when dealing with a seller who they have not purchased from before. The security is very high since the buyer's credit card number is transmitted to or stored in an authorized organization that maintains confidentiality.

From a literature review on the variables or factors in this study, the researcher has adopted the theory of Technological Acceptance Model (TAM) [8], which is a theory that is still popular today to describe the acceptance behavior of individuals to the introduction of new technology Information systems used in organizations. TAM is used in the study to describe the behavior of customer acceptance of electronic payment services when making purchases through electronic commerce. TAM has shown that behavioral intention to use a new information system is based on the recognition of the two factors which are perceived usefulness (PU) and perceived ease of use (PEOU). Perceived usefulness means the level of belief of a person in using new information systems that makes better performance. Perceived ease of use means that the users have expectations that the newly developed systems must be easy to learn and to use. There were studies which employed TAM to analyze payment behavior such as the [5], [9]-[11], whose results supported this theory. It can be concluded that consumers will decide whether to use payment services via E-commerce or not because of their perception in regards to two factors that are the recognition of the benefits and usability of the system.

The perceived risk in the context of online purchases is the perception of customer uncertainty which relates to the negative behavior of customers in product purchasing. Risk affects product or service assessment in the aspect of security and privacy protection of the personal data of customers. The information presented on the corporate website has an effect as well, because the clear presentation of the information required would result in lower perceived risk [12]. The studies concerning the perceived risk of online transactions found that Internet users are aware of the risks and safety of paying online which affect the decision to use the payment services through electronic commerce [5], [13].

Creating trust for electronic payment is an important factor. Trust refers to the belief that a person has toward someone willingly. This is an important tool in building business relationships with customers in the long run. Lack of trust is causing consumers not to make purchases from online stores which results in the failure of e-commerce businesses. Trust also influences consumer acceptance of new technologies and determines consumer's confidence in products [14]. Thus, effective e-payment system with safety protection, privacy, and trust-mark of the site, can create the trust to the system users. Previous research has found that trust is one of the factors vital to the acceptance of electronic transactions or

decisions to make online transactions. Customer trust is based on the attitude of customer toward the offering of products and services of the site, system quality, data quality, and service quality. It is found that customer trust depends on effective and reliable management of the payment systems of the organization that owns the site. These will lead to building customer trust in e-business management, as well as to purchase and to do payment through e-commerce, including the influence of word-of-mouth and the decision to purchase products. In addition, the researchers reviewed the literature on the description of electronic commerce, which refers to the type, quality, or the specific characteristics of an e-commerce business consisting of reputation, size of business, communication, transaction safety, economic feasibility and word-of-mouth referrals. The study of Kim and Park [7] looked at the characteristics of business through e-commerce affecting the credibility and trust of consumers. It was found that the size and reputation of the organization have a positive relationship to reliability. Therefore, a large company is likely to be perceived as more reliable than the smaller one. It was also found that the relationships between data quality, secure transactions, communication and word-of-mouth with reliability and trust were in a positive direction. Also, the relationship between trust, purchase intentions, credibility of variables in the aspects of reputation, size, data quality, secure transactions, communications, economic benefits and word-of-mouth to the purchase intention were positive.

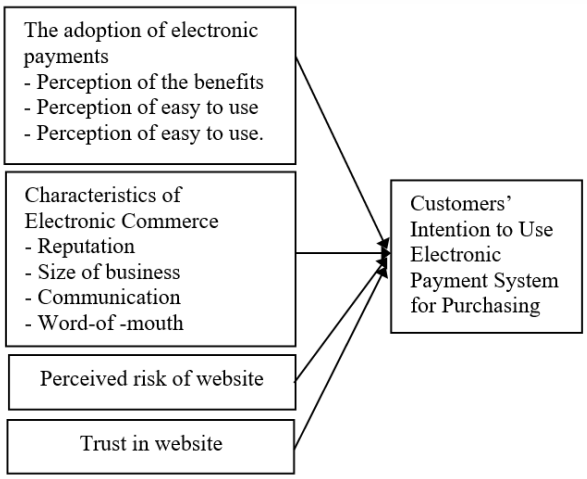

Fig. 1 Conceptual Framework of Research to Investigate Customers' Intention to Use Electronic Payment Systems for Purchasing

The dependent variable in this study is the payment intention which is a process that involves the mind in the planning of the consumers to pay via electronic payment in any period of time. Purchase intention arises from the attitude and confidence in the service provider [15]. The results of the study based on theory and the related research concluded that the factors which affect the decision to use payment services through electronic commerce include technology adoption (TAM) that consists of the recognition of the benefits from its use and recognition that it is easy to use. It was also found that the characteristics of e-commerce business, perceived risk of the website, and website trust affected the decision to pay electronically or online. These issues lead to the creation of the conceptual framework as shown in Fig. 1.

III. Research Methodology

This study was a quantitative research in the form of a survey, cross sectional study and descriptive study using a questionnaire as the tool for collecting data. The population in this research consisted of consumers who have purchased online. The samples were 300 consumers selected by purposive sampling technique. The questionnaire was used to measure the variables in the conceptual framework. There were closed-ended questions utilized a five-point rating scale: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree.

The researcher performed statistical analysis using descriptive statistics to describe the personal data of the respondents and the level of these variables. For hypothesis testing, multiple regression analysis with Stepwise approach was used to analyze the factors which affected the intention of customers to use electronic payment systems. The results of the analysis were summarized in the form of linear equation, and described and compared the relationship of each independent variable which affected the intention of customers to use electronic payment systems.

A analysis of the results of confidence (reliability) of the questionnaire before carrying out the field survey was conducted with 40 consumers who have purchased online or used electronic commerce. Cronbach's alpha coefficient (α) was employed to test the reliability of the questions, which should be between $0 < \alpha < 1$ shown in Table I.

TABLE I
The Confidence of the Questionnaire with Cronbach's Alpha

Variables	Number of questions	Cronbach's alpha coefficient
The acceptance of electronic payments	6	0.854
The characteristics of Electronic Commerce	12	0.795
The perceived risk of the website	3	0.721
Trust in the website	3	0.765
The intention of using electronic payment services	3	0.828
Total questions	27	0.836

The results of the reliability measurements from the group of 40 samples showed that the reliability of the questionnaire was equal to 0.836 and the questions in each variable had the level of confidence between 0.721 and 0.854, which could be concluded that the questionnaire or this research instrument had rather high reliability.

IV. Results

The analysis of 300 samples was as follows:

A. Personal Data of the Respondents

The study on demographic factors showed that the majority of the respondents were male, aged 21 years to 30 years with

an undergraduate education. Most had a monthly income of 500-1,000 US dollars, were single and company employees. For the behavior of consumers in using the payment services through the electronic commercial system, it was found that most of the respondents use the electronic payment systems because of the speed and convenience in doing the transaction, anywhere and anytime. For payment via commercial services, it was found that most respondents did not use electronic payment or online payments; instead, they used offline payments through direct deduction from a bank account, followed by online payments including payment by credit card, payment via e-banking, debit card payments, and Pay-Pal, respectively. It was also found that the types of goods and services paid through electronic commercial system were consumer goods. The period of payment through electronic commercial systems was mainly in the period between 12:00 p.m. to 17:59 p.m. The frequency of payment through electronic commercial systems found the most often was 1-2 times a month and the amount of most was around 86-114 US dollars (3,001- 4,000 baht).

B. The Level Analysis of the Studied Variables

The opinions on various factors affecting the respondents' intention to use electronic payment services are shown in Table II.

TABLE II
MEAN AND STANDARD DEVIATION OF THE STUDIED VARIABLES

Variables	Mean	Standard Deviation
The acceptance of electronic payments	3.94	0.726
The characteristics of electronic commerce	3.86	0.566
The perceived risk of the website	3.59	0.661
Trust in website	3.76	0.597
The intention of using electronic payment services	3.65	0.655

The analysis of the opinion level on various factors affecting the intention to use electronic payment services in this study found that most of the respondents strongly agreed on every factor. Their opinion level on the acceptance of electronic payments that were usefully and easily to use was the most with mean value of 3.94. This was followed by trust in the website, the perceived risk of the website and the characteristics of electronic commerce on reputation, size of business, business communication and word-of-mouth with a mean value of 3.86, 3.76 and 3.59, respectively. The comment on the intention of using electronic payment services was at a high level of 3.65.

C. Hypothesis Testing

Inferential statistics analysis to find the factors affecting the intention to use electronic payment services adopted multiple regression analysis with Stepwise technique. According to the conceptual framework of the study, there were four factors that affected the intention to use electronic payment services. The assumptions that must be tested were as follows:

- H_1: The acceptance of electronic payments affected the intention to use electronic payment services.
- H_2: The characteristics of Electronic Commerce affected the intention to use electronic payment services.
- H_3: The perceived risk of the website affected the intention to use electronic payment services.
- H_4: Trust in the website affected the intention to use electronic payment services.

Multiple regression coefficients from hypothesis testing which used multiple regression analysis and Stepwise procedure are shown in Table III.

TABLE III
STATISTICAL MULTIPLE REGRESSION ANALYSIS

Variables	b	SE	t	Sig.
Constant		0.178	4.194	0.000
The acceptance of using electronic payment services	0.323	0.078	5.569	0.000**
Characteristics of Electronic Commerce	0.107	0.077	1.850	0.076
Perceived risk of the website	0.202	0.084	3.846	0.005**
Trust in the website	0.278	0.086	4.446	0.000**
$R=0.737$, $R^2=0.523$, $F=35.298$, $SE=0.415$				

*Significant at $\alpha = 0.05$, **Significant at $\alpha = 0.01$.

Hypothesis testing H1-H4 using multiple regression analysis had four independent factors affecting the intention to use electronic payment services, namely technology acceptance in e-payment, characteristics of business, and perceived risks of the website and trust in the website. The dependent variable was acceptance of payments online. The results showed that there were three key factors that had a significant value of less than 0.01. It could be concluded that the factors which affected the intention to use electronic payment services included acceptance of electronic payments technology (ß=0.314), perceived risk of the website (ß=0.192) and trust in a website (ß=0.269) at the 0.01 level of significance. While the characteristics of electronic commerce on reputation, size of business, business communication, and word of mouth did not affect the intention to use electronic payment services. The coefficient of multiple correlations (R^2) of 0.523 meant that the influence of the independent variables could explain the variation of the intended use of electronic payment services as 52.3%, while the remaining 47.7% was due to other variables.

Testing results on factors that affected the intention to use electronic payment services can be used to set the multiple regression equation of the sample as follows:

The intention of using electronic payment services = 0.232 + 0.314 (acceptance of electronic payments technology) + 0.192 (the perceived risk of the website) + 0.269 (trust in the website).

V. DISCUSSION

The results of the hypothesis testing on the awareness of an e-commerce system that affects the intention to use payment services through electronic commerce are discussed as:

1. Hypothesis testing is done on the acceptance of the electronic payment service about the perceived benefits of use and recognition that this service as easy to use which

are the variables in the Technological Acceptance Model (TAM) of [8], and is consistent with [9]-[11]. In those studies, a model of technology acceptance is introduced in evaluating the perception of consumers about online payments and found that the perceived benefits and recognition of the easy to use feature have a positive effect on behavioral intention and acceptance to use e-payment of the samples with a positive attitude because of convenience and benefit of the services.

2. To test the hypothesis on the perceived risk that affects the intention to use electronic payment services, it was found that perceived risk has a positive effect on the intention to use the electronic payment services of the sample. This is consistent with [5], [12], who studied the impact of perceived risk online. It was found that there is a positive influence on the decision to use the website of the sample. This corresponds to the works of many marketing academics who explain the perceived risk is the uncertainty of customer perception and resulted in a negative direction with the purchase of goods or services, which [12] proposed that in the online environment, consumers assess risk from the security provided, the privacy of customers personal data, and presenting clear and complete information about the business. Thus, the perceived risk affects the decision of consumers to use e-payment services.
3. To test the hypothesis that trust affects the intended use of electronic payment services, it was found that trust has a positive effect on the intended use of the sample for e-payment. This is consistent with [14] and found that trust influences consumer acceptance of new technologies and contributes most to the success of electronics business. Since it determines consumers feeling confident about products from stores, influence on word of mouth and recognition for the use of electronic commerce services. This is consistent with [2] of trust in B2C (Business to Customer) e-commerce, which found that trust has a relation to the use of electronic commerce between organizations and customers. This is consistent with theories of [15] who say that when a consumer accepts the technology that will lead to a decision to use the service in the end.
4. Testing hypotheses about the characteristics of the e-commerce business on reputation, size of business, business communication, and word of mouth do not affect the intention to use electronic payment services. This is inconsistent with the hypothesis, probably due to the case that a majority of consumers thought that businesses providing online payments should be financial institutions or that consumers prefer the Trustmark rather than the characteristics of entrepreneurial business through social media, where most of enterprises are small and medium sized. This is inconsistent with [7], which showed that the size of the organization has a relationship with positive reliability. The large company is likely to appear more reliable than a small company. In addition, the consumer is not given priority in the field of communication and word of mouth can result from the reason that this research focused on doing business online through the website, rather than doing business through online social media. In the case of doing business through on line social media, communication and word of mouth have correlation with the consumer's positive trust.

VI. Recommendations

The results showed that there are factors that affect the intention or the decision to use payment services through an electronic commerce system. Hence, the business sector should have a strategy and guidelines on creating a payment system, risk management system and trust to its clients in using a payment system through electronic commerce as follows:

1. Technology acceptance factor regarding the perceived benefits affects the decision to use a payment service. Entrepreneurs should conduct public relations by focusing on safety in information storage, convenience, speed and timeliness, and lower fees through various media such as television, online media including Facebook, Twitter, Line, etc., or organize mobile events to reach a wider group of customers. This will make the consumer aware of the benefits of using payment services through electronic commerce and will result in consumers choosing to pay via electronic commerce more.
2. Technology acceptance factor regarding the recognition that the online payment service is easy-to-use affects the decision to use payment services through electronic commerce. Entrepreneurs conduct publicity regarding the steps and the process of online payments clearly through a brochure or via the website, so that customers can understand how to use it any the time, which allow them to be able to learn and follow each payment step easily.
3. Since the trust factor affects the decision to use payment services through electronic commerce, entrepreneurs who have received payments through electronic commerce should set up a trustworthy system that allows consumers to place their trust in the payment. The organization can set up the system as sending the message to the customer when it is paid, sending a receipt back in the form an e-mail confirmation of payment received from the consumer, which provides them with a reference of the transaction and as a way of building increased confidence.
4. Entrepreneurs can apply the results of this study in reference to the factors that influence the decision to use payment services through electronic commerce. To develop and improve the system that consumers are likely to use the service more. By focusing on the utility, convenience of payment to buy goods and services via e-commerce, such as the demonstrated safety supervision, privacy with the credibility of sites like Trustmark, advertising through banners, sending an email to a targeted individuals to keep customers interested and have the trust intention to access the site search for goods and services. The payment system has to be convenient, reliable and trustworthy. Customers will compare

received service with the expectations that have been generated by the promise. If the customer receives satisfaction, trusting belief occurs that will reinforce the strong relationship and can lead to customer loyalty.

ACKNOWLEDGMENTS

The author would like to thank Assoc. Prof. Dr. Luedech Girdwichai, the president of Suan Sunandha Rajabhat University, Bangkok, Thailand for financial support and would like to thank Asst. Prof. Dr. Prateep Wajeetongratana, the Dean of Faculty of Management Sciences for the full support in this research. The author is grateful for suggestions from all those who kindly provide consulting advices throughout the period of this research.

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