The Study of Customer's e-Commerce Adoption Behavior in Different Countries: A Technology Acceptance Model View

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Abstract: In recent years, with the rapid increase in global internet usage, many companies have entered the international market through e-commerce. Which has been regarded as a low cost and speed way. However, these firms have found that there is a lack of knowledge in consumers' needs in the international market, which lead a high fail possibility. Therefore, it is important for the firms to understand the e-commerce adoption and use of behavior in different culture environment. In order to explore the behavior of cross-cultural consumers using e-commerce, this study takes the Technology Acceptance Model (TAM) as the main structure to exam the use of e-commerce for consumers, and adopt technology readiness as external variable to explore if it will affect the use behavior, and finally some elements of Theory of Planned Behavior (TPB) have adopted in this study and intend to strengthen the TAM model. On the other hand, this study is based on three Asian emerging market countries, including Taiwan, Hong Kong and Indonesia. This study-administrated questionnaires to the experienced online shoppers to compare their attitude and behavior in different culture environments. SEM is applied in this study as a main statistical analysis technology. Samples from these three countries were rigorously analyzed and verified. The results show that consumers in higher degree of power distance index (PDI) are less concerned about whether e-commerce can help their own accomplishments, and the rest of results verify the findings of previous studies. This study provides practical advices on the conclusion of the study, provided to the enterprise as a strategy for the development of cross-border e-commerce strategy.

Key words: Technology acceptance model, technology readiness, theory of planned behavior, structural equation modeling, e-commerce adoption.

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1. Introduction

Over the past decade, with the rapid development of Internet technology, global Internet penetration has risen sharply. According to the report of the Internet World Stats [1], at the end of June 2016, about 49.5% of the global population uses the Internet and (the number?) continues to rise, which represents the modern people's way of life and the Internet has a close relationship. Even if people have need to personally go to the physical store experience, trading, payment of the purchase behavior in the Internet and e-commerce booming now, these consumer behavior are done through a virtual path. The advent of electric commerce (EC) not only provides a new business model for enterprises, but also becomes an important part of many lives [2]. In an era of more than 360 million Internet users [1], companies can enter the

international market through e-commerce in a low-cost and fast way to expand market access and develop potential customers. In addition, The Boston Consulting Group predicted that in 2016 the network economy will grow to $ 4.2 trillion in the G-20's national economy, contributing 5% to 9% of GDP growth and developing countries each year 15% to 25% of the market growth. As above showed, we can see the benefits of e-commerce and economic growth, can not be underestimated.

EC is based on the Internet platform, with its own global advantages, in order to make business more competitive and efficient. The original Internet users gathered in Western countries were more than one billion Internet users, occupy the first use of the global network, followed by the European countries and North America [3]. According to e-Marketer in the 2013 report, in 2016, the United States, Canada, Western Europe increased (in addition to the use of EC) more than 75% of Internet users in the country use EC shopping. The popularity of EC in emerging markets is far lower than it is in the Western countries. There is only in the Asia-Pacific region account for 52.5% of the total EC users, of which 12.6% in Indonesia, 26% in India, and 67% in China (including Hong Kong) This suggests that the adoption and diffusion of EC is still uneven around the world, and even in the same or similar cultural background. This research therefore aims to study why there are still many consumers (in certain regions/countries) reluctant to use EC or related advanced technology systems. This study will adopt the Technology Acceptance Model (TAM) [4] and the Technology Readiness (TR) [5] as a consumer's perception of EC behavior usage. As more in-depth understanding of the consumer's new technology to prepare, the extent of its use of EC behavior will have an impact effect.

Based on the above research background and motivation, this study takes the TRAM model [6] from combination of TAM [4] and TR [5] as the main framework of this study to explain EC consumers' use attitudes and intention.

2. Theoretical Perspectives

2.1. Electric Commerce (EC)

The most primitive nature of EC is meant to promote commercial transactions through electronic [7]. Over time, EC has many different definitions. In the present day, popular EC is generally defined as "through any computer or mobile device for any commercial transaction" [7], therefore, where the bank transactions, purchase and sale of products or services, payment, fees, receipt of orders are common business activities. Holsapple & Singh [8] widely explored that the paper, document and electronic information, and five views on the definition of EC, respectively, trading views, information exchange view, business activity, effects view, and value chain view. Holsapple & Singh [8] suggests that EC is a way to achieve the goal of achieving business goals by facilitating the implementation of internal and external value chain activities and helping decision making through the exchange of information [2]. Even if EC has the influence of changing the lifestyle, there still exist huge differences among different countries or regions [9]. Therefore, this study will focus on consumer who adopting EC.

2.2. Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), proposed by Davis 1989, is used to explain and to predict the theoretical infrastructure for individual IT acceptance by examining the use of new technologies by consumers. The development of TAM comes from the extension of Theory of Reasoned Action, which focuses on the social behavior inspired by attitude and execution. The TAM extends from the Theory of Reasoning Action (TRA) which using the TRA theory to explain how external factors affect intrinsic beliefs, the behavioral intentions of users and the use of actual technology [10]. Two key facets are introduced, namely Perceived Ease of Use and Perceived Usefulness. The difference between TAM and other behavioral

theories is that TAM is intended to provide an explanation for the use of broad-spectrum users [11].

The perceived behavior control (hereinafter referred to as PBC) is a new dimension that is used to reinforce the explanatory power of the theory of reasoning action (TRA). Originally by Fishbein & Ajzen proposed rational behavior theory, in the field of social psychology used to understand the individual in the social context of behavior. Based on theoretical maturity, it is considered to be one of the most influential architectures in behavioral theory and is therefore widely used in many behavioral studies [12]. Although TRA is a mature theory, many studies argued that TRA does not have enough capacity to explain certain behaviors [13]. TRA is to assume that the individual has a complete willpower for the conduct of the implementation of the conduct, the conduct of the discussion. While the individual does not have a complete volition control, the application of TRA will be limited [14]. To address this limitation, TRA imports PBC as a third facet that measures behavioral intentions and is called theory of planned behavior (TPB).

PBC refers to the degree to which the individual feels the degree of self-control when performing a particular act. Since the PBC can explain the behavior of an individual in a low-behavior or loss-of-minded environment, the PBC is often considered a factor that reflects the actual behavior [3]. In addition, Taylor & Todd [11] subdivides PBC into self-efficacy and facilitating condition, which enhances the interpretation of its factors. Self-efficacy is interpreted as an individual's ability to use technology to perform specific assignments in information technology research [3], while favorable conditions refer to the extent to which the individual considers the necessary infrastructure to support the use of the system. Based on the above literatures, self-efficacy is consistent with the purpose of this study. Therefore, self-efficacy, which is subdivided by Taylor & Todd [11], will be used as one of the key points of this study.

2.3. Technology Readiness (TR)

Technology readiness refers to the individual's tendency to accept and use new technology to bring time to family life and work goals [15]. Previous studies have found that millions of American workers [16] have computer-related anxiety with one-third of college students [17]. New technology brought about by the uncomfortable, resulting in many people choose to avoid contact with technology, so to explore the consumer for the new technology, the degree of preparation will be important. Mick and Fournier (1998) used a wide range of qualitative research and defined eight paradoxes in order to explore in more detail the reactions of individuals to science and technology, namely (1) control/chaos, (2) freedom/enslavement, (3) fresh/obsolete, (4) efficiency/inefficiency, (5) competence/incompetence, (6) fulfills/creates needs, (7) assimilation/isolation, (8) engage/disengaging. Through the inference of these eight paradoxes, we can see that the technology can lead to positive and negative feelings at the same time, thus affecting the individual's use of new technology. In the TR architecture, the individual's tendency to use new technology can determine the individual's tendency for new technology from the mental state of the enabler and the inhibitor [15].

Parasuraman and Colby [18] found that there was a significant change in the quality of technology for the customer base in terms of network-related behavior. Yen [19] pointed out that not all users have the same preparation for technology-related services. Therefore, in assessing the adoption of technology-related services by consumers, technology preparation can not be ignored and its role should be able to explain and incorporate any technology to accept the architecture. Lin, Shih & Sher ([20] argues that TR focuses on measuring the inner state of mind of technology users, while TAM reflects the user's use of technology, and therefore develops a model that combines TR and TAM for its relationship TRAM (TR and Acceptance Model).

3. Methodology

3.1. Research Framework

The research framework of this study focuses on the use of TAM model proposed by Davis [4] to explore the use of EC by consumers and to influence TR according to TRAM [6]. The external variables of TAM measure the impact of TR on consumers' acceptance of EC usage. Finally, the impact of the PBC variables on the use of EC in the context of low-performance control or loss of willpower control. The structure of this study and Hypotheses Development are as follows:
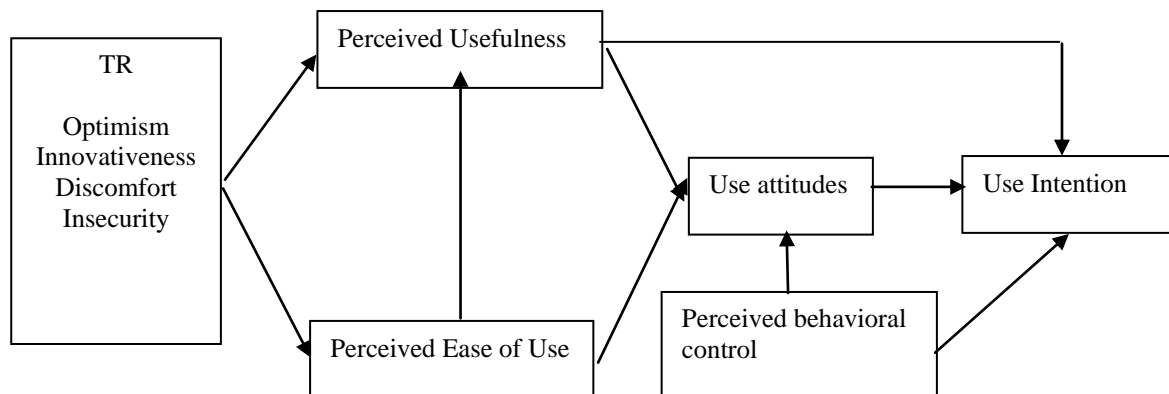

Fig. 1. Research framework.

H1a: Perceived ease of use has a significant positive influence on use attitudes.
H1b: Perceived usefulness has a significant positive influence on use attitudes.
H1c: Perceived ease of use has a significant positive influence on perceived usefulness.
H1d: Perceived usefulness has a significant positive influence on use intention.
H1e: The use attitudes has a significant positive influence on the use intention.
H2a: Perceived behavioral control has a significant positive influence on use attitudes.
H2b: Perceived behavioral control has a significant positive influence on the use intention.
H3a: Technology Readiness has a significant positive influence on the perceived usefulness.
H3b: Technology Readiness has a significant positive impact on the perceived ease of use.

3.2. Sampling

This study focuses on cross-border EC users with online shopping experience, and they are located in the following three countries: Taiwan, Hong Kong and Indonesia. This study takes into account the difficulty and cost of issuing cross-country questionnaires, so internet questionnaire was adopted for the data collection. Therefore, with reference to previous research experience, Google Survey has been used to design a web-based questionnaire and distributed in three well-known web forums and snowballs. Since the structural equation modeling (SEM) is a large sample of analytical techniques, it is important to consider that the number of samples collected by the questionnaire is not too small. Schumacker and Lomax [21] investigated the use of SEM analysis in the past and suggested that the number of samples from 250 to 500 is relatively stable.

In order to ensure the reliability and validity of the questionnaire, this study is expected to issue 60 front questionnaires to the selected group as the front side of the object. After the recovery will be carried out on the front side of the statistical analysis, and modify the items. Questionnaires were issued for a month and a total of 510 questionnaires were collected. In addition, there were 385 valid questionnaires, including 138 in Taiwan, 115 from Indonesia and 132 in Hong Kong with a response rate of 75.4%.

4. Analysis and Results

4.1. Reliability and Validity

All scales used in this study were found to be reliable, with Cronbach's α ranging from 0.83 to 0.96. Table II shows the reliability of each scale, and the factor loadings for each item therein. In order to gauge validity, this study employed confirmatory factor analysis (CFA) using LISREL 8.54 to verify the construct validity (both convergent and discriminant) of the scales. Hair, Black, Babin, Anderson, and Tatham (2006) recommended convergent validity criteria as follows: (1) standardized factor loading of higher than 0.5; (2) average variance extracted (AVE) above 0.5; and (3) composite reliability (CR) above 0.7. The evaluation standard for discriminant validity is the square root of AVE for one dimension greater than the correlation coefficient with any other dimension(s). As Table 2 indicates, all three criteria for convergent validity were met, and correlation coefficients were all less than the square root of the AVE within one dimension, suggesting that each dimension in this study had good discriminant validity.

4.2. Verification of Hypotheses

Next, we examined the path coefficients and their significance values to test the hypotheses, and used partial least squares (PLS graph) to analyze data, as this approach is known to be particularly advantageous for the exploratory nature of this study. The results of H1a suggest that perceived ease of use has a significant, positive relationship with use attitudes (β = .257, p < 0.001), but perceived usefulness does not relate to use attitudes (β = .098, p > .10) (See Table 1). Therefore, the findings support H1a, but reject H1b. The results of H1c suggest that perceived ease of use has a significant, positive relationship with perceived usefulness (β = .328, p < 0.001), and perceived usefulness also has a significant, positive relationship with use intention (β = .198, p < 0.001). Therefore, the findings support H1c and H1d. The results of H1e suggest that use attitudes has a significant, positive relationship with use intention (β = .420, p < 0.001), also findings support H1e.

The results of H2a and H2b indicate that perceived behavioral control has significantly and positively to use attitudes (β = .407, p < .001) and use intention (β = .386, p < .001). Therefore, the findings support H2a and H2b. Finally, the results of H3a and H3b indicate that TR has significantly and positively to perceived usefulness (β = .383, p < .001) and perceived ease of use (β = .962, p < .001). Therefore, the findings support H3a and H3b.

Table 1. Estimation Results of the Integrated TAM Model

Paths	β	S.E.	t	P
Perceived Ease of Use←TR	0.962	0.143	6.718	***
Perceived Usefulness←TR	0.383	0.167	2.292	**
Perceived Usefulness←Perceived Ease of Use	0.328	0.115	2.847	**
Use attitudes←Perceived Usefulness	0.098	0.074	1.322	0.186
Use attitudes←Perceived Ease of Use	0.257	0.062	4.122	***
Use attitudes←Perceived behavioral control	0.407	0.049	8.375	***
Use Intention←Use attitudes	0.42	0.057	7.409	***
Use Intention←Perceived behavioral control	0.386	0.049	7.877	***
Use Intention←Perceived Usefulness	0.198	0.049	4.038	***

Note: *p<0.1; **p<0.05; ***p<0.001

5. Conclusions

This study takes the TAM proposed by Davis [4] as the starting point and considers that the attitude of

the individual to behavior is determined by the difficulty of the act of execution (ease of use) and whether the act can help itself (the usefulness). The results of the study, as in the past, have shown that perceived usefulness has influence on the use intention [22]. According to the results of this study, consumers in Taiwan, Hong Kong and Indonesia face the perceived ease of use as compared with whether they can help their own purpose (usefulness). In addition, as the theory of rational behavior and the theory of planning behavior suggested, an individual's attitude towards EC has significant impact on use intention, and EC system in the search, order, payment and other consumption processes. The choice and control will strengthen and improve the use of the individual attitude and willingness to use [23].

There are many types of external variables that can be used as TAM models, and the purpose of this study is to understand the EC adoption and behavior of consumers in different countries. Therefore, according to Lin, Shih & Sher [20] TRAM model architecture, TR as an external variable to explore whether the individual will be due to their own understanding of the state of science and technology and thus affect the use behavior. The results show that TR does significantly affect the perceived usefulness and ease of use of individuals in EC, where TR is more influential in perceived usability than perceived usefulness, representing the greater acceptance of technology.

In this study, according to the TAM model, it is assumed that the consumers' perception of EC will have a significant positive impact on the use attitude, but the empirical results show that this hypothesis is not significant in this study. However, Lin et al. [22] have different conclusions. Straub, Keil and Brennan [24] pointed out that the explanatory power of TAM model will be affected by the level of CMSI, if the higher the CMSI value of the national TAM model interpretation of the greater impact, and from the cultural point of view in the high CMSI [3], the reason for shopping in the use of EC compared to traditional shopping is a personal act. And lower interaction with the seller, so the authoritarian culture of the country will be regarded as unacceptable behavior.

5.1. Practice Implications

With the use of EC enterprises to rise, the degree of competition in the field also increased. To become a leader in the fierce competition, one should understand the use of target customers behavior and develop relevant strategies. With the rise of the Southeast Asian market, the Taiwan Executive Yuan, launched a new Southward Policy Plan in 2016 in order to establish economic and trade partnerships with Southeast Asian countries and to enhance their economies and international competitiveness. The policy can also help Taiwanese companies on developing strategies to understand the use of EC in Southeast Asian countries and the degree of adoption becomes an important issue.

This study takes TAM as the main axis and uses the national culture to explore the differences and preferences of the behavior of consumers in different countries. As the results of this study confirm that the consumers of the authoritarian countries have a higher perception of the difficulty of EC operation. Should focus on their own EC system is easy to understand and easy to operate, such as the site to provide the search engine, simple and clear operating instructions and less complex use interface. In addition, the results show that Taiwan, Hong Kong and Indonesia all use students as a large network of people, and the monthly disposable income is less than 300 US dollars, so most students do not have credit card qualifications, so if you can provide more kind of payment Way, will effectively improve the use of willingness and utilization.

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