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A study on the impact of design attributes on E-payment service utility

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ABSTRACT

Prior research has shown how consumer perception, when risk is an important factor, may affect the adoption and the usage of E-payment service. Given this general knowledge, this study investigates the more specific issues of the mix of design attributes to drive consumer choice in using E-payment services. Using six design attributes defined by a group of practitioners and E-payment service users using the Delphi method, an online conjoint experiment is conducted. We find out how these design attributes may affect consumer choice under risk and the rank order of the magnitudes of their effects.

1. Introduction

The development of E-business technologies in the past two decades has significantly changed the way of conducting retail businesses. Using the latest E-business technologies, business-to-consumer (B2C) E-commerce operators can develop their retail businesses in the virtual world with minimal cost. Some companies, such as Amazon and those E-vendors operating on eBay, do not have any physical store. This virtual business model provides B2C E-commerce operators with the opportunities to be connected with their online customers from all over the world on a 24×7 basis. However, some online customers only surf these websites but do not complete their transactions online because they perceive making payment online using E-payment service is risky [1,2]. Therefore, many electronic marketplaces, such as eBay, have developed specific design attributes, such as a peer-evaluation system, to reduce the risk of making online payments [3,4]. Most of these design attributes increase the probability of closing online transactions by reducing the perceived risk of participating in online transactions.

Prior research has shown that both hedonic and functional qualities of E-service have positive impacts on its perceived values [5]. However, the perceived risk of using E-services, including E-payment services, reduces perceived usefulness and the intent to use E-services by users [6]. In addition, Im et al. [7] also reported that the perceived ease of use of a technology has a more significant impact on a user's adoption of a risky technology compared with a less risky technology; and perceived usefulness of a technology has a more significant impact on a user's adoption of a less risky technology than a risky technology. In a review conducted by Darley et al. [8], it is reported that perceived risk is an important factor affecting online consumer behavior. Pavlou [9] and Pavlou and Gefen [10] showed that perceived risk has a negative impact on consumers' intention to undertake a transaction with an E-retailer. Gupta and Kim [11] also reported that perceived risk has a negative impact to purchase intention in an online environment through the perceived value of the E-service concerned. On the contrary, marketing researchers have suggested that the attributes of a service have significant impacts on its perceived risk levels [12]. Thus, by manipulating the attributes of a service, it is possible to vary the level of impact of perceived risk on the intent to use the service. Hence, if an E-payment service engineer develops some design attributes that can reduce the level of perceived risk for using such services, these attributes will reduce the overall negative impact of perceived risk on the intent to use E-service by users. This will convert more web surfers into online shoppers.

The core research issue in this study is to investigate issues related to the service design of an information system. Prior research has shown the importance of service attributes toward user satisfaction on E-services (see [13]). Venkatesh [14] suggested

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IS researchers should conduct research studies on "the right mix of attributes to drive consumer choice" in service design research using statistical techniques such as conjoint analysis. In this study, we investigate the impacts of six design attributes of an E-payment service selected by a group of practitioners and E-payment service users through the Delphi Method [15]. Those attributes are believed to have impacts on the risk propensity of using E-payment services. The incorporation of the ideas of the group of practitioners and users into our research design echoes the suggestion by Lee [16] who suggests that "the starting point of IS research need not be existing theory" but can be the wisdom or craftsmanship of IS professionals and practitioners, which eventually will enhance the practical implications of this research. Hence, our main task is to find the right mix of design attributes to drive consumer choice in using E-payment services [14], which can help researchers and practitioners to gain a better understanding on how technology interacts with social and behavioral aspects of consumers in the E-payment service context. To achieve our research goal, conjoint analysis is selected as the statistical technique used in this study [17], which allows us to rank the impacts of different design attributes based on their relative importance, and to understand their relative impacts on the consumers' utility of using E-payment services.

The results of this study have several theoretical contributions and practical implications and one methodological contribution. First, they extend knowledge on how design attributes of an E-payment system may affect the associated consumers' utility through their influence on the perceived risk level. Second, this study shows the value of conjoint analysis, as a methodology, in analyzing the non-linear impact of constructs on information system adoption. For practical perspectives, our results help E-commerce operators to improve and better plan for the designs of their E-payment services by enhancing consumers' utility of using these E-payment service websites. In addition, they provide insights to E-commerce operators on the effectiveness of different design attributes on the consumers' utility of using these E-payment service websites, which can be indirectly measured as a monetary value [18].

2. Research model and hypothesis development

2.1. Research model

We investigate the impacts of different design attributes of E-payment services on the consumers' utility of using E-payment services. The design attributes concerned are developed to reduce the negative effect (i.e., negative impact on utility) of different dimensions of perceived risk on the consumers' utility of using E-payment services, which directly affect and increase the intention to adopt the service [19] due to the increase of risk propensity of consumers using the service. Prior research studies on perceived risk on consumer behavior can be dated back to the seminal article of Bauer [20], which defines that risk "will produce consequences which (consumer) cannot anticipate with anything approximating certainty, and some of which at least are likely to be unpleasant." Other researchers, such as Peter and Ryan [21], enriched the definitions of risk by further elaborating Bauer's definition. While some early researchers analyzed perceived risk as a single construct, other researchers, such as Stone and Grønhaug [22], suggested that perceived risk can be analyzed as a multidimensional construct [6] or measured by different aspects [23].

IS researchers have already studied the impact of perceived risk on IS for over two decades. In particular, they are interested in the impact of perceived risk of the intention to adopt E-services, such as E-banking service [24] and E-payment service [6]. Some of these IS studies treat perceived risk as a single construct in studying consumers' intention to transact with E-retailers and observe the negative impact of perceived risk of transaction intention [9,10]. Nicolaou and McKnight [25] also researched into the impact of perceived risk on performing online transactions in an exchange and showed that perceived information quality reduces the level of perceived risk of users. Kim et al. [26] also used perceived risk as a single construct to study the impact of risk and trust on the intention of online consumers to purchase. More recently, Chang and Wu [27] revisited the impact of perceived risk on purchase intention in an online environment and reported that the impact of perceived risk to purchase intention is moderated by the decision-making style.

Other IS studies investigated perceived risk based on its different risk dimensions. Ho and Ng [28] investigated the level of perceived risk of different types of E-payment services using five risk dimensions. They showed that the level of perceived risk of different risk dimensions depends on the types of E-payment service concerned, and the amount of money involved in the business transactions. Hann et al. [18] focused their investigation on the impact of privacy risk on consumers' utility of E-commerce website design using a conjoint analysis. They suggested that it is possible to offset the negative effect of privacy risk by monetary reward and future convenience provided by the websites. Lou et al. [29] studied the impact of perceived risk on E-banking services and showed that perceived risk has a negative impact on the intention to adopt E-banking services and the performance expectancy of E-banking services. Featherman and his colleagues also conducted several studies on E-payment services by operationalizing perceived risk by several risk dimensions [6,19,30]. In this study, we define perceived risk using the perceived risk dimensions proposed by Featherman and Wells [6], as reported in Table 1.

In this study, we focused our investigation on six design attributes of E-payment service, that is, (i) monetary reward per transaction; (ii) consumers' liability for losses per transaction; (iii) physical control feature through a physical token; (iv) anonymous payment record; (v) online information transfer; and (vi) acceptability of E-payment services, on the consumer's utility of using E-payment services. These six attributes were selected based on the recommendations from the group of practitioners and E-payment service users through the Delphi Method. This group consisted of 15 members, including 10 practitioners and five users. Four of the practitioners belonged to the senior management of financial industries who had >10 years of experience and involvement in formulating banking policies in information security, compliance, credit and debit card services, and online enquiry services in relation to the E-banking services. The other three practitioners were senior management of the E-business sectors who had over 10 years of experience and involvement in the design of their corporate website for retailing industries, which were able to handle online orders. The other three practitioners belonged to the senior management of E-service providers, whose companies were providing either E-payment service or web-portal services. These 10 practitioners were involved to join the study based on their job relevance, as all of them were involved in the provision or usage of E-payment service. Besides, they have experience across different industries, which allow us to gain their insights of the E-payment service requirement across industries. The five users involved in the Delphi Study included two business school doctoral students, two MBA students who had >5 years of full-time working experience in major retailing companies, and one undergraduate student. The doctoral and MBA students were having more than ten years of experience in making purchases online and using E-banking services, and the undergraduate student had around 3 years of similar experiences. We anticipate the doctoral students can provide us with opinions through the