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The impact of perceived ease of use on Internet service adoption: The moderating effects of temporal distance and perceived risk ☆

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ABSTRACT

Perceived ease of use is found to affect consumer's intention toward using an Internet-based service. However, to protect online transaction security, more security verification mechanisms are established which in turn increase the complexity and difficulty of using online services. This study proposed that the importance of perceived ease of use is depending on short- vs. long-term transaction expectation, product type, and whether security concern information is presented. In certain situations buyers or sellers of an Internet service may tolerate the inconvenience of using the Internet-based service. A 2 (verification requirement) × 2 (network externality) × 2 (short vs. long term) between-subject design was conducted on sellers of an auction site and a 2 (verification requirement) × 2 (product type) × 2 (with vs. without security concern information) between-subject design was conducted on buyers of an auction site. The results of two studies suggest that perceived ease of use increases the intention toward using online service when sellers expect that the Internet service usage is only for a short-term transaction or when buyers have no access of the security concern information on the website. In contrast, sellers prefer using an online service which requires a relatively high verification requirement when the purpose of using Internet service is for long-term transaction or when buyers have access of security concern information. The results also showed that perceived network externality positively affect sellers' intention toward using an auction website.

1. Introduction

Despite many aspects of e-commerce being superior to traditional modes of commerce for consumers (e.g., speed and convenience of information search), there are still some inherent problems existing in online environments (e.g., Lawson, 2002; Pinker, Seidmann, & Vakrat, 2003). Consumers may have difficulties in discerning another party's identity and are unable to touch and verify real products prior to purchase. Therefore, there exists high transaction risk in the online transaction environment (Smith, 2004; Wang & Emurian, 2005). Akerlof (1970) and Heal (1976) proposed that transaction mechanism design is very important to reduce the perceived risk between sellers and buyers in the online transaction relationship. However, to increase online transaction safety, a company may employ various tools such as firewalls or strict validation processes to protect Internet mischief or fraud and these safety mechanisms may bring out difficulties when using the online service. For example, the website may require the user's cooperation in providing detailed personal information or specific knowledge in implementing a complex function (e.g., credit card verification or a user's password must be changed within a period), all of them will increase the user's time-spending and mental effort.

Past research on consumer adoption of online services found perceived ease of use is a critical antecedent determining the user's adoption of new Web technology (e.g., Pikkarainen, Pikkarainen, Karjaluoto, & Pahnila, 2004; Wu, Chen, & Lin, 2007). Therefore, there is a trade-off between ease of use and strict verification process for security on the adoption of online services. This study proposed that the importance of perceived ease of use is depending on short- vs. long-term transaction expectation, product type, and whether security concern information is presented. In certain situations buyers or sellers of an Internet

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service may tolerate the inconvenience of using the Internet-based service.

In recent years, the volume and variety of profitable e-commerce businesses have become more evident, such as Google, Yahoo, Amazon, and eBay. The most prosperous e-commerce market on the Internet undoubtedly is the online auction, with the leading company eBay first appearing in September 1995 and growing to approximately 248 million registered users worldwide (eBay, 2007). Owing to its numerous e-commerce advantages (e.g., having access 24 h a day, the low marginal cost of printing and mailing catalogs, ability to access the worldwide marketplace), the number of sellers adopting the Internet as their strategic sales channel is increasing. Annual revenue on online auction sites is already in the range of tens of billions of dollars, and this is predicted to grow substantially over the next few years. Therefore, this study intends to conduct the research on buyers and sellers of auction websites to examine the proposed relationships.

A 2 (low vs. high verification requirement) × 2 (low vs. high network externality) × 2 (short- vs. long-term transaction) between-subject design was conducted on sellers of an auction site and a 2 (low vs. high verification requirement) × 2 (low vs. high risk product type) × 2 (with vs. without security concern information) between-subject design was conducted on buyers of an auction site, respectively. Specific hypotheses for the different mechanisms of acceptance of strict verification process will be presented. In addition, the effect of network externality on seller's auction website adoption will also be examined.

2. Theoretical background

2.1. Information asymmetry

Information asymmetry occurs when one party in a transaction has pertinent information that the other party lacks. Two types of information problems were mentioned under this circumstance: adverse selection, and moral hazard or hidden action (Akerlof, 1970; Arrow, 1971). Adverse selection problems occur when one party is unsure about the claims that the other party makes regarding its capability to fulfill contractual obligations (Eisenhardt, 1989; Mishra, Heide, & Cort, 1998). For example, it is hard for bidders being in an online context to observe the quality of the seller and of the item offered since the seller can more easily hide her/his true type. To solve adverse selections, it is possible to design a mechanism to induce sellers to reveal their private information (Fudenberg & Tirole, 1991). Moral hazard problems occur when a transaction party reduces the quality of the good after the transaction contract is concluded in order to increase his/her benefit. For example, the winner of the auction may not be able to receive the item purchased or receive an item of inferior quality than originally represented.

Selection efforts may solve the adverse selection problem, but without enforcement of the rules, moral hazard problems may still occur (Wathne & Heide, 2000). Sellers can inform the buyers that they are of high quality and reduce asymmetric problems only if they accurately send credible signals to the buyers (Benedikctus, Brady, Darke, & Voorhes, 2007). Normally, such credible signals requiring considerable investment to deter lower quality sellers from doing so. Thus, a costly signal ascertaining the seller's quality could help buyers to reduce information asymmetry, resulting in a higher return (Erdem & Swait, 1998).

2.2. Perceived risk

Perceived risk is the nature and amount of risk perceived by a consumer when contemplating a particular consumption decision (Cox & Rich, 1964). The risk here focuses on the consumer's perceived risk rather than the true risk that is present. Considerable research has addressed the degree of perceived risk as being a crucial factor in consumer behavior (Bettman, 1973). According to past studies, perceived risk has six traits: product performance, social aspects, psychological aspects, physical aspects, and time/convenience loss (e.g., Mitchell, Davies, Moutinho, & Vasson, 1999; Schiffman & Kanuk, 1994).

Due to the uncertainty throughout the purchasing process, all shopping activities involve more or less risk. The amount at stake, and the buyer's subjective assessment of the possibility of an unfavorable consequence, determine the total amount of risk in any purchase decision (Dowling & Staelin, 1994; Grewal, Gotlieb, & Marmorstein, 1994).

2.3. Hypothesis

2.3.1. Perceived ease of use

The technology acceptance model (TAM) is one of the most widely used models in studying the reasons a firm or an individual accepts new technology. It is based on the theory of reasoned action (TRA), proposed by Ajzen and Fishbein (1977), which was concerned with the determinants of consciously intended behaviors (Davis, Bagozzi, & Warshaw, 1989). In the model, perceived usefulness and perceived ease of use are related to the attitude toward acceptance of new technology, which in turn affects acceptance intention, and subsequently behavior. *Perceived ease of use* is defined as the degree to which the prospective user expects the new technology to be free of effort. *Perceived usefulness* refers to the prospective user's subjective likelihood that the use of the new technology will increase his/her performance (Davis et al., 1989).

TAM has been widely tested, with different samples in different situations, and has proven to be a valid and reliable model explaining new technology system acceptance (e.g., Adams, Nelson, & Todd, 1992; Legris, Ingham, & Collerette, 2003; Mathieson, 1991; Taylor & Todd, 1995; Venkatesh & Davis, 1996). Davis et al. (1989) and Mathieson (1991) also found that TAM's ability to explain attitudes toward using an information system, is better than both TRA and the theory of planned behavior (TPB) that used belief, subjective norm, and perceived behavioral control to predict individual's indentation (Ajzen, 1985; Ajzen & Fishbein, 1977).

Thus, the ease of use of a website will affect the user's use intention in spite of perceived risk increasing (Stern, Royne, Stafford, & Bienstock, 2008). For example, to protect a user's password not being stolen, a company may ask users to set their password by mixing numerals and English letters, in addition to changing the password regularly. This action, however, may increase the difficulty for users if an auction site requires users to provide detailed information and to complete validation by following a severe verification procedure. As such, this may deter a consumer's use intention resulting from the amount of time consumed and mental effort invested in the transaction (Arning & Ziefle, 2007; Hasan & Ahmed, 2007).

Thus, Hypothesis 1 is as follows:

- *H1*: (a) Other thing beings equal, for the **seller**, the looser the requirement for verification (high perceived ease of use), the greater the likelihood of using the auction website. (b) Other things being equal, for the **buyer**, the looser the requirement for verification (high perceived ease of use), the greater the likelihood of using the auction website.

2.3.2. Network externality for sellers

Network externality is the effect that the value of adopting a product or service will be higher when the network has more users (Shy, 1996). In telecommunications, network externalities arise