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Decision Factors for the Adoption of E-Finance and other E-Commerce Systems

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ABSTRACT

The development of e-commerce relies upon customer usage intentions, and IS researchers have examined usage intentions toward various online e-commerce systems. However, these systems have been studied in prior works independently rather than comprehensively. In order to pursue better measures for predicting and explaining B2C e-finance and some other major e-commerce adoptions for customers, we conducted a comparison analysis across different online systems to advance the understanding of the adoption factors and their linkage to customer behavior. Refining from Perceived Risk Theory and existing studies, specific risk facets, customer characteristics and system characteristics were operationalized and integrated within the Technology Acceptance Model (TAM) resulting in a proposed e-finance and other e-commerce system adoption model.

Keywords
Adoption of IT, E-commerce, E-finance, TAM, perceived risk, website design, customer characteristics.

INTRODUCTION

Numerous prior empirical works have shown that TAM (Davis, 1989) is a parsimonious and robust model of technology acceptance behaviors in a wide variety of information technology (IT) across both levels of expertise and across countries (e.g., Gefen, Karahanna and Straub, 2003). According to TAM, the intention to voluntarily accept a new IT is determined by two beliefs dealing with (1) the perceived usefulness (PU) of using the new IT and (2) the perceived ease of use (PEOU) of the new IT. However, e-commerce research still needs a more comprehensive set of beliefs as decision factors for technology adoption than that described in TAM. There is an absence of evidence proof that the e-vendor will not engage in harmful opportunistic behaviors, including seller opportunism due to product and identity uncertainty (Ba and Pavlou, 2002), unauthorized use of personal information, violations of privacy, etc. Therefore, perceived risk (PR) is also considered an important factor of belief about e-commerce and thus should be integrated into TAM.

Based on customer risk perception, E-commerce adoption can be categorized into E-finance and other e-commerce activities. E-finance, including online brokerage, payment, banking, insurance and other financial services, can be defined as “the provision of financial services and markets using electronic communication and computation” (Allen, McAndrews and Strahan, 2001). Compared with other e-commerce activities such as online shopping, vending and bidding, e-finance involves more financially-sensitive information transfer through the Internet. E-finance adopters may have a higher level of risk perception than other e-commerce adopters do and therefore desire a higher level of information, system, and service quality. Moreover, due to the difference in levels of risk tolerance, e-finance adopters could probably exhibit different demographic characteristics than other e-commerce adopters. However, how the beliefs (PU, PEOU and PR) may influence the adoption of e-commerce and what may be the antecedents of these beliefs are still unclear in the prior literature.

Compared with traditional face-to-face commerce, e-commerce is considered more convenient as products and services can be accessed from any computer with Internet access. Geographical and logistical conflicts associated with traditional business sales are eliminated with the presence of e-commerce. However, customers may differ, and web-based systems may vary in terms of services and features offered, possibly leading to a significant level of variation in the intentions to use the online systems. What would make e-customers more willingly and widely accept online business systems? What should e-vendors focus on to accelerate such a technology acceptance process? This study thus addresses the following specific research questions.

1. What are the antecedents to a customer’s beliefs (PU, PEOU, and PR) about e-commerce?
2. How do a customer’s beliefs affect the adoption of e-finance and other e-commerce activities?
3. How does the adoption of one e-commerce activity influence the decision to adopt another activity?
DEVELOPMENT OF CONSTRUCTS AND HYPOTHESES

Given that an online e-commerce system is both an IT and the channel through which customers interact with an e-provider, technology-based and risk-based antecedents should work together to affect the decision to adopt e-commerce with a particular e-provider. Previous research has established that usage intentions of online systems are the product of consumer assessments of IT itself – specifically its perceived usefulness and ease-of-use (TAM), and perceived risks regarding a specific e-commerce system (He and Mykytyn, 2007; Featherman and Pavlou, 2003; Pavlou, 2003). However, to advance and integrate our understanding of user perceived characteristics, their linkage to e-customer behaviors and the interactions between these behaviors, a comparison study examining usage intentions will be needed across different online systems. Figure 1 in the Appendix presents the proposed model. The dependent variables, intended use of e-finance (e.g., online banking and online payment systems) and other e-commerce systems (e.g., online shopping systems), are posited as the primary constructs to determine consumer acceptance of e-commerce systems. The TAM variables (PU and PEOU) are posited as key drivers of e-commerce acceptance, while PR is proposed as a key inhibitor. Online system characteristics and customer characteristics, widely studied in previous technology acceptance research (Lian and Lin, 2007; Ranganathan and Ganapathy, 2002), are integrated as additional key drivers of e-commerce acceptance.

Perceive Risk

Product/Service Features and PR

Existing empirical evidence has showed that customers’ perceived risk and benefit could be negatively correlated in determining people’s willingness to consume (Traill et al., 2006). Since online shopping and online bill paying are typical consumption-driven behaviors, customers should perceive a lower risk when facing the higher economic benefits (e.g., discount, bonus, better price, reduced searching cost, avoiding late fee penalty, saving postage costs). However, when it comes to investing behaviors, the financial investment theory supports a positive relationship between perceived benefit and risk. The capital asset pricing model (CAPM) concludes a trade-off exists between risk and expected return (Sharpe, 1964). The greater risk investors perceive in an investment, they will expect a greater return (perceived economic benefit) as compensation for such a perceived risk. Facilitating savings and deposit investments (possibly along with money market funds, annuity and trust, etc.), online banking can be categorized as an investment behavior. Customers perceive high risks generated by online banking as the cost to obtain a high interest rate and/or a low transaction fee. To clarify the exact sign of correlation between perceived economic benefit and PR across different types of B2C e-commerce systems, we suggest the hypothesis of a non-zero association should be tested. Besides economic benefits, another great attraction of an online e-commerce system is the convenience that it affords. Convenience has been reported as the primary reason for customers using e-commerce systems (Wolhandler, 1999). Customers perceive a higher level of risk because of inconvenience resulting from the difficulty of navigation, submitting order and/or finding appropriate Websites, or from the delay in receiving products (Forsythe and Shi, 2003). A negative correlation between convenience and PR is therefore hypothesized.

Website Features and PR

The level of risk perception decreases when an individual trusts others who are involved in the transaction (Featherman and Pavlou, 2003; Gefen, Karahanna and Straub, 2003). The perceived effectiveness of the institutional mechanisms facilitates transaction behavior by reducing risk. In fact, effective third-party certifications or services would not only reduce actual risk by absorbing some of the uncertainty regarding product quality, delivery and payments, but also reduce customer perceptions of risk by inducing vendors to behave appropriately. A good Website design may also help mitigate customers’ PR. Effective B2C Websites serve as a major source of information to users (Ranganathan and Ganapathy, 2002). By providing users with complete information on the products/services and facilitating quick access to information through tools like search engines, a well-organized and attractive Website design can make users fell more at ease, and reduce users’ perceived uncertainty (risk) associated with e-commerce transaction. In summary, the preceding arguments suggest

H1a: Online system characteristics should have a significant impact on PR.

Customer Characteristics and PR

Eastin (2002) indicated that personal Internet self-efficacy positively affects individual acceptance of online activities. The confidence on the Internet makes the behaviors of an e-provider predictable, and further reduces the sense of uncertainty and risk. Internet self-efficacy is therefore hypothesized to be negatively associated with PR.
As for demographic variables, Li, Kuo and Russell (1999) found that men were more frequent Web buyers than woman. Women have been found to perceive greater risks in a wide variety of domains including financial, medical, and environmental (Brody, 1984; Gutteling and Wiegman, 1993; Stern, Dietz, and Kalof, 1993). In the context of online behavior, it has been observed that men are more likely than women to purchase over the Internet because on average men perceive a relatively lower level of risk in online purchasing (Garbarino and Strahilevitz, 2004).

Although elderly individuals tend to exhibit more negative perceptions toward new technologies and feel greater reluctance to adopt new technologies (Pommer, Berkowitz and Walton, 1980), our study excluded them who may have an aversion to the Internet but only focus on those who already are on the Internet. As people mature, through experience they learn more about the products/services in the market place and form more confident opinions about what suits their likes and what does not (Bhatnagar, Misra and Rao, 2000). With such confidence, older people perceive lower risks than younger people.

Education level may also be an influential demographic variable, with a large portion of better-educated customers being in the frequent Web buyer category. A similar pattern is shown for income, with customers with higher incomes being more likely to be the frequent online buyers. Since Internet shoppers are less risk-averse (Donthy and Garcia, 1999), peoples with higher income and/or education level may perceive less risk on online e-commerce systems than their counterparts. We thus hypothesize

H1b: Customer characteristics should have a significant impact on PR of the online system.

Technology Acceptance

Product/Service Features and TAM Variables

The perception of economic benefits from a product/service purchase is formed based on the relative price offered by a B2C Website (Balasubramanian, Ragunathan and Mahajan, 2005; Read and Loewenstein, 1995). Therefore, if customers perceive a Website offers better economic benefit than other competing sites, they would evaluate the Website more positively in terms of PU and PEOU. Another product/service feature, perceived convenience, was also found to be a critical factor that drew people to the Internet platform in an evaluation of electronic service quality (Zeithaml, Parasuraman and Malhotra, 2000). First, perceived inconvenience of online shopping reduces the expectation of e-commerce usefulness (Han and Noh, 1999). Second, persons scoring low on the convenience scale suffer from a perceived lack of control and a sense of being overwhelmed by technology, while this might be improved through informative feedback and augmented ease of use (Dabholkar, 1996; Norman, 1998).

Website Features and TAM Variables

Institutional-based trust exists when trust is tied to the existence of third-party structures (Pavlou and Gefen, 2004). Protected by the third party, customers with institutional-based trust have fewer needs to monitor the e-provider’s actions, making online transactions easier. A lower level of institutional-based trust also results in a lower level of PU. If the e-provider cannot be trusted to behave in accordance with the customers’ confident beliefs, customers should expect to gain little utility from using the interface (Pavlou, 2003). As for a Website design, the perceived quality covers specific properties such as organization of contents, navigational quality, retrieval speed, and interactivity. Once customers realize the quality, they can form their beliefs in the relative ease of use and usefulness of the Website (Kim, Eom, and Yoo, 2001). We thus hypothesize

H2a: Online system characteristics should have a significant impact on PEOU.
H3a: Online system characteristics should have a significant impact on PU.

Customer Characteristics and PEOU

Venkatesh and Davis (1996) argued that self-efficacy could be explored and understood in the context of user acceptance of IT. Based on PEOU measures, they concluded that computer self-efficacy and PEOU should be associated. Therefore, we posit that with the greater Internet self-efficacy, the more likely a customer is to perceive ease of use and usefulness of an online e-commerce system.

Demographic variables could also influence PEOU. Older people may feel greater reluctance to adopt new technologies than younger people due to computer anxiety (Kelly and Charness, 1995; Marquie, Jourdan-Boddaert, and Huet, 2002). However, some studies that are more recent found that there were portions of the elderly population who are comfortable with Internet technology, even using their own Websites as expressions of social identity (Harwood, 2004). Based on such new evidence,
elder people may instead perceive higher level of ease of use than younger people do. Besides the studies on the age factor, Ilie et al. (2005) found when adopting specific information technologies such as Instant Messaging, men value perceived relative advantage, result demonstrability and critical mass more than women, whereas women value PEOU and visibility more than men do. Donth and Garcia (1999) found that Internet shoppers are people making more money than Internet non-shoppers, suggesting the influence of the income level. Education is often found positively correlated with an individual’s income and it also predicts the level of Internet literacy (Li, Kuo and Russell, 1999). Since Internet shoppers are more convenience seekers, variety seekers and innovative impulsive than the others (Donthy and Garcia, 1999), we therefore posit that income level and educational level positively correlate with PEOU. We thus hypothesize

H2b: Customer characteristics should have a significant impact on PEOU.

PR, PU and PEOU

PEOU has shown a significant effect on PU in many studies (Davis, 1989; Davis, Bagozzi, and Warshaw, 1989; Taylor and Todd, 1995a, b; Venkatesh and Davis, 2000). Given that PU is defined as the prospective user’s subjective probability for the case that using a specific technology will increase the user’s job performance, PEOU and PU should be positively associated. The more useful and easy to use is the Website in enabling the users to accomplish their tasks, the more it will be used (Gefen et al., 2004). Prior studies have also shown that experience may be a factor moderating the relationship between PEOU and PU. The more experienced the users are, the less the effect of PEOU on PU (Szajna, 1996).

H3b: PEOU should be positively associated with PU.

Because customers consciously and unconsciously perceive risk when evaluating products and services for purchase and/or adoption (Bauer, 1967), it is necessary to include a measure of PR into TAM. Usage of the Internet delivery medium adds uncertainties and potential dangers due to its perceived unsecured nature (Featherman and Pavlou, 2004). The combination of “probability of loss” and “cost of loss” that make up perceived risk has been shown to inhibit product evaluation such as PU in TAM (Dowling and Staelin, 1994). We thus hypothesize:

H3c: PR should be negatively associated with PU.

Intended Use of Online E-commerce Systems

TAM Variables

TAM (Davis, 1989) was designed to gather evaluative measures of information system (IS) quality and suitability to job requirements, and thereby enable predictions of IS acceptance and usage (Featherman and Pavlou, 2003). Extending TAM by adding gender, age and IT competency as control variables, Cheng, Lam, and Yeung, (2006) found that PU is a major determinant of Hong Kong customer’s intentions to use online banking, and PEOU is a significant secondary determinant, which does not have a direct impact on intention to use but is mediated through PU. Chan and Lu (2004) also found that PU is more influential than PEOU in explaining technology acceptance of online banking. To test the robustness of TAM variables in predicting US customers’ intention of adoption of online banking, my study hypothesizes a positive relationship between TAM variables and intended use of online banking.

The adoption of online payments can also be explained in part by the TAM, which argues that the intention to use a new technology is determined by the PU and PEOU for the specific technology. This model has been widely used to study technology acceptance behavior and to identify the adoption decision determinants of various e-commerce activities (Gefen et al., 2004; Hsu and Lu, 2004; Luarn and Lin, 2005). When customers perceive the online payment system as more useful and/or easier to use, they should be more willing to adopt it.

As previously discussed in Section 2.2.2, there is much research extends TAM to enhance understanding of user acceptance behavior for online shopping (Chen et al. 2002; Koufaris, 2002; Shih, 2004; Vijayasarathy, 2004). In particular, Gefen et al. (2004) found that experienced customer’s intentions to transact with the last e-vendor from whom they purchased are positively and significantly influenced by the two TAM variables. We thus hypothesize:

H4a: PEOU should be positively associated with intended use of e-finance.
H4b: PU should be positively associated with intended use of e-finance.
H5a: PEOU should be positively associated with intended use of online shopping.
H5b: PU should be positively associated with intended use of online shopping.

Perceived Risk
A well-recognized obstacle to e-commerce adoption has been the lack of security and privacy over the Internet (Bhimani, 1996; Cockburn and Wilson, 1996). This has led many to view e-commerce as a risky undertaking. Customers are very sensitive with regard to services that involve monetary transactions, in which case they worry about both money and information loss (Hourahine and Howard, 2004). E-finance makes it easier to manage customers and to customize financial products, but such “efficiency” efforts must respect people’s desire for privacy and confidentiality. Thus, it is expected that only individuals who perceive using online banking as a low risk undertaking would be inclined to adopt it. Featherman and Pavlou (2003) found a significantly negative effect of PR (in terms of performance risk, financial risk, privacy risk, time risk, psychological risk and overall risk) on the adoption intention of online bill paying. On the other hand, PR is also a useful context to explain barriers to online shopping. For example, Forsythe and Shi (2003) found that perceived financial risk was the most consistent predictor of online shopping behavior. We thus hypothesize:

H5c: PR should be negatively associated with intended use of e-finance.

Adoption of E-finance and other E-commerce Activities

Eastin (2002) employs the diffusion model to investigate the adoption of four e-commerce activities: (1) online shopping, (2) online banking, (3) online investing, and (4) electronic payment for an Internet service (such as online auction site or exclusive club membership). The results indicate that when users decide to adopt one of these activities, they tend to also adopt another. We thus hypothesize:

H6: The adoption of one of e-commerce activities – namely, online payment systems, online banking or online shopping—should positively affect the adoption of another activity.

SUMMARY

Existing studies have investigated the impact of key factors on the customer adoption process of some specific e-commerce activities, such as consumer shopping, entertainment, and stock trading (Eastin, 2002; Gefen et al., 2004; Hsu and Lu, 2004; Huang, Hung and Yen, 2004). These findings jointly suggest that individuals’ behaviors could be explained by perceived characteristics of the online transaction methods, vendors’ website and product/service characteristics, and customer characteristics, not only supporting but also extending the widely-accepted TAM which emphasizes the importance of PU and PEOU on customer adoption and satisfaction with e-commerce. Yet, given that e-commerce is increasingly accepted in the business world and becomes more diversified in products and services, so far few published studies have specifically addressed and compared the underlying factors that could materially affect customers’ decisions to adopt different types of online systems classified by customers’ beliefs. Research progress in this area will help vendors better understand customer psychological needs and make better plans regarding the replacement of traditional business tools with integrated online systems that are facilitated with modern technology (He and Mykytyn, 2007).

In this research, we focus on the important beliefs in e-commerce adoption. Specifically, unlike prior studies which have examined limited aspects of perceived risk, we provide a more comprehensive conceptual definition that views this belief as a multidimensional construct consisting of six distinct and separable dimensions, including performance risk, financial risk, social risk, psychological risk, privacy risk and time risk. In contrast to prior IS-related research that has predominantly regarded beliefs about risks as an independent antecedent of technology acceptance outcomes (Yüksel and Yüksel, 2006; Huang and Chuang, 2004), we posit casual linkages among the risk beliefs and other key beliefs of usefulness and ease of use. The major difference between the beliefs in TAM and PR is that TAM beliefs focus on perceived benefits (PU and PEOU), while PR focuses on negative beliefs. Introducing a new technology may involve both benefits and risks to the end-user, and the individual need to weigh the risk-benefit tradeoff before making an “optimal” decision about whether (and to what extent, if any) to adopt the technology (Horst, Kuttenschreuter, and Gutjeling, 2006). The integration of the belief factors shall result in a comprehensive, yet parsimonious model that is expected to explain a substantial portion of the variance in e-commerce adoption, providing insights to both e-vendors and e-customers, across both consumption and investment e-business fields.

REFERENCE

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APPENDIX

Online e-commerce system characteristics
- Product/Service features
- Economic benefits
- Convenience
- Website features
- Institutional-based trust
- Website design

Customer characteristics
- Computer self-efficacy
- Demographic variables
  - Age
  - Gender
  - Education Level
  - Income Level

Perceived ease of use
- H2a
- H3a
- H2b
- H3b

Perceived usefulness
- H4a
- H4b
- H4c
- H5a
- H5b
- H5c
- H6

Perceived risk
- H1a
- H1b
- H3c

Intended use of e-finance systems
- Online bill paying
- Online banking

Intended use of other e-commerce systems
- Online shopping

Figure 1 Research Model