



An empirical study of customers' perceptions of security and trust in e-payment systems

Changsu Kim^{a,1}, Wang Tao^{a,2}, Namchul Shin^{b,*}, Ki-Soo Kim^{a,2}

^a School of Business, Yeungnam University, 241-1, Dae-dong, Gyeongsan-si, Gyeongsangbuk-do, 712-749, South Korea

^b Department of Information Systems, Seidenberg School of Computer Science and Information Systems, Pace University, 163 William Street, New York, NY 10038, United States

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ABSTRACT

It is commonly believed that good security improves trust, and that the perceptions of good security and trust will ultimately increase the use of electronic commerce. In fact, customers' perceptions of the security of e-payment systems have become a major factor in the evolution of electronic commerce in markets. In this paper, we examine issues related to e-payment security from the viewpoint of customers. This study proposes a conceptual model that delineates the determinants of consumers' perceived security and perceived trust, as well as the effects of perceived security and perceived trust on the use of e-payment systems. To test the model, structural equation modeling is employed to analyze data collected from 219 respondents in Korea. This research provides a theoretical foundation for academics and also practical guidelines for service providers in dealing with the security aspects of e-payment systems.

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1. Introduction

Electronic commerce (EC) is built upon e-payment systems (EPS). As EC becomes a major component of business operations for many companies, e-payment has become one of the most critical issues for successful business and financial services (Hsieh 2001, Peha and Khamitov 2004, Stroborn et al. 2004, Linck et al. 2006, Cotteleer et al. 2007, Kousaridas et al. 2008).

In comparison to the traditional payment methods, e-payment techniques have several favorable characteristics, including security, reliability, scalability, anonymity, acceptability, privacy, efficiency, and convenience (Chou et al. 2004, Stroborn et al. 2004, Tsiakis and Sthephanides 2005, Linck et al. 2006, Cotteleer et al. 2007, Kousaridas et al. 2008). EPS have gained recognition and have been deployed throughout the world. Countries such as France, the US, and the UK have fully developed systems, while regions such as the Asia–Pacific rim provide the growth impetus to the industry.

Our research uses Korea as the site of the empirical investigation because the supporting infrastructure required for the EPS development has been put in place. Korea has aggressively pursued the development of IT and networks and created a world-class IT

infrastructure (Au and Kauffman 2008). Since the mid-1990s, the Korean government has enforced a number of policies for spreading and promoting EC. As a result of these focused investments, Korea now boasts a world-class infrastructure for EC. According to the annual report of EC published by the Korea Ministry of Commerce in 2007, the total EC market size in Korea was USD 507.42 billion with a growth of 34.6% compared to the previous year. Meanwhile, Korea also has one of the highest per-capita usage statistics for the Internet; the number of Internet users was 34,430,000 (or 75.5% of the population aged six or older) and continues to rise. In the meantime, online shopping and transactions have become a normal part of life for average consumers.

The e-commerce market in Korea is expected to double annually in the next five years. Since Korea is the world's second-fastest-growing IT market, EPS will play an important role in executing wide-ranging activities and actively confronting changing economic conditions. In fact, many EPS brands such as Easy-cash, Easypaydirect, Inipay, iCash, eGate, eCredit, Smartpay, mypay.net, Payplus, and Paymatics have been established in the recent years.

While good EPS have a number of advantages over the traditional payment methods, they must be free of security breaches (Hegarty et al. 2003, Linck et al. 2006). The Gartner Group reports that 95% of customers are somewhat concerned about privacy or security when using credit cards on the Internet; Harris interactive also reports that six in ten respondents fear credit card theft. A key factor for the success of EPS is security, a requirement that is becoming even more crucial in the current global EC environment

* Corresponding author. Tel.: +1 212 346 1067; fax: +1 212 346 1863.

E-mail addresses: c.kim@ynu.ac.kr (C. Kim), w.tao@ynu.ac.kr (W. Tao), nshin@pace.edu (N. Shin), k.kim@ynu.ac.kr (K.-S. Kim).

¹ Tel.: +82 53 810 2752; fax: +82 53 810 4652.

² Tel.: +82 53 810 3213; fax: +82 53 810 4652.

(Herzberg 2003, Stroborn et al. 2004, Peha and Khamitov 2004, Tsiakis and Sthephanides 2005, Linck et al. 2006, Cotteleer et al. 2007). Transactions in EC can occur without any prior human contact or established interpersonal relationships. Stories about EC security threats from the media or interpersonal networks can undermine trust in EPS and cause people to fall back on the interpersonal trust that arises in human-to-human interactions. Generally, security is a set of procedures, mechanisms, and computer programs for authenticating the source of information and guaranteeing the process (Theodosios and George 2005, Linck et al. 2006). Although extant literature extensively addresses technical details of security and trust in EPS from the perspective of merchants or EPS service providers, consumers' perceptions of the security of EPS have not been well addressed and empirical studies are lacking in this area (Linck et al. 2006).

A number of e-payment systems have recently emerged on the Internet. Although various security measures and mechanisms have been designed for these EPS, many security problems still remain (Hsieh 2001, Chou et al. 2004, Dai and Grundy 2007, Kousaridas et al. 2008). Hence, there is a growing need to minimize the risks associated with e-payment transaction processes (Tsiakis and Sthephanides 2005). Since the majority of users of EPS are relatively unfamiliar with the technical details of EPS, they tend to evaluate the security level of EPS on the basis of their experience with user-interfaces. Thus, to attract and retain e-payment users, it is vital to enhance consumers' perceptions of security and to maintain customers' trust during e-payment transactions (Chellappa and Pavlou 2002, Stroborn et al. 2004, Tsiakis and Sthephanides 2005, Linck et al. 2006, Kousaridas et al. 2008). The principal objective of this research is to empirically examine, from the viewpoint of consumers, the determinants that affect consumers' perceptions of security and trust, as well as the effects of perceived security and perceived trust on the use of EPS.

In the next section, we review the EPS that currently exist in B2C and C2C EC and examine prior research on security and trust issues in EPS. Section 3 develops an exploratory conceptual model of consumers' perceived security and perceived trust in the use of EPS, and presents research hypotheses and constructs. We outline research methodology and results in Section 4. Conclusions and research implications are provided in Section 5.

2. Theoretical background

2.1. Electronic payment systems

When EC created the need for e-payment services, traditional cash-based and account-based payment instruments were used as a model. Simultaneously, new intermediaries such as PayPal succeeded in fulfilling some of the new needs of online merchants and consumers (Dahlberg et al. 2008).

e-Payment is defined here as the transfer of an electronic value of payment from a payer to a payee through an e-payment mechanism. e-Payment services exist as web-based user-interfaces that allow customers to remotely access and manage their bank accounts and transactions (Weir et al. 2006, Lim 2008).

International banking statistics from the Bank of International Settlements and the European Central Bank show that the popular payment instruments used for the payment of day-to-day purchases include cash, checks, debit cards, and credit cards. In general, EPS can be classified into five categories (Lawrence et al. 2002, Guan and Hua 2003, Abrazhevich 2004, Dai and Grundy 2007, Schneider 2007), which are listed below.

1. Electronic-cash: transactions are settled via the exchange of electronic currency.
2. Pre-paid card: customers use a pre-paid card for a specified amount by making an entry of the unique card number on merchant sites. The value of the card is decreased by the amount paid to the merchant.
3. Credit cards: a server authenticates consumers and verifies with the bank whether adequate funds are available prior to purchase; charges are posted against a customer's account; and the customer is billed later for the charges and pays the balance of the account to the bank.
4. Debit cards: a customer maintains a positive balance in the account, and money is deducted from the account when a debit transaction is performed.
5. Electronic checks: an institution electronically settles transactions between the buyer's bank and the seller's bank in the form of an electronic check.

Electronic-cash, pre-paid cards, credit cards, and debit cards are widely used in B2C and C2C EC (Theodosios and George 2005), as shown in Fig. 1. This study focuses on these four types of EPS.

2.2. Electronic payment systems in B2C and C2C EC

2.2.1. Electronic cash

Electronic cash is a method of payment in which a unique identification number is associated with a specific amount of money. Electronic cash is often referred to as e-cash or cyber cash (Jewson 2001, Wright 2002, Stalder 2002, Chou et al. 2004). This method was developed as an alternative to the use of credit cards for Internet purchases of goods or services. For using this payment system, customers purchase electronic digital-cash from the issuing company (Abrazhevich 2004). The cash may then be transferred through computers or other telecommunications channels (Hsieh 2001). The digital-cash method involves a single organization for the issuance and redemption of cash. The low cost characteristic of electronic cash makes it one of the most promising methods

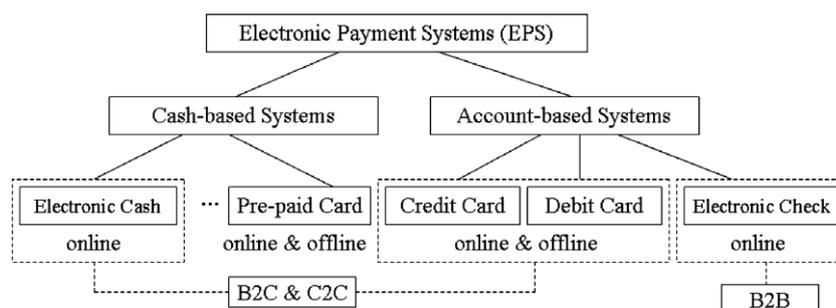


Fig. 1. Classification of electronic payment systems.

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