Management

Research Paper



A study on value network theoretical model to examine the e-banking services

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ABSTRACT

These days several developing countries are encouraging technology based financial services to attract the customers towards their products and services. To sustain in the competition more banks are following e-commerce and especially using e-payment mechanism. In this paper, I made a study on e-payment system, a value network theoretical model to examine the banking services in India.

Keywords : E-Commerce, E-Payments, Technology, Value Network model.

Introduction

Payment systems that use electronic distribution networks constitute a frequent practice in the banking and business sector since 1960s, especially for the transfer of big amounts of money. In the four decades that have passed since their appearance, important technological developments have taken place, which on the one hand have expanded the possibilities of electronic payment systems and on the other hand they have created new business and social practice, which make the use of these systems necessary. These changes, naturally, have affected the definition of electronic payments, which is evolving depending on the needs of each period. In its, most general form, the term electronic payment includes any payment to businesses, bank or public services from citizens or businesses, which are executed through a telecommunications or electronic networks using modern technology. It is obvious that based on this definition, the electronic payments that will be the objects of present result, are the payment that are executed by the payer himself, whether the latter is a consumer or a business, without the intervention of the another natural person. Furthermore, the payment is made from distance, without the physical presence of the payer and naturally it does not include cash.

Process of Electronic Payment System

Electronic payment systems have been in operations since 1960s and have been expanding rapidly as well as growing in complexity. After the development of conventional payment system, EFT (Electronic Fund Transfer) based payment system came into existence. It was first electronic based payment system, which does not depend on a central processing intermediary. An electronic fund transfer is a financial application of EDI (Electronic Data Interchange), which sends credit card numbers or electronic cheques via secured private networks between banks and major corporations. To use EFT to clear payments and settle accounts, an online payment service will need to add capabilities to process orders, accounts and receipts. But a landmark came in this direction with the development of digital currency. The nature of digital currency or electronic money mirrors that of paper money as a means of payment. As such, digital currency payment systems have the same advantages as paper currency payment, namely anonymity and convenience. As in other electronic payment systems (i.e. EFT based and intermediary based) here too security during the transaction and storage is a concern, although from the different perspective, for digital currency systems double spending, counterfeiting, and storage become critical issues whereas eavesdropping and the issue of liability (when charges are made without authorizations) is important for the notational funds transfer.

TYPES OF ELECTRONIC PAYMENT SYSTEMS

With the growing complexities in the e-commerce transactions, different electronic payment systems have appeared in the last few years. At least dozens of electronic payment systems proposed or already in practice are found (Murthy, 2002). The grouping can be made on the basis of what information is being transferred online. Murthy (2002) explained six types of electronic payment systems: (1) PC-Banking (2) Credit Cards (3) Electronic Cheques (i-cheques) (4) Micro payment (5) Smart Cards and (6) E-Cash. Kalakota and Whinston (1996) identified three types of electronic payment systems: (1) Digital Token based electronic payment systems (2) Smart Card based electronic payment system and (3) Credit based electronic payment systems. Dennis (2001) classified electronic payment system into two categories: (1) Electronic Cash and (2) Electronic Debit-Credit Card Systems. Thus, electronic payment system can be broadly divided into four general types (Anderson, 1998): Online Credit Card Payment System

Electronic Cheque System Electronic Cash System and Smart Card based Electronic Payment System

Online Credit Card Payment System: It seeks to extend the functionality of existing credit cards for use as online shopping payment tools. This payment system has been widely accepted by consumers and merchants throughout the world, and by far the most popular methods of payments especially in the retail markets (Laudon and Traver, 2002). This form of payment system has several advantages, which were never available through the traditional modes of payment. Some of the most important are: privacy, integrity, compatibility, good transaction efficiency, acceptability, convenience, mobility, low financial risk and anonymity. Added to all these, to avoid the complexity associated with the digital cash or electronic-cheques, consumers and vendors are also looking at credit card payments on the internet as one of possible time-tested alternative. But, this payment system has raised several problems before the consumers and merchants. Online credit card payment seeks to address several limitations of online credit card payments for merchant including lack of authentication, repudiation of charges and credit card frauds. It also seeks to address consumer fears about using credit card such as having to reveal credit information at multiple sites and repeatedly having to communicate sensitive information over the Internet.

Electronic Cheque Payment System: Electronic cheques address the electronic needs of millions of businesses, which today exchange traditional paper cheques with the other ven-

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dors, consumers and government. The e-cheque method was deliberately created to work in much the same way as conventional paper cheque. An account holder will issue an electronic document that contains the name of the financial institution, the payer"s account number, the name of payee and amount of cheque. Most of the information is in uncoded form. Like a paper cheques e-cheques also bear the digital equivalent of signature: a computed number that authenticates the cheque from the owner of the account. Digital chequing payment system seeks to extend the functionality of existing chequing accounts for use as online shopping payment tools. Electronic cheque system has many advantages: (1) they do not require consumers to reveal account information to other individuals when setting an auction (2) they do not require consumers to continually send sensitive financial information over the web (3) they are less expensive than credit cards and (4) they are much faster than paper based traditional cheque. But, this system of payment also has several disadvantages. The disadvantage of electronic cheque system includes their relatively high fixed costs, their limited use only in virtual world and the fact that they can protect the users" anonymity. Therefore, it is not very suitable for the retail transactions by consumers, although useful for the government and B2B operations because the latter transactions do not require anonymity, and the amount of transactions is generally large enough to cover fixed processing cost.

Electronic Cash Payment System: Electronic cash (e-cash) is a new concept in online payment system because it combines computerized convenience with security and privacy that improve on paper cash. Its versatility opens up a host of new markets and applications. E-cash is an electronic or digital form of value storage and value exchange that have limited convertibility into other forms of value and require intermediaries to convert. e-cash presents some characteristics like monetary value, storability and irretrievability, interoperability and security. All these characteristics make it more attractive payment system over the Internet. Added to these, this payment system offers numerous advantages like authority, privacy, good acceptability, low transactions cost, convenience and good anonymity. But, this system of payment also has many limitations like poor mobility, poor transaction efficiency and high financial risk, as people are solely responsible for the lost or stolen.

Smart Cards based Electronic Payment System: Smart cards" are receiving renewed attention as a mode of online payment. They are essentially credit card sized plastic cards with the memory chips and in some cases, with microprocessors embedded in them so as to serve as storage devices for much greater information than credit cards with inbuilt transaction processing capability (Chakrabarti and Kardile, (2002). This card also contains some kinds of an encrypted key that is compared to a secret key contained on the user"s processor. Some smart cards have provision to allow users to enter a personal identification number (PIN) code. Smart cards have been in use for well over the two decades now and have been widespread mostly in Europe and Asian Countries. Owing to their considerable flexibility, they have been used for a wide range of functions like highway toll payment, as prepaid telephone cards and as stored value debit cards. However, with the recent emergence of e-commerce, these devices are increasingly being viewed as a particularly appropriate method to execute online payment system with considerably greater level of security than credit cards. Compared with traditional electronic cash system, smart cards based electronic payment systems do not need to maintain a large real time database. They also have advantages, such as anonymity, transfer payment between individual parties, and low transactional handling cost of files. Smart cards are also better protected from misuse than, say conventional credit cards, because the smart card information is encrypted. Currently, the two smart cards based electronic payment system- Mondex and Visa Cash are incompatible in the smart cards and card reader specification. Not knowing which smart card system will become market leader; banks around the world are unwilling to adopt either system, let alone other smart card system. Therefore, establishing a standard smart card system, or making different system interoperable with one another is critical success factors for smart card based payment system.

Review of Related Empirical Studies

Pohjola (2002) in the study conducted on the Finnish market sector revealed that the use of e-payments and e-filing led to significant rise in the output of the market sector in Finland.

Ahmad Bello (2005) investigated the impact of e-banking especially how e-payments are satisfying the customers in Nigeria. It was discovered that though customers are aware of the positive developments in information technology and telecommunications, they are not satisfied with the quality and efficiency of e-banking services.

Andoh-Baidoo and Osatuyi (2009) employed a value network theoretical model to examine the e-banking services and products provided in Nigeria. The study illustrated that Nigerian banks are not taking advantage of the full spectrum of e-payment features because of some challenges especially inadequate power supply and telecommunication. The study suggested government invests heavily in the power supply and telecommunication sector and if possible, privatize these sectors to improve efficiency and productivity of these sectors. Anyasi and Otubu (2009) assessed the use of mobile phone technology in the Nigerian banking system and its economic implication. Their study showed that mobile banking offers a way to lower the costs of moving money and paving a way to bring more users in contact with the formal financial systems.

Auta (2010) examined the impact of e-banking on the Nigerian economy using Kaiser-Meyar-Olkin (KMO) Approach and Barlett's Test of Sphericity. It could be inferred that e-payments provides several advantages to the Nigerian banking sector and Nigerian customers have security, access and inadequate knowledge regarding e-payment services. Ayo, Adewoye and Oni (2010) reviewed the state of e-payments and e-banking implementation and evaluated the influence of trust on adoption of e-payment in Nigeria. The study revealed that perceived case of use and perceived usefulness not only precedes the acceptance of e-banking, they are factors to retain customers to use e-banking system. Baten and Kamil (2010) determined the economic prospects of e-banking as well as demonstrating the scope and benefits of e-payments in Bangladesh. It could be deduced that e-banking tends to provide numerous benefits for the economy and the public lack sufficient knowledge regarding e-banking. Madueme (2010) assessed the impact of information and communication technology (ICT) on the efficiency of 13 commercial banks in Nigeria using TRANSLOG and CAMEL rating. The finding showed that ICT improved the efficiency of the banks and recommended increased investment in ICT by banks. Salehi and Alipour (2010) examined ebanking and e-payments in an emerging economy seeking to provide empirical evidence from Iran. The results showed that e-banking is beneficial to the banking sector in several ways and customers have little or no knowledge about e-payments.

Ojeka and Ikpefan (2011) in their study explored the various challenges and benefits e-payments pose to Nigerian business, with particular inclination to the banking industry. It was discovered that there is statistically significant difference between anticipated and encountered benefits and the major challenge is the security breach experienced by customers. Periodic training on e-commerce was recommended to create awareness on latest development in e-payments. The study recommended banks should improve their service delivery and provide adequate security to win customers confidence. Oluwagbemi et al. (2011) in their study determined the impact of information technology on the Nigerian banking industry. It revealed that application of information technology (IT) facilities has brought about fundamental changes in the content and quality of banking business.

OBJECTIVES

• To study the critical success factors of e-payment systems and make the comparison between different e-payment systems.

USAGE OF ELECTRONIC PAYMENT SYSTEMS IN INDIA Table 1: E-Commerce Payments in India

E-Commerce Payment Systems	Percentage	Rank
Credit Card	35	1
Debit Card (Smart Card)	26.5	2
Cash on Delivery	23.5	3
Bank Transfer	9	4
Money Transfer	5	5
Postal Transfer	1	6
Prepaid Card	0	0
Payment Through Convenience Store	0	0
Total	100	0

Source: Sumanjeet

Credit card is most popular method of payments in India (Table 1). Interestingly, this fact is supported by a recent study of Nielsen. According to a global online survey conducted by leading research firm Nielsen, at 84%. Indian netizens have emerged as the third biggest credit card users globally for online purchasing, next only to the Turkish (91%) and Irish eshoppers (86%). The survey found that credit cards are by far the most common method of payment for online purchases with 60 per cent of global online consumers having used their credit card for a recent online purchase. Among the various credit cards, more than half or about 53 per cent used a Visa card.

CRITICAL SUCCESS FACTORS OF e- PAYMENT SYSTEM Success of e-commerce businesses, including both the largest of corporations and small retailers, rely on electronic payment system. Therefore, understanding the various critical success factors of e- payment system is important.

Table 2: Factors Discouraging Consumer for Online Payments

Factors	Percentage
Concern about security	65
Difficulties to enter information	10
Do not have credit cards/smart cards etc.	5
Do not like interest charge	10
Purchase value too small	7
Exceeded personal limit	3

Source: PaymentOne, April 2011

Figure 1: Comparison of electronic payment systems

Table 2 shows some factors, which are obstacles in the online payment systems. A good payment system should also consider these factors. Added to this, new payment products must be low margin to compete, high volume to build critical mass and be profitable, receive favorable press treatment, be well branded to gain customer confidence, achieve rapid uptake, and be differentiated from check and credit card so that consumers and merchants find reason to prefer and use them. Studies also revealed that simplicity (Schwartz, 2001; Truman et. al, 2003), trust (Herzberg, 2003; Juang, 2006), security and mutuality (Peha and Khamitow, 2004; Baddeley, 2004; Oh et al, 2006) of stakeholder benefits are all of importance to the adoption of e-commerce payment system. Thus the factors which are critical for the success of e-commerce payment systems are multifaceted. These include integrity, non-repudiation, authentication, authorization, confidentiality and reliability, which are discussed below:

- Integrity: Transaction data are transmitted and received unchanged and as intended.
- Non-repudiation: transactions have the quality of non deniable proof or receipts.
- Authentication: identities and attributes of parties engaged in commerce are established at some tolerable level of risk.
- Authorization: individuals are established and recognized as entitled to receive, send or view transactions.
- Confidentiality: transactions can be protected from view except by those who are authorized.
- Reliability: probability of failure in the transaction-send, receive, acknowledge-is low.

COMPARISON OF ELECTRONIC PAYMENT SYSTEMS

The present part of the study revealed many electronic payment systems and broadly these electronic payment system can be grouped or classified into four categories: (1) Online Credit Card Payment System (2) Online Electronic Cash System (3) Electronic Cheque System and (4) Smart Cards based Electronic Payment System. These payment systems have numbers of requirements: e.g. security, acceptability, convenience, cost, anonymity, control, and traceability. Therefore, instead of focusing on the technological specifications of various electronic payment systems, we have distinguished electronic payment systems based on what is being transmitted over the network; and analyze the difference of each electronic payment system by evaluating their requirements, characteristics and assess the applicability of each system. Figure 1 presents the comparison of various electronic payment systems.

Figure 1: Comparison of electronic payment systems							
Features	Online Credit Card Payment	Electronic Cash	Electronic Cheque	Smart Cards			
Actual Payment Time	Paid later	Prepaid	Paid later	Prepaid			
Transaction information transfer	The store and bank checks the status of the credit card	Free transfer. No need to leave the name of parties involved	Electronic checks or payment indication must be endorsed	The smart card of both parties make the transfer			
Online and offline transactions	Online transactions	Online transactions	Offline transfers are allowed	Offline transfers are allowed			
Bank account involvement	Credit card account makes the payment	No involvement	The bank account makes the payment	The smart card account makes the payment			
Users	Any legitimate credit card users	Anyone	Anyone with a bank account	Anyone with a bank or credit card account			
Party to which	Distributing Bank	Store	Store	Store			
Consumer's transaction risk	Most of the risk is borne by the distributing bank, consumers only have to bear part of the risk	Consumer is at risk of the electronic cash getting stolen, lost, or misused	Consumer bears most of the risk, but the consumer can stop check payments at any time	Consumer's transaction risk			

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Current degree of popularity	Credit card organizations check for certification then total the purchases. Therefore, it can be used internationally, and is the most popular payment type	Unable to meet financial internet standards in the areas of expansion potential and internationalism.	Can not meet international standards, therefore its not very popular	Credit card organizations check for certification then total the purchases. Therefore it can be used internationally, and is becoming more widely used.
Anonymity	Partially or entirely anonymous	Entirely anonymous	No anonymity	Entirely anonymous, but if needed, the central processing agency can ask stores to provide information about a consumer
Small payments	Transaction costs are high. Not suitable for small payments	Transaction costs are low, suitable for small payments	Allows stores to accumulate debts until it reaches a limit before paying for it. Suitable for small payments	Transaction costs are low. Allows stores to accumulate debts until it reaches a limit before paying for it. Therefore, it is suitable for small payments
Database safeguarding	Safeguards regular credit card account information	Needs to safeguard a large database and maintain records of the serial numbers of used electronic cash.	Safeguards regular account information	Safeguards regular account information
Transaction information face value	Can be signed and issued freely in compliance with the limit	Face value is often set, and cannot be changed	Can be signed and issued freely in compliance with the limit	Can be deducted freely in compliance with the limit
Real/Virtual world	Can be partially used in real world	Can only be used in the virtual world	Limited to virtual world, but can share a checking account in the real world.	Can be used in real or virtual worlds.
Limit on transfer	Depends on the limit of the credit card	Depends on how much is prepaid	No limit	Depends on how much money is saved.
Mobility	Yes	No	No	Yes

After analysis and comparison of various modes of electronic payment systems, it is revealed that it is quite difficult, if not impossible, to suggest that which payment system is best. Some systems are quite similar, and differ only in some minor details. Further, all these systems have ability or potential to displace cash. Added to this, widely different technical specifications makes it difficult to choose an appropriate payment system. On the basis of above analysis it is concluded that, smart cards based electronic payment system is best. It has numerous advantages over the other electronic payment systems. Therefore, establishing a standard smart card based system, or making different system interoperable with one another is critical success factor for the smart cards based payment system. Smart card organizations around the world must establish a smart card interface standard and a conformance testing organization to make all smart card system compatible; otherwise smart card related products will not develop fully.

CONCLUSION

On the basis of present study, first remark is that despite the existence of variety of e-commerce payment systems, credit cards are the most dominant payment system. Second, alternative e-commerce payment systems are some countries are debit cards. In fact, like many other studies, present study also reveals that the smart card based e-commerce payment system is best and it is expected that in the future smart cards will eventually replace the other electronic payment systems. Third, given the limited users bases, e-cash is not a feasible payment option. Thus, there are number of factors which affect the usage of e-commerce payment systems. Among all these user base is most important. Added to this, success of e-commerce payment systems also depends on consumer preferences, ease of use, cost, industry agreement, authorization, security, authentication, non-refutability, accessibility and reliability and anonymity and public policy.

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