Mobile Payments (mPayments) -An Exploratory Study of Emerging Issues and Future Trends

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ABSTRACT

With the growing momentum of wireless revolution and mCommerce explosion, mobile devices are becoming a critical component of the new digital economy. However, the mobile payments market today is typical of an emergent one, encumbered with an abundance of approaches and concepts that may not interoperate. In this paper, we have explored the broad range of available mPayment methods, emerging issues in standardization, security and some proposed/ existing solutions.

INTRODUCTION

The new freedom economy driven by deregulation, global competition and ICT revolution (Keen and Mackintosh 2001) is transitioning commercial transactions from fixed locations, to anywhere. Mobile phones have become devices for paying merchandise, receiving time sensitive information such as stock quotes, or for dissemination of critical business processes in the value chain (Paavalainen 2001). Forrester Research claims that mobile payment market will be worth $22 billion by 2005 (Baschnonga 2002). Since most mobile phones have an embedded chip to store value or provide secure authorization, some experts believe that they will replace smart cards as a means of payment (Krueger 2001b, Henkel and Zimmermann 2001, Bucci 2001). This paper attempts to provide an insight into the progress of mPayments.

EXPLORATORY RESEARCH FRAMEWORK

Exploratory studies are critical for obtaining a grasp of new phenomenon and for advancing knowledge using further methods (Gavana et al, 2001). The dynamic nature of the topic entailed an exploratory investigation, through synthesized data collection from secondary sources. Jarvenpaa (1991) and Neuman (1997) endorse the method of synthesizing and analyzing data that has been collected for other purposes and making inferences for exploratory research in Information Systems. The research is driven by the positivist philosophy where the world is external and objective to the researchers. Behaviors are explained on the basis of observable facts and by making preliminary inferences made from these observations (Ticehurst and Veal, 2000).

MOBILE PAYMENTS – CURRENT SCENARIO

Mobile Payment is a point-of-sale (POS) payment made through a mobile device, such as a cellular telephone, a smart phone, or a personal digital assistant (PDA). A person with a wireless device could pay for items in a store without interacting with any staff member. Mobile payments are used for not only merchandise purchased via mobile channel but also for transactions in the physical world such as vending machines, passport photo machines, car wash machines etc (Paavalainen 2001). There are several providers (see Table 1[1]) offering the mPayment systems services although the predominant players are Telcos and the

Financial institutions (what-is.com, MeT 2001, Krueger 2001, KPMG 2000, Bucci 2001).

In March 2002, Korea's Seongnam City, piloted a mobile payment system "Zoop" that connect the city's stores to a central payment system via broadband links. Because the credit card-equipped phones interact with cash registers, and link to a central payment system, users

Table 1: Mpayment Ventures

SUPPLIER	TYPE OF TRANSACTION
Banko.max (Austria)	Virtual POS
Bibit (Holland, intern ational)	M -commerce (WAP -enabled)
Cellonet (Sweden, Netherlands)	Parking
Cingular DirectBill (USA)	Virtual POS
EMT (Estonia)	Parking
GiSMo (Sweden, UK, Germany)	Virtual POS
Metax (Denmark)	Real POS (filling stations)
Mint (Sweden)	Real POS
NTT DoCoM o (Japan)	M -commerce (subscription)
Omnitel Onphone (Italy)	Virtual POS
Orange Mobile Payment (Denmark)	Purchase of mobile air time
Oskar (Czech Republic)	Payment for prepaid and invoice
Paiement CB sur mobile (France)	Mail order and virtual POS
Paybo x (Germany, international)	Real and virtual POS
PayDirect (USA)	Virtual POS, P2P
Payitmobile (Germany)	Virtual POS
Payline (France)	Virtual POS
PayPal (USA)	Virtual POS, P2P
Phonepaid (UK)	Virtual POS, P2P
Sonera Mobile Pay (Finland, Sweden)	Real POS (including vending machines)
StreetCash (Germany)	Real and virtual POS
Telenor Mobil (Norway)	Tickets
Telia Payit (Sweden)	Virtual POS
VisaMóvil (Spain)	Real and virtual POS

only have to enter a PIN on their phone handset to initiate a payment anywhere in the city. (Korean Herald 2002). The Finnish carrier, Sonera, is running a mobile payment trial in Helsinki, with Visa and Euro cards complementing its prepaid Shopper service, to which funds are transferred from users' bank accounts. Payments in the pilot are added to the customer's credit card invoice, or debited to a Shopper account (Cnet 2002).

In Australia, Telstra Mobile and the City of Melbourne has commenced a three-month m-Commerce parking meter trial in September 2002, where customers can elect to pay for their parking via their eligible mobile phone or cash (Telstra 2002). At the same time, Coca-Cola and Telstra have partnered to bring in the **Dial-a-Coke** service. The mobile phone users in Australia can use the phone to buy a drink from specially marked 'Coca-Cola' vending machines distributed across Central Station, Sydney. Customers have to call the number displayed on the vending machine, make the selection and the bottle will appear as if customers had used coins. The cost will appear on the customer's next mobile phone bill, and there is no charge for the call (Telstra 2002).

In Germany, IBM (NYSE:IBM) Global Services and leading international mPayment provider, paybox.net AG, have a joint initiative to drive mCommerce through an integration of systems and an expansion of services which includes wireless vending machine payments and retail point-of-purchase solutions (Paybox 2002). Paybox is available in UK, Germany, Sweden, Austria and Spain and ignores the mobile Internet and PKI, relying instead on just a four digit PIN in addition to the customer's mobile number. It works with any terminal and on any network. Paybox teamed up with US-based PayStar in February 2001 to launch a 'PizzaFone' service with an as yet unnamed national Pizza franchise where orders are paid for on delivery using a cell phone (Baschnonga 2002).

Bucci (2001) suggests that main mPayment initiatives are coming from the telcos due to the technology push. An example of this is TIM (Telecom Italia Mobile) who has jointly developed a system with Oberthur Card Systems and Societa' per i Servizi Bancari (SSB), that allows the mobile phone user to carry out banking functions and mPayments. TIM and Banca Popolare di Milano (BPM) have jointly launched We@TIM, a set of services for on-line trading, mobile banking and generalized access to eCommerce. Omnitel has launched a trading service along with Self Trade, a French broker on the Net. The EMPS is a joint project between Nokia, MeritaNordbanken and Visa to enable secure mobile payments using dual-a lot mobile phones with chip cards. The first slot is for the SIM card the identifies the caller, and the second slot is for a tiny credit card (Paavalainen 2001).

EMERGING ISSUES IN MPAYMENTS

Standardisation

MeT (2001) highlighted that the mobile commerce market today is typical of an emergent one, encumbered with an abundance of approaches and concepts that may not interoperate. A standard interface is necessary because ease of use and commonality of experience is key to driving adoption of new technology. Open Mobile Alliance (OMA) is the first step towards wireless technology unification which aims to deliver responsive, high-quality open standards, specifications for market requirements (Open Mobile Alliance 2002). PayCircle, a consortium including Sun Microsystems Inc., Hewlett-Packard, Oracle, Lucent Technologies and Siemens AG and several smaller firms have teamed up to create standard interfaces for mobile transactions (Yahoo News 2002).

RichSolutions is offering a mobile applications suite; to render PDAs and mobile phones as mobile credit card terminals that support signature capture and receipt retrieval. Card-present payments on mass-market mobile devices such as Palm, Handspring, iPaq, Jornada, Sony, and Kyocera smart phones, are possible given that the suite supports the Palm, Microsoft Windows CE and Symbian OS. The mPayment solution utilizes the connectivity options of mobile devices, such as Palm.Net, CDPD, or 802.11b, to access the Internet for the processing of SSL-secured payments (ePaynews.com 2002).

Security

Baschnonga (2002) highlighted that the evolution of payment services has been hampered by the absence of a ubiquitous security standard. Kikuchi and Tanokura (2000) argue that mCommerce began with mobile phones equipped with smart cards, offering protection of personal information. Data on a smart card is relatively secure because it is difficult to extract encrypted data from the outside and difficult to alter it. The mobile phone with its integrated SIM card is an ideal bearer for the private key digital signature of a PKI system. It will eventually become an electronic wallet where payment will be made through electronic funds transfer via the mobile phone network and the Internet or paid via the telephone bill (Kikuchi and Tanokura 2000).

The smart cards in 3G mobile phones will include a processor for encryption and other processing, an electrically-erasable programmable read-only memory (EEPROM) to store user information, a program ROM, and random access memory (RAM) work space. The EEPROM stores a variety of information including the terminal information needed during communication, the electronic authentication certificate issued by the certifying authority to verify the identity of the user, the encryption program, confidential information such as credit card numbers and personal identification details (Kikuchi and Tanokura 2000).

Visa International announced a new global specification namely Mobile 3D Secure Specification - that ensures the security of Internet payments made over mobile phones. This is based on existing payment technologies and extends payment authentication initiatives into mCommerce, enabling Visa card issuers to validate the identity of their cardholders in real time. It supports global interoperability, enabling consumers to have a consistent, seamless experience regardless of the method or device being used to access the Internet. In Asia, Visa has partnered with Hutchison Telecommunications and Dao Heng Bank; in Europe with Omnitel Vodafone and in US with Sprint PCS to develop a mPayment services (Visa 2002).

CONCLUSIONS

It is evident that mPayment methods are here to stay with mCommerce gaining momentum. Lack of standards and security within devices as well as network may be pertinent issues for the future of mPayments. A range of solutions involving financial institutions and mobile service providers seem to be in progress, and perhaps is the key to addressing these issues. The lack of standards across economies may be addressed through various consortiums, involving many economic forums, mobile operators and also financial institutions, if mCommerce has to be diffused into the mass-market. From our preliminary exploratory lens, the view is still optimistic that mPayments will progress and become a standard for future business.

ENDNOTE

[1] The highlights are where mobile operators are participating in the mPayment ventures.

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