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# SMART CARD USAGE FOR INFORMATION RETRIEVAL

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# ABSTRACT

The emergence of Electronic Commerce have enhanced the business efficiency, increased responsiveness and accountability and reduced the cost of transaction as it become more common nowadays. Recent developments in encryption, microchips, and computer network technology have enabled consumers to make electronic payments through the usage of a stored-value card or so-called electronic wallet, which money value is stored digitally. The transactions made with stored-value cards resemble transactions made with currency or coin. An information retrieval from digital library can make use of the extraordinary features of smart card to create an efficient, low cost and safe transaction throughout the virtual world. The usage of smart card could settle the hassle of using credit card and the need of central authorization to purchase information of any kind.

### Keywords Information, Smart Card, Micropayment

## **INTRODUCTION**

In order to get snippets of information, like one page article, it would cost a fraction of a cent. Therefore, an efficient electronic payment system will have to be able to handle small payments where instant settlement is needed. A credit card is well suited for the average transaction of \$ 60 (1) but when it comes to small payments, cash is still the method of choice in conventional transactions. As large amount of money is now electronically stored by means of databases, the term "e-cash" in this paper reflected a money that serve as a value store as implied by the traditional definition of money. Thus, the authors proposed smart card-based payment as settlement for micropayment in retrieving information from digital library and other sources. Nowadays, information is a valuable thing, and things that have value also have a price. In this context, digital libraries is an extension, enhancement, and integration of a variety of information institutions as physical places where resources are selected, collected, organized, preserved and accessed in support of a user community (2). Stored value cards or so-called smart card represent the "missing link" in a move towards a cashless society, as they provide an economic means of carrying out small value transactions electronically.

A stored value card may be either disposable or reloadable. If the card is disposable, it may be disregarded once the value has been spent. If the card is reloadable, the consumer can replenish the value of the card as often as he or she likes. It can be done at ATMs, special terminals, home or office telephones or cash-to-card terminals (3). Disposable card functions in a similar fashion to a public phone one. It is issued for a fixed amount and once this amount has been used, the card is thrown away. In case of a reloadable card system, once the value on the card has been used, the system allows for the recharging of the card, which then can be used again. The easiest approach to reloading is from banking account of the cardholder. The great majority of electronic purse systems are based on reloadable cards, although the nature of the reloading process varies. Virtual money offers many benefits to the consumer. Once the card is "loaded" with value, either from an ATM machine or telephone, the customer presents the card to a merchant, in this context the merchant is the administrator of digital library and the appropriate amount is deducted from the card. There is no need to access the customer's bank balance or check their credit.

Customer could pay for information without revealing their identity and at the same time organization can benefits from the increased of security and cost reduction from the lower record keeping. Smart cards in the form of cash card provide a new platform for the development of additional information and payment based applications. They represent an active replacement for the passive magnetic-stripe card, permitting enhanced security techniques. Furthermore, they provide greater storage capacity than standard magneticstripe cards, leaving more room for application growth. Another immediate value by Digital's library administrator was the convenience of accepting the card versus other forms of payments such as cash or credit cards. The handling of cash is eliminated, therefore, no errors are made in making change and cash drawers would not need to be maintained and counted.

### MATERIALS AND METHOD

The authors proposed a payment design called PayEZ. Many of the design ideas are based on a close examination of systems such as DigiCash, Mondex and other related systems such as First Virtual, CyberCash and NetCash. All the models except Mondex are related to on-line transaction because of the needs to get central approval regarding the purchasing of goods or services. PayEZ eliminate the needs of central authorization because the cash card needs to be preauthorized before it can be used. Figure 1.0 shows the details of transactions.

Figure 1.0 Transaction process with PayEZ



PayEZ is designed to meet the requirements of all parties. Transaction to each and from entity implies a number of specific prerequisites. First, customer would select desired information from the digital library or any other sources. After the information; articles for instance have been selected, the administrator will ask for payment. The customer will insert his smart card to the card reader. The screen at Point-Of-Sale (at the administrator side) will show original amount in the card, amount of purchase, deducted amount and date of purchase. The receipt will be given to the customer upon request. It will be emailed to the customer showing the detailed of last 10 transaction. The administrator will deposit all the coins received by the end of the day into the bank (settlement process). The bank will then validated the coins by checking serial number with the currency server at the time of purchase (or exchange) to prevent double spending. If the coin's serial number is then removed from the database. The coin is then replaced with a new coin (coin exchange). User asks for new coins or reloads e-cash provided that he has an account with the bank. Bank will reload the smart card of the user with requested amount provided that he has enough funds. The term "coin" in this context refers to the collection of value that represents original money.

### DISCUSSION

As the settlement phase implies a lot of exchange of sensitive information to other people, privacy is always traded for convenience as in the case of using credit cards (4). When the privacy of the customer is not maintained, the buying habits could be easily traced. The usages of smart card however, eliminate this problem by maintaining the user's privacy with the technology of digital signature. Smart card could make the flow of information more reliable by emphasizing to the privacy aspect of the user. MEPS (1997) Sdn Bhd have initiated the Electronic Purse (E-Purse) project to take the lead in the development of e-payment

system in Malaysia. E-Purse contains an electronic value and has an electronic support i.e. the Integrated Circuit Card. It is a prepaid, destined for small amount purchase, substitutes for coins and smaller banknotes, user friendly and contains unit of money. E-Purse is developed with three objectives; to improve speed and convenience of low value payment, to reduce cash as means of payment and to provide a better security against fraud and counterfeiting (5). One can have full control i.e. cardholder can only spend what is on the card, so there is no risk of going into debt.

The decentralization i.e. not linking to the central computer while exchanging money offers dangers because people will find ways to either clone or manipulate the smart card. Anonymity could not be thoroughly maintained because the card would record the last ten of its transaction and it can be read using the card reader at merchant's terminal (6). New technologies might compromise the protection; consequently there are additional costs involved. Cash card is a card dependent system, so it requires card readers in the hands of customers. The card reader will cost the customer some amount of money, which makes it one of it major disadvantage (7).

The technology of micropayment put more convenience to both customer and merchant. The electronic solutions for micropayment are undeniably crucial for the success off electronic information purchasing. Panurach stated that the question of whether a system is adopted depends largely on the details of the transaction and the needs of the people conducting the transaction (8). The development of advance security aspect of smart card should always count whether it would raise acceptability of the user.

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