m–COMMERCE WITH CELLULAR MOBILE TELEPHONE OPERATORS AS A THIRD PARTY

SAJJAD WAHEED[1], MOHAMMED ABUL HASAN[2]
[1]Faculty of Science & IT, Daffodil International University, Dhaka 1207, BANGLADESH
[2]Department of Computer Science, Information Valley of IIT, Dhaka 1207, BANGLADESH

Abstract:- *m–commerce* has emerged as the latest trend of *e–commerce*. Popularity of cellular mobile telephones has widened the prospects of *m–commerce*. Existing *m–commerce* applications do not integrate the cellular mobile telephone operators as the third party. The proposed scheme here suggests an integration of the cellular mobile telephone operators as the third party for the purpose of *m–commerce*.

Keyword: − Mobile commerce, wireless network, credit cards, debit cards.

1 Introduction

Any form of business transaction in which the parties interact electronically rather than by physical exchanges or direct physical contacts becomes a main criterion for *e–commerce*. [1]

Mobile commerce or *m–commerce* is a type of e–commerce. The pattern for e–commerce aims to communicate in a highly accessible fashion in all forms of business, system architecture, product mappings, and guidelines required for different classes of clients. A buyer using e–commerce can purchase in confidence knowing their transactions are secured and their privacy is protected.

2 e–commerce and development of m–commerce

Electronic fund transfer (EFT), electronic cheques, debit cards, credit cards, Internet banking and other alternative payment types are few examples of e–commerce payment schemes.

e–commerce transaction [fig. 1] is employed to purchase goods, services, pay off various bills, and online retail marketing and many more. User–to–online buying application topology includes an integrated third–party application. This application is not built as a stand–alone solution; rather this application needs to integrate existing applications. [2] The integration can be achieved in two ways: on functional basis or on data basis where transaction interface or a data interface is used.

Integration of existing applications may require little analysis into requirements of the system. However, integration does not always require changes in the existing applications.
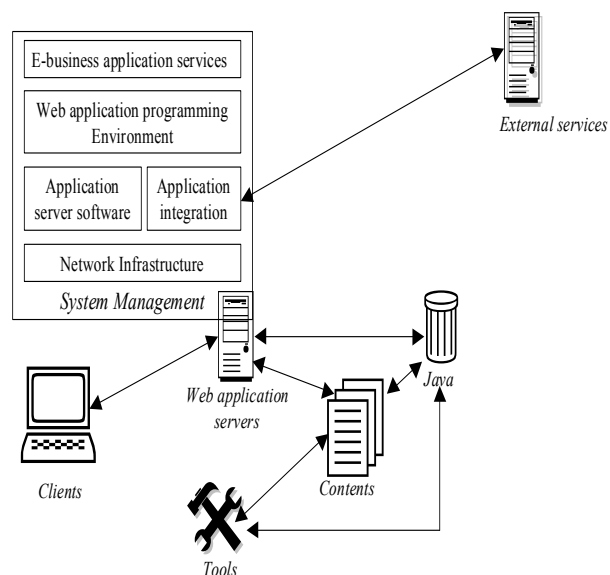

Fig.1: Application framework for e–commerce

3 Contemporary applications of cellular mobile telephones in m–commerce

The contemporary e-commerce applications have few problems. First of all, a buyer must be present in front of a computer that should be connected to complete the activities of e–commerce. If, for instance the buyer is on the move, and does not have access to such a computer, the e–commerce

shall not work. Thus, the desired goal of e-commerce will not be achieved.

Credit cards play a vital role for both ordinary commerce and e–commerce. A credit card cannot work without proper terminal. [3] This limitation of credit cards was a turning point when the cellular mobile telephones were becoming popular. e–commerce now evolves to replace all smart cards.

A survey in 2004 showed 74 million users access the wireless web from e–commerce which is one third of all wireless subscribers [4]. This has given the opportunity for cellular mobile telephones to be interactive with credit cards.

Three prospective m–commerce methods have so far evolved. They combine credit card companies, cellular mobile telephone companies and enterprises or retailers.

The first option uses infrared beam installed inside the handset to emit a beam directly to a cash register and make a payment. The second technique involves a special chip embedded in the phone that users can wave over a scanner attached with the cash register, and thus enable the handset to transfer data for transaction. The third one involves no new technology at all: A text message is sent from the handset to the credit card company which in turn authorises a credit card transaction.

4   Problems in the exiting system
In the first option mentioned in the previous section, the infrared beam works within a room only, thus limiting the range of the transaction within a permitted distance. In addition, the cash terminal needs an extra device to receive this beam.

A leading Japanese cellular mobile telephone operator plans to implement this option with specially designed handsets. However, huge expenditure will be levied on both the subscribers and the enterprises or retailers for changing handsets and for adding special devices.

The second option requires one to attach an extra device with the handset that will be recognised at a suitable scanner for making payment. This will require both the buyer and the seller to add one extra device on both of their devices.

The last option requires authorised persons to use their credit card facilities only for making a payment through a text message over the cellular mobile telephone networks to the credit card companies.

In some countries, text message and phone–banking complete a transaction: A consumer, while waiting in queue, calls the phone–banking service

of the participating banks, or credit card companies and requests an approval number. They can tell the system to debit their accounts directly or charge the credit card. Seconds later, they get a reply through short message services (SMS) that contains an approval code valid for just completed purchase. The buyer then shows the SMS to the cashier. The cashier enters the code into the usual payment terminal to complete the transaction.

5   Mobile telephone operators as the third party for m–commerce
None of the processes discussed so far are user friendly. In addition, they also do not meet security aspects. In first two schemes, the retailers need to attach extra devices at their cash terminals, or the buyers need special type of handsets. Third option involves few manual operations. No advantage of automation is used, which is indeed possible to implement.

An unauthorised person can make a payment and a genuine account could be drained. [5] The credit card companies, in above scenarios, does not check with the cellular mobile telephone operators about the validity of the telephone number.
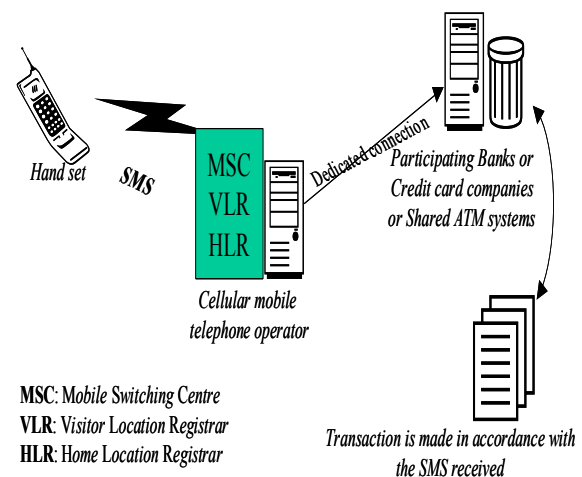

Fig. 2: Components of the proposed *m–commerce*

Instead, if a text message is sent through cellular mobile telephone systems [fig. 2], this message can be verified if the telephone number is valid or not. The cellular mobile telephone companies can also ensure secured data transfer [fig. 3] for participating banks, credit card companies and shared ATM systems.
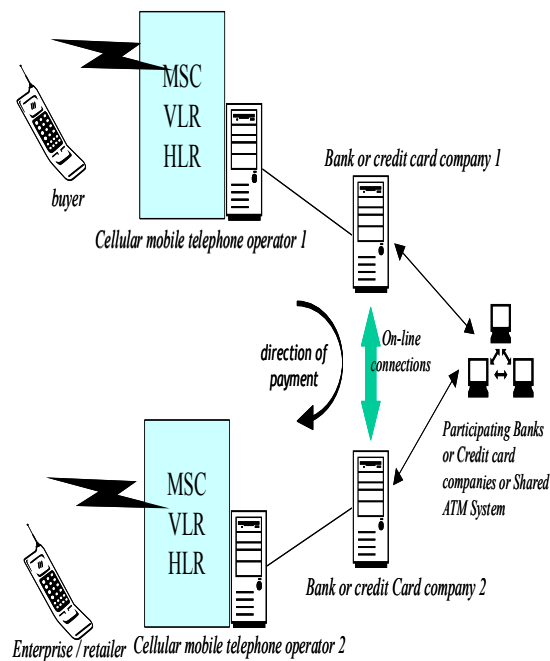
Fig. 3: *m–commerce* using third party integration

6 Proposed system principle

In the proposed system, both the buyers and the retailers should have unique *bank accounts* or *credit cards* or *debit cards* with the participating banks, credit card companies, or shared ATM systems, respectively; and corresponding personal identification numbers (PIN). [6]

When a buyer makes a purchase, a message should be sent to a pre-defined number with the cellular telephone operator. This request is received in the mobile telephone operator's end; a request for preparation for transaction can be sent to the corresponding bank, credit card company or shared ATM system with the account number.

In the mean time, a text message for the buyer would be sent with few fields in sequence [fig. 4] which the buyer needs to fill up. Once these *sequences* are filled up, all these *sequences* will be sent to the participating banks, credit card companies or shared ATM systems through the mobile telephone operators.

In no circumstances, one *sequence* shall appear unless the previous *sequence* is filled out properly and sent back. Mobile operator should ensure the correct ordering of the *sequences*.

It is important that the cellular mobile telephone operators verify if the user with that particular telephone number is a valid one before they send

those to the participating banks, credit card companies, or shared ATM systems.

Fig. 4: Text message initiating payments from handset

Once the data is received, the corresponding server initiates the transaction. Two separate SMS will be generated after a successful transaction. One of these messages will be sent to the buyer [fig. 5], confirming a successful transaction.

Fig. 5: Sample of bank or credit card company or shared ATM system test message confirming the transaction for the buyer (*top one*) and for the seller (*the bottom one*)

On the other hand, retailers or enterprises will receive another message [fig. 5] confirming that a certain amount of money was transferred to its account. The message for the retailers can be sent as end–of–the–day transaction information, or as an instantaneous message.

The cellular mobile telephone company and the participating banks, credit card companies, or shared ATM systems may have a mutual agreement on data transfer between their servers. However, under no circumstances, the cellular mobile telephone operators shall disclose any information regarding all these transaction to unauthorised entities. [6]

7 Concluding remarks

Use of text message service from the cellular mobile telephone operators shall easily connect almost all mobile telephone subscribers in the m–commerce. It will reduce the risk of carrying cash, provide with secured personal-level financial transactions, and results in flexible and easier transaction procedures.

If this proposed system is used properly, more text messages will be generated which will earn more revenue for the cellular mobile telephone operators. The respective participating banks, credit card companies or shared ATM systems will be able to increase their business volumes.

The operator may impose a minimum charge per text message basis on the users, and may also charge participating banks or credit card companies or shared ATM systems for providing them with secured data services. The banks, credit card companies or shared ATM systems may also charge, separately, the users of the system or account holders for transactions they make using this system.

Few internal connections and little software adjustment would be required for the cellular mobile telephone operators to implement this scheme. This scheme expects that adding extra devices with the handset or substitute the handsets only for the m–commerce can be resolved. Even manual operations for paying bills are not required.

Since no additional expenditure for setting up components, machines or software are essential; the participating banks, credit card companies or the shared ATM systems may easily integrate the cellular mobile telephone operators as third party.

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