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The application of Web ATMs in e-payment industry: A case study

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ABSTRACT

Today's highly competitive marketplace is forcing the retail banking industry to optimize every possible revenue-generating opportunity. New electronic channels are replacing the more traditional ones. Web ATMs system represents one of the recent developments in financial service distribution.

Through a real-life case study, this article explains how much more advantage can be achieved by enhancing Web ATMs with the latest Web-enablement technology, and examines the key benefits that can accrue from the deployment of integrated circuit (IC) card and smart card reader on Web ATMs. Last but not the least, it is expected that this article could provide strategic thinking with some apocalypses of Web 2.0 to steer the banking system for achievable changes in a direction that is consistent with the needs and expectations of a population, especially in C2C business model.

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1. Introduction

The advent of the Internet has had great impacts on today's world. Business is being conducted very differently and has been reshaped by such genius Internet technology. The concepts of electronic commerce (e-commerce) or electronic business (e-business) have gone through a rapid evolutionary process. Today, applications of e-commerce can be seen almost everywhere, from product design, business operations, business transactions, and even to the services delivery (Thomas, Jung, Thomas, & Wu, 2006; Tsai, Huang, Fan, & Liu, 2006; Tsai & Wang, 2008).

Indeed, the recent advancement in science and technology does provide many competitive advantages to modern businesses (Chen, Chiniwar, Lin, & Chen, 2006; Chen, Parker, & Lin, 2006). Such Technological advancements are also changing the face of the financial services industry. Although nowadays brick-and-mortar branches still remain the main banking distribution channel (Celik & Karatepe, 2007; Howcroft, Hamilton, & Hewer, 2002; Wang, Wang, Lin, & Tang, 2003), in recent years, the growth of newer channels has introduced significant changes. The Internet and new ATMs are examples of technologies that enable customers to carry out banking operations on their own, without the need to visit a branch office (Martinez Guerrero, Ortega Egea, & Roman Gonzalez, 2007).

Because financial services are highly dependent on technology and well-suited to remote delivery, technological advances and

the advent of the Internet are causing dramatic changes in the industry. New electronic channels are replacing the more traditional ones (Laukkanen & Lauronen, 2005). Here, the Internet offers many opportunities and benefits to financial services providers by using the Internet for information presentation, two-way communications, interaction with users, and transaction banking (Wu, Yang, & Liang, 2006). On the same point of view, Stamoulis (2000) pointed out that the Internet is increasingly considered a strategic weapon by banks, which are leveraging it as a distribution channel to offer complex products at the same quality they can provide from their physical branches, at a lower cost, to more potential customers, without boundaries. Timmer (2000) also supported this view, highlighting the key features of the Internet such as 24 h availability, almost immediate access and the absence of physical borders. Indeed, the Internet has been one of the key drivers in promoting e-commerce in the banking sector (Jeevan, 2000). Many banks have also looked toward information technologies to assist them in making this transition and to obtain the flexibility necessary to compete well into the future (Chen, Chiniwar et al., 2006; Chen, Parker et al., 2006).

However, ACI Corporation (2002) pointed out that most of the ATMs developed prior to the late 1990s were designed to run in an isolated and exclusive environment, with the primary function of dispensing cash. As such, these machines work with magnetic strip cards. They are relatively easy to skim and counterfeit, so for the sake of security, their functionality are still limited. Besides, it is a high degree of independence – they act as small financial islands that communicate only a limited amount of information to and from the bank. They are thus not an effective payment instrument for emerging services. Customers still used to make majority of payments or transfers around the brick-and-mortar banks.

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Nowadays, the bank industry has been ushered to develop electronic banking services with a suite of products besides to existing over-the-counter services. These Internet platforms which people comparatively know well is “Internet Banking” or “Online Banking”. Such electronic financial services on the Web with a secure, reliable payment gateway could enable their customers to carry out elementary transactions such as interbank account transfers, bill payments, tax payments, and balance inquiries. However, owing to related financial services that are still limited on specific websites of proprietary banks and their safe mechanism that are involving various kinds of potential risks, on-line intrusion, hacker’s Trojan procedure, etc., the consequence not only results in effecting their consumer’s confidence, the brand images of banking but also negatively affect the tendency of use of their customers’.

Therefore, the purpose of this study is looking on the issues related to the development of Web ATMs in Taiwan from an evolutionary perspective. Through a real-life case study, it is expected this article can explain how much more advantage can be achieved by enhancing Web ATMs with the latest Web-enablement technology, and examines the key benefits that can accrue from the deployment of integrated circuit (IC) card and smart card reader on Web ATMs. Last but not least, authors will try to present some critical strategic thinking with some apocalypses of Web 2.0 to steer the banking system for achievable changes in a direction that is consistent with the needs and expectations of a population that is becoming increasing ready to take control.

2. Critical issues on the way to Web ATMs

2.1. Electronic banking (e-banking)

Electronic innovation in banking can be traced back to the 1970s when the computerization of financial institutions gained momentum (Pang, 1995). However, a visible presence of this was evident to the customers since 1981, with the introduction of the Automated Teller Machines (ATM) (Sadiq & Shanmungan, 2003). At the early decade of the 1990s, people have had chances to see the emergence of automated voice response (AVR) technology. With such kind of technology, banks could be able to offer the telebanking facilities for financial services and other services through personal computers owned and operated by customers at their convenience, through the use of Intranet proprietary software. The commitment by the banks towards e-banking is evident by the fact that most of these banks have made substantial investments for moving towards e-banking and trying to provide customers with online banking transactions.

In general, e-banking refers to the use of Internet as a remote delivery channel for providing services. Ahmed, Zairi, and Alwabel (2003) indicated that the services of e-banking can be offered in two main ways. First, an existing bank with physical offices can establish a website and offer these services to its customers in addition to its traditional delivery channels. Second, it is to establish a virtual bank, where the computer server is housed in an office that serves as the legal address of such a bank. Virtual banks offer their customers the ability to make deposits and withdraw funds via ATMs or other remote delivery channels owned by other institutions. Convenience of virtual banks to be pursued by customers as better way is to execute business transaction remotely.

Indeed, e-banking has brought efficiency and benefits to financial services (Buhl & Will, 1998; Devlin, 1995; King & Liou, 2004; Liao & Cheung, 2002; Scruggs & Nam, 2002; Shah & Siddiqui, 2006; Yan & Paradi, 1998; Yousafzai, Pallister, & Foxall, 2003, 2005). Esser (1999) stated that the benefits of e-banking are (1) competitive advantage; (2) customer retention and attraction; (3) increased revenues; (4) reduced costs. However, in terms of trends,

according to the Gartner research group, the vast majority of Internet bank users (21.6 million) merely checked accounts online; only 6.6 million used services such as bill payments online. A large number of organizations were announcing the launch or development of transactional Internet Banking (Daniel, 2000; Sundarraj & Wu, 2005). Similarly, Bream (1998) estimated that 60% of retail banking transactions would be performed online in 10 years’ time. A report from Cap Gemini mentioned that large banks expect that 25% of transactions should be done online by year 2005 (Pigni, Ravarini, Tagiavini, & Vitari, 2002). It is believed that e-banking services would be indispensable for people’s daily life in the near future.

2.2. The financial revolution on the Web ATMs

Technological more advances are continually changing the face of the financial services industry. The online banking channel has matured beyond a technical innovation into a vital channel for financial institutions regardless of size. Technological developments have also enabled more financial services products to be gained and administered via remote distribution channels. To make current functions of ATMs and the services of Internet Banking have a better integration in delivering new products and services, or communication more fully with current applications of Web-based electronic banking and delivery channels, bank society has been ushered to develop a new kind of Web-based payment instruments which is known as “Network ATM” or “Web ATMs”. Web ATMs is the latest channel whose potential is being promoted by both traditional financial services players and new entrants alike.

New mechanisms and new providers will have ability enabling customers to use the more financial services provided by financial institutions and effect transfer transactions via the Internet from a personal computer or other such devices only with an integrated circuit card and smart card reader (interface device, also name of IFD). On the platform of Internet, the payee and drawee link up with the Web ATMs system via personal money receiver of exclusive Web ATMs on the site of banking or via an intermediary payment gateway of portal site. The payment of transaction can receive and send right in several seconds. It is an extremely convenient way of online payment instrument enabling consumers to allocate or transfer funds, effect payments, and make account inquiries 24 h a day, all year round.

Such a new type of service has not only varied e-finance penetration but also opened up many new opportunities, both within and outside the payments field. Banks could keep its Internet Banking program flexible and competitive using Web-based technology. It could also speed up its service and reduce its operation costs. With secure transactions over new channels such as Web ATMs, customers could administer and enjoy convenience and security of financial services with a familiar user interface of Internet from home, office to large multi-national corporations.

Although Web ATMs and the Internet Banking services both are implemented on an open architecture which is constructed in the network environment, the risks of transactions of Web ATMs are much smaller than those of the Internet Banking. The reason is that consumers have to use the encryption function of Integrated Circuit Card (ICC) and the smart card reader (or Card Interface Device, IFD) synchronously. The security mechanisms of Web ATMs not only could solve various payments problems but also could save time in looking for the entity ATM machine. The functionality of Web ATMs with IC card possesses: card holder authentication and discernments, card legitimacy, transaction authentication code (TAC), and reach confidentiality, integrity of data and the transaction non-repudiation, it is safe, difficult to be recorded and counterfeited, etc.

Besides these, banks could also take advantage of the characteristic of Web ATMs, Internet-based financial solutions, deploying Web ATMs of its mechanism onto typical popular portal site via an outsourced service of banking. Web ATMs empowers the portal sites to provide to their end users and commercial customers through to proprietary payment gateway of banking to fulfill their demand of payment. With Web ATMs of Internet Banking platform, portal site, “a branch of Internet Banking”, can serve as kind of the financial hub for all its end users’ online banking needs and strengthens the brand and image of its own. Through Web ATMs of online banking solutions, portal site can market and serve its patrons with more on-going supports but also increase revenues, satisfy end users, and build longer lasting relationships with minimal demand on the bank’s existing infrastructure and resources.

These developments will force bank society to provide more competitive products and better e-financial service and the services of banking will be becoming more maturity. The result will not only benefit for all parties but also further boom the banking industry. At last, it will lead bank industry get more close to the ideal world of electronic commerce and Internet.

3. Research method

This study was based on a case study of E. Sun Commercial Bank. Its main focuses were to identify and understand how organizations can manipulate the Web ATMs to sustain their competitive advantage and how much more advantage can be achieved by enhancing Web ATMs with the latest Web-enablement technology. Therefore, in order to determine the data needed for the research, a variety of qualitative data were gathered from past project document archives, face-to-face unstructured taped-recorded interviews, on-site observations and field-notes. Meanwhile, in-depth interviews were conducted with key participants and project managers of the corporation and some experts in e-payment industry. For each interviews, full transcripts of the interviews were also prepared and coded to note the main themes and insights for the following discussion. At last, to ensure the quality of the collected data, all referred document and insights were double-reviewed carefully with field-related experts and researchers in e-payment industry.

4. The background and development of Web ATMs in Taiwan

For the purpose of this commentary, the following context of the study will give a real-life Taiwanese case of how to initiate the development of Web ATMs on the right way to explicit what kind of business model can be deployed to add value for consumers and improve the performance of banking.

4.1. Case overview (E. Sun Commercial Bank)

Founded in 1989, E. Sun Commercial Bank is the flagship operating subsidiary of E. Sun Financial Holding Company, a well-run financial holding company with professional management and a constituent of the MSCI Taiwan Index. As of December 31, 2005 E. Sun Financial Holding Company had total assets of NT\$636 billion and total shareholders’ equity of NT\$44 billion.

E. Sun Commercial Bank places high emphasis on customer needs and maintains that the only way to cultivate a large and royal clientele is to further promote the value of banks and their contributions to the society, as well as providing products and services that satisfy customer needs. As a leader in the financial services industry in Taiwan, E. Sun Commercial Bank has worked hard to explore potential areas enable it to further improve the efficiency of banking operation as well as the suite of products and services.

The action undertaken by E. SUN in seeking to efficiency is to establish online banking solutions that can making online banking services as convenient and as safe as possible.

E. Sun Commercial Bank combined the latest technology with top-notch service to make customers’ life easier. It has built a new and improved Internet Banking and bill payment system where customers are in charge – giving customers constant access to account information, up-to-the-minute financial control and transaction security. It is so streamlined that managing customer’s money can now be accomplished in a matter of minutes from the comfort of customers’ home! Through these year’s efforts, E. Sun Commercial Bank is capable of delivering sophisticated, easy-to-use and useful technology to its customers’ desktops through its online services, which gives their customers access to the full breadth and depth of E. Sun Commercial Bank’s expertise.

These years, E. Sun Commercial Bank has not only made Internet Banking and bill payment more efficient than ever, with easy-to-understand screens, user-friendly navigation and added functionality but also gained steady developments under the strategy of IT introduction and online service of penetration. This global-yet-local approach has given its clients a significant advantage compared to other banks and its investment in market-leading online services shows its commitment to supporting the changing needs of this vital sector of the Taiwanese economy. It is believed that such efforts will not only strengthen the IT capability and its long-term competitive position of E. Sun Commercial Bank in Taiwan, it will also allow E. Sun the financial flexibility to pursue new growth opportunities in the face of increasing competition and challenges.

At present, E. Sun Commercial Bank’s Business online Banking services have succeeded in attracting more than 670,000 customers since its launch in 2005, with 11,000 new customers joining every month.

4.2. Driving forces to develop Web ATMs

At a time when success in the retail banking industry relies not only on gaining new customers but also keeping existing ones, organizations will also need to look for new and popular ways of delivering more products and services. Here, Web ATMs brings a lot of opportunities for the financial sector as well as for corporations and individuals in Taiwan. Financial institutions are now increasingly using the Internet delivery channel to allow their customers to conduct almost all of the transactions that they offer at their branches. This brick and click strategy has proven to be very successful if appropriately introduced and managed. For financial institutions, Web ATMs has become a requirement to better serve their customers. This initiative could bring many cost savings for all the parties involved. On the other hand, the usage of Web ATMs tools for online merchants is becoming more and more important as well as to the patrons, due to the access to information regarding their financial resources and the convenience and increased security that the different tools provide. These intensive claims and expectations will force an efficient market to introduce the mechanisms of Web ATMs and to increase productivity and efficiency of the market eventually.

In addition, there are some main driving forces fostering Web ATMs quick development and these broadly fall into the following categories of drawbacks of the magnetic strip card and current payment instrument.

4.2.1. Drawbacks of the magnetic strip card and current payment instrument

4.2.1.1. *Security concern.* In earlier decades, the development of ATMs with the primary function of dispensing had astonished people’s life at the conveniences of its birth. However, they were

designed to run in an isolated and exclusive environment and work with magnetic strip cards. They are relatively exclusive and easy to skim and counterfeit, so for the sake of security, their functionality are still limited. They act as small financial islands that communicate only a limited amount of information to and from the bank. They are thus not an effective payment instrument for emerging services in some ways. Customers still used to make majority of payments or transfers around the banks or both. Afterward, banking industry makes effort to improve the efficiencies of operation and introduce electronic banking service through Internet. Similarly, owing to related financial services that are still limited on specific website of proprietary bank, furthermore, its safe mechanism involves various kinds of potential risks, on-line intrusion, hacker's Trojan procedure, etc. People more often feel intimidated by its security mechanism with potential risks and pressured to commit to the Web transaction before they have researched to their secure satisfaction. Under such a circumstance, people feel no confident and feel skeptical of doing transactions online with such payment instruments. Also, such consequence not only results in effecting the expansion of banking service but also affect its brands and enterprises images of bank. In order to solve these problems completely, The Bank Society announce stopped the magnetic stripe card trade since March 1, 2006, nearly 40 million IC card will be terminated by that time.

4.2.1.2. Inconvenience. Since that customers is accustomed to purchase over the Internet and enjoying the convenience of Internet, however, most of them were confronted with difficulty not only to make real-time payment but also experience time-wasted payment procedure. They might have to find brick-and-mortar bank or post office to make the consumptive (postal) transfer, or use wire transfer except paying cash. Then consumer should keep the transfer receipt and fax it to the payee in order to complete an online transaction. In a number of cases, people surf on the Web and enjoy buying something with high hopes and expectations, which later fade in dealing with the follow-up process as they place the order. In consequence, discomfort with the shopping process poses a significant barrier and causes many consumers to feel frustrated with such unnecessary and over-laborious formalities of transaction procedures they are required to do so on Web shopping and overwhelmed by the substantial time and effort that it takes to get items.

4.2.1.3. Inefficiency. The advent of the Internet has ushered and enabled Web merchant to operate their corporations and promote their businesses by providing new Web platforms for delivering their services and products with the key features of the Internet such as 24 h a day/7 days per week/365 days one year round. Same to such nonplussed situations, however, Web merchant often receive little on-going assistance in managing their money flow of Web under current traditional financial process and service after customers place online orders. Here, marketer and accountant of the corporation take responsibility for the main transaction process between patrons and corporation. Without technology involved, marketer and accountant normally wait for not prompt payment confirmation in front of certain booking order from patrons' service request. Marketer and accountant of the corporation have a hard time to perform the whole transactions because of time lag and dispersed information.

The online business exercise for the transactions seems to be harder than it should be. Indeed, the processes of transactions for both consumers and Web merchants are an uneven. Consumers perceive effecting payment to be inevitably inefficient and hard to encounter various obstacles if online business operation is still based on the traditional transaction processing. Even though merchants have an incentive to pursue business opportunities via the Internet, typically, they still lack the financial technological capa-

bility to their customers with instant, user-friendly and secure payment methods.

Such consequences eventually result in all parties involved in online transactions to revamp current transaction process with wishes and make another step forward by introduction of technology, improvement of efficiency and re-engineering of transaction process.

4.2.2. Opportunity for E. Sun Commercial Bank

As indicated above, owing to the drawbacks inherent in these and other online approaches to current payment instrument, electronic transaction of Internet has brought out some critical problems with regard to the inconvenience, inefficiency and security concern. Therefore, for the sake of security, the Bank Society announced that the banking industry began bringing chip cards online in 2003 and committed to initiate secure and convenient financial chip card operation. And the magnetic stripe card trades were stopped on March 1, 2006.

The advent of Internet and innovative technological delivery channel, indeed, could be a preferable source for future payment instrument and for many people who have had unpleasant experiences with payment mechanism in the traditional way. Since then, Web ATMs were led and promoted to current emerging market naturally. The Web ATMs can give consumers and business patrons of banks with informational links and graphical interfaces for use as well as money transfer capabilities. Such a new type of service not only varies e-finance penetration but also opens up many new opportunities, both within and outside the payments field. With secure transactions over new channels such as Internet, banks could keep its Web ATMs program flexible and competitive using Web-based technology. Customers could enjoy convenience and security.

Since 2005 Web ATMs started to be promoted in the market actively, financial market has been turned into a pitched battle field. The key banks have joined into the war. It is estimated that there are 40 million of issued IC cards circulated outside and the number of transfer transactions over the Web ATMs increased from 62,000 times per month at the beginning of 2005 to 1,151,521 times in October of 2007 among average 308 million US dollars, a month. Moreover, the majority of portal sites and online service providers have been key promoters not only embedded related functionality of Web ATMs into their sites but also launched a series of marketing campaigns with free smart card readers such as Yahoo!, PChome and MSN. It is estimated that the smart card readers would increase the volume of circulation from 1 to 1.5 million by the end of 2006. Obviously, the growth and potential of Web ATMs is astonishing.

Along with such a substantial market opportunity, E. Sun Commercial Bank believes that Taiwan will give birth to a significant market opportunity existing for a centralized, globally accessible and easy-to-use online service-based on saving money, time and effort, and an open, integrated service that can speed up the services and provide a complete transaction and payment fulfillment solution online. E. Sun Commercial Bank has absolute faith and ability to do so with Web ATMs of online service in a convenient, cost-effective way, thereby building a leading national brand name in consumptive transfer market.

5. The application of Web ATMs on the Web platform of E. Sun Commercial Bank

Security is mentioned as a very critical factor by a number of authors (Enos, 2001; Regan & Macaluso, 2000; Turban, Lee, King, & Shung, 2000). Shah and Siddiqui (2006) stated that lack of it, or consumers' fears about it, is one of the biggest obstacles in the

growth of e-commerce. Therefore, the first top priority for E. Sun Commercial Bank is to deploy an architecture which enables its Web ATMs to meet new PIN-encryption security standards. As described in Fig. 1, the architecture works on Web technologies, using Web-based software, servers and network protocols to communicate to the Web ATMs network and the bank's host systems and databases. For the sake of security, E. Sun Commercial Bank employed several security mechanisms which could be divided into four-tier secure controlling modules and widely deployed over the client site, front-end and back-end server site, respectively.

The first secure controlling module is called off-line data authentication. Off-line data Authentication is the process whereby the terminal verifies the authenticity of critical card data. The other functionality is cardholder verification. It is performed to ensure that the person presenting the ICC is the person to whom the

application in the card was issued. Also it is performed by the terminal to protect the acquirer, issuer, and system from fraud.

The second one is designed in the smart card reader and its typical start-up software which is programmed by E. Sun Commercial Bank itself. While user starts the Web ATMs, the Active X module on client site of PC will verify if the Uniform Resource Locator (URL) is the one of issued Active X module originally. This mechanism will not only prevent the user from being connected to the counterfeit site but also serve as mutual authentication with the key agreement based on the smart cards between clients and servers.

The third one is designed on the transaction webpage which enables transactional information and existing applications could be verified and protected from Trojan procedure by providing dynamic verified code. And the last one is transaction

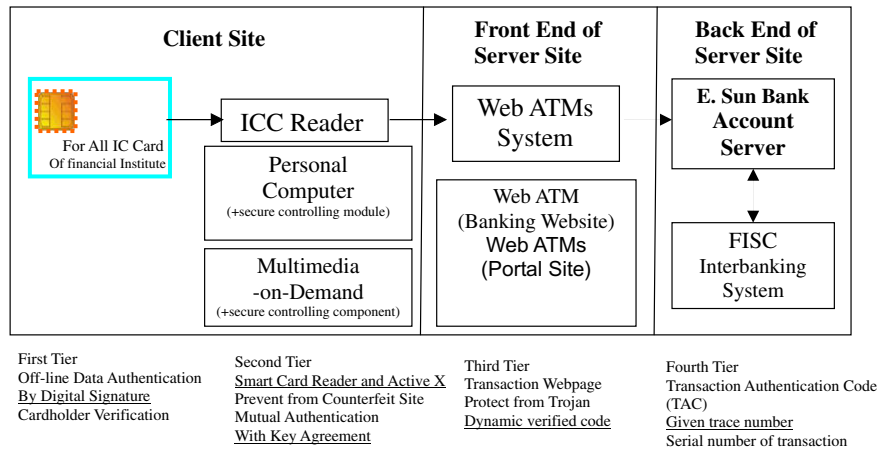


Fig. 1. The security architecture of Web ATMs with four-tier secure controlling modules.

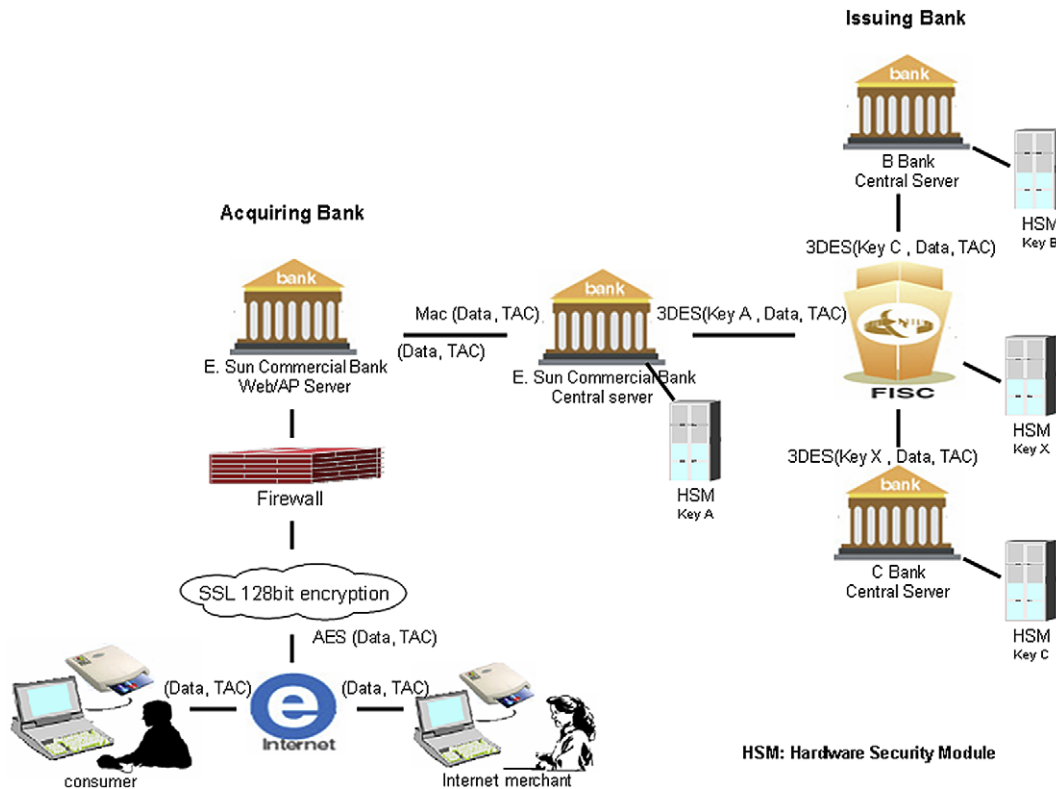


Fig. 2. The transactional architecture of Web ATMs.

authentication code (TAC) which is performed and given a trace number by issuer to acquiring bank of the merchant.

All added security mechanisms enable Web ATMs to have a better risk management, including improved off-line and on-line authentication and authorization. And the characteristics of these secure controlling modules are all based on the ISO/IEC 7816 series, which is a generic cross industry standard for IC card and Web ATMs applications.

5.1. How the operational principles and service works

Card transfer transactions normally take place between two parties that do not know one another. As shown in Fig. 2, cardholders can choose the platform of E. Sun Commercial Bank's Web ATMs as their desired transfer transactional platform no matter which IC card of issuing bank does cardholders have, for instance a patron with IC card of B bank or a merchant with IC card of C bank, both of them can logon the platform of E. Sun Commercial Bank's Web ATMs. That is, the operations of transfer transactions on the Web ATM platforms of E. Sun Commercial Bank are not limited to itself IC card proprietary members. E. Sun Commercial Bank with Web ATMs platform can serve as acquiring bank all the time to serve members and nonmembers and earn transaction fee. Patrons can live on the Web ATMs platform of E. Sun Commercial Bank and carry out transactions simply by inserting their IC card into smart card reader and then can conduct necessarily transfer transactions constantly. Therefore, the architecture of Web ATMs on E. Sun Commercial Bank' platform represents not only a cross-platform design but also intrabanks and interbanks transactions. These unique applications put forward here are of vital importance to the development of service type of C2C business model where Internet merchants and their patrons both have not yet existed or equipped with suitable money flow Web solutions.

Moreover, the mechanisms of Web ATMs on the platform of E. Sun Commercial Bank could be easy to be duplicated or deployed onto the e-mail, MSN and even webpage of the online merchant to build linkages with banks through its payment gateway. To build linkage with E. Sun Commercial bank's Web ATMs could be done online without any counter paper work application in advance. Once patrons select and click on the linkage icon of the Web ATMs payment instrument on the webpage of the merchant, the Web ATMs will startup the linkage with E. Sun Commercial Bank' platform system and execute the functions of Web ATMs. Last, the terminal will transmit the transaction data to the chip card and receives a transaction authentication code (TAC) or a digital signature, which will send to an acquirer, FISC, and then sends it to the card issuer. For the time being the card issuer authenticates the card and the TAC, and sends that authentication back to the terminal over the interbank network. Here, FISC will provide the network for authorizing and clearing of cross-border payment transactions on the back-end of server site.

The more explication of this basic operation process is as following steps:

- (1) Insert ICC into IFD – Cardholder carry out transaction simply by inserting his card into one of a variety of terminals.
- (2) Verify personal identification number (PIN Code) – Cardholder enters the password which will be verified by ICC itself with an off-line processing.
- (3) Read account number of the cardholder – The terminal will select elementary files (EF) and read the records into the system from built-in storage of ICC through smart card reader.
- (4) Write transaction data into ICC and generate serial number of the transaction, digital signature and transaction authentication code (TAC) – The terminal transmits the transaction data to the chip card and receives a transaction authentication

code (TAC) or a digital signature, which it will send to an acquirer, which will transmit it to FISC, which then will send it to the card issuer.

- (5) Prepare transfer transaction information – The terminal prepare the transfer transaction information which include issuer, acquirer, account number of drawee and payee, date of transaction as well as the generated TAC, digital signature and serial number of the transaction.
- (6) Send data to agent of financial Institute – The card issuer authenticates the card and the TAC, and sends that authentication back to the terminal over the interbank network.
- (7) Terminal deactivates IC card – The transaction is then completed.

5.2. Personalized service of Web ATMs

The Web ATMs of E. Sun Commercial Bank provides convenient online banking services by linking up with multiple financial institutions and FISC. Consumer can login personal exclusive webpage or portal site of Web ATMs channels to carry out account transfers and query accounts at any time or place. It is like carrying an ATM on your person at any time. On the webpage of Web ATMs, a multimedia screen with active graphics give customers new ways to use and find out about E. Sun Commercial Bank's products and services. The service which provided on the Web includes:

- (1) Common transfers account list (customers are encouraged to set up a frequent payment list for their future use).
- (2) Inquiry of your Labor Retirement Fund.
- (3) Transaction Notification system (through the e-mail account for notification from bank to customer upon completion of account transfer).
- (4) Memo-Assistant (system is designed to enable customer to take notes for each of payment).
- (5) Earn your bonus or coupons (aggregate bonus).

Such services would expected to meet the need of ordinary customers for online banking services with a diverse range of real-time account transfer and account query functions, and reduce the duplication of procedures that would otherwise happened in reality existing bank or ATM.

To access a range of value-added online services including intrabank and interbank account transfers and balance inquiries, a customer needs only apply for a personal IC banking card and buy an IC smart card reader and then login Web ATMs of the Internet or a portal site to get start for transaction online. Transactions are instantaneous and convenient.

5.3. The typical reservation procedure of home stay

Since those customers prefer convenience of purchase over the Internet, however, most of them confront with difficulties not only hard to make real-time payment but also experience time-wasted payment procedures usually after they completed the transactions online. To state such embarrassing situations, here, authors make a sample of reservation procedure of home stay to present what problems of people usually have and what solutions of Web ATMs could provide for solving these problems.

5.3.1. The real case scenario

In the past, the typical reservation procedure of home stay is as following:

- (1) Customers search information on the Web.
- (2) Make phone calls or online bookings.

- (3) Customers will be requested to make deposits in two days, then keep deposit receipt and fax it to the home stay.
- (4) Sales department makes booking paper work to accounting department after received customers' reservation.
- (5) Accounting departments confirm the deposits with booking information from sales department.
- (6) Once deposits are received, accountant responses the result to sales department, then reservation notice will be sent to customers.
- (7) Reservation procedure could be thought as completed.

As the scenario presented above, there are some problems of the typical reservation procedure. Firstly, waiting cost with many troublesome procedures to be followed is the common occurrences to the patrons. The patrons need to find brick-and-mortar financial institute to make deposits, then fax the deposits receipt to the home stay following with the instruction on Web. This procedure not only takes time and easy causes shoe-leather cost but also make patrons confront with an uncertain reservation.

Secondly, it is the points of views from business process to salesmen and accountant side. Marketers serve as information intermediary upon inefficient transaction process. Here, marketers take responsible for information transmitting to the reservation between patrons and accountants. Without technology involved, salesmen normally wait for not prompt payment confirmation in front of certain booking order from the service requests of patrons. Salesmen have a hard time to perform the whole tractions because of this time lag. Meanwhile, accountants deal with lots of paper works and confirmations with relevant to the transaction. Accounting department need wait for the deposits and take time to check payment records of payers. Similarly owing to the time lag effect, the accountant should check the payment records with the copies of booking name lists given from sales department. In order to figure out the consistent name and the record of payer, the accountant has a hard time to do so.

Besides a variety of opportunity costs, communication costs, waiting costs and shoe-leather costs being caused to patron, sales-

men and the accountants, respectively, there are still some critical problems which are made by its no real-time integration and inefficient transactional procedures. The informational and money flow are being not only separated but also independent from one another in such circumstances. Here the well-established application of Web ATMs just in time provides an absolute opportunity and solution for further integration between information and money flow along with online transactions.

5.3.2. The advantages of money receiver of Web ATMs

An innovative mechanism could be deployed onto the webpage of Web ATMs with full of integrated functionality. This mechanism could be called as the Money Receiver of Web ATMs. The Money Receiver of Web ATMs enables online merchant to open space of database to set up a personal proprietary check sheet configuration in order to have informational and money flow combinations along with their transactions. This mechanism also could apply widely through the linkages of contact means with their patrons such as on MSN or e-mail. The functionality of the Money Receiver of Web ATMs will not only benefit to all participants but also contribute to reengineer the whole transaction procedure. The advantages are described as following.

5.3.2.1. For online merchant. By adding layers of message board (as shown in Fig. 3), Web ATMs could be deployed an innovative and integrated mechanism onto the display interface of Money Receiver of Web ATMs. This mechanism equips the host of webpage to customize or configure display format of check sheet on the money receiver of Web ATMs in the light of the purposes for bookkeeping. And the final confirmed check sheet configuration will be stored onto the database of Web ATMs. The contents on the top of screen as shown in Fig. 3 are the display format of check sheet. The section in the middle of screen is the message board. This unique display interface of message board will be shown at the startup page of Web ATMs and it could guide customers to fill out the form and collect the necessary information about transaction besides common payment information.

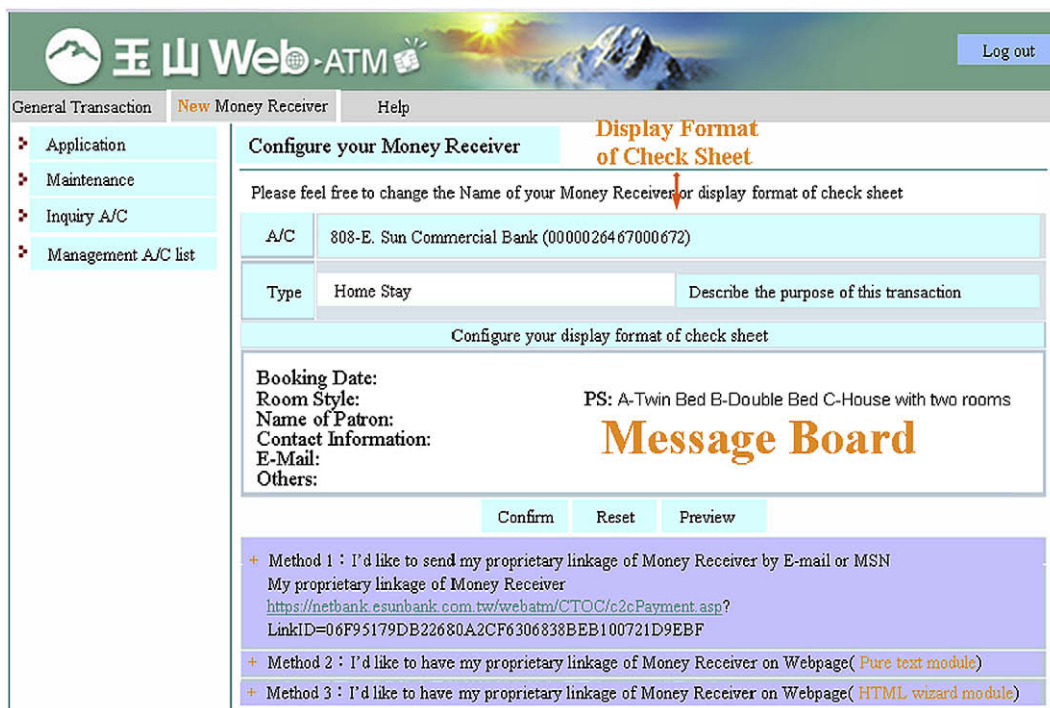


Fig. 3. The money receiver of Web ATMs – translate from <<https://netbank.esunbank.com.tw/webatm/>>.

Balance Inquiry				
<p>Result of Inquiry:</p> <p>Inquiry Time: From 2006/09/14 To 2006/09/21 The detail of balance inquiry is as following</p> <p>Download Excel or Text File:</p>				
Issuer: E. Sun Commercial Bank		Account Number: 0000026467000672		
A/C of Payee	Amount	Type	Information of Payee Fold or Spread up	
95/09/21 13:33:15 808/0000015771009563	2,800	Home Stay	Booking date: 2006.10.15 Room Style: 2 Twin Bed, 2 double bed Patron: Louis Liu Contact By Cell Pone: 0938542965 E-mail: liu78705@yahoo.com Others: Arrival Time: 17:00 , Parking Needed	

Fig. 4. The result of inquiry of money receiver – translate from <<https://netbank.esunbank.com.tw/webatm/>>.

Fig. 4 shows the result of inquiry of money receiver. The information here is collected upon the demand of host and this information could be accurate, up-to-date. Also such information given by customers about the name of patron, contact information, the reserved date, room style, amount and special request could be received and well confirmed along with the payment information which is set by the host. This is an important development and breakthrough from [the] point of view of informational and cash flow combinations. And the contents in the Fig. 4 are the output of balance inquiry which is as same as previous setting by host's configuration.

Based on such information, salesmen and accountants not only can perform efficient and complete records of orders but also they can quickly and properly answer customers' questions about their orders through prompt build-in inquiry of account and transaction notification system. Besides these functionalities, system also allows the host to view and update their own user-specific settings and such transaction is not limited to same-bank account transfers.

5.3.2.2. For the customers.

- (1) Customers search information on the Web.
- (2) Select the program and complete online booking.
- (3) Choose the payment tool, if Web ATMs has been selected, customers fill out the designed payment column on the message board which is given by the host of webpage.
- (4) Sales and accounting department will receive the notification from Web ATMs system. Then Sales and accounting department could process the transaction given by the patron.
- (5) Reservation procedure will be completed directly online.

5.3.2.3. For E. Sun Commercial Bank. E. Sun Commercial Bank believed that good services must be given to patrons' total control of the creation. Customer could extend their demand and configure their services with a support of technology. By the introduction such financial instrument of Web ATMs, E. Sun Commercial Bank could not only keep its Web ATMs program flexible and competitive using Web-based technology but also enable its customers to enjoy convenience and security. E. Sun Commercial Bank expected that this new prototype state-of-the-art Web ATMs can be succeeded in solving information communication and offering Easy-to-use, 24/7 self-service online financial service as well as speeding up its service and reducing costs.

5.4. Portal site of Web ATMs channel

E. Sun Commercial Bank also makes a vigorous expansion its electronic financial services channels of Web ATMs through a deal with the portal site of Yahoo or other popular sites! By deploying an associated host processing system and the platform provided by the FISC Banking Sharing Center, E. Sun Commercial Bank can establish back-end linkups with the portal sites and all its member banks participating in the platform. With such new Internet channels of Web ATMs platform, portal site's "Internet branch" serves as the financial hub for all customers as well as the patrons of E. Sun Commercial Bank and strengthens brand and image itself.

This new channels also allows E. Sun Commercial Bank to promote and provide Web ATMs services to the millions of Yahoo's users in the territory. By dealing with Yahoo!, many more people will be able to access its banking online services, and E. Sun Commercial Bank is expecting to an upsurge in the number of applications which could be received online and the volume of transfer transactions.

With these products, modern electronic financial services channels will be more flexible and modular, allowing capabilities of Web ATMs to be added as and when required on Web. Such concept of services outsourcing will not only extend their sales opportunities but also benefit to the large-scale patrons of the portal site or other popular sites.

In addition to making transactions more convenient and ubiquitous on the Web, E. Sun Commercial Bank has also simplified the application process for IC card applications. Online applications to the IC card for the Web ATMs of E. Sun Commercial Bank were initially only available to customers who had registered for the bank's Internet Banking service. The registered customers are now able to complete a typical online application in about 30–40 s, as the bank will automatically complete personal details such as name, address and date of birth on the application form. Finally, E. Sun Commercial Bank is expected to offer instant online approval, payment and delivery of policy documents to customers and even non-customers through its own Website of Internet-banking and Yahoo! in the near future.

5.5. A marketing campaign (Afternoon Tea Time Break) for promoting Web ATMs

Since card transfer transactions normally take place between two parties that do not know one another as presented above, it

not only exhibits the main characteristics of transactional behavior but also represents the potential value for marketing. For maximum impact and promotion of Web ATMs, E. Sun Commercial Bank believed that it should pay particular attention to customer's social network and involve some direct marketing campaign. Therefore, E. Sun Commercial Bank designed a unique marketing program to promote Web ATMs which is called "Afternoon Tea Time Break".

Firstly, customer common values and communications will be highly targeted. As liked all relationships, customer relationships thrive on regular communication particularly in C2C business. The mechanisms of Web ATMs on the platform of E. Sun Commercial Bank can enable its patrons to duplicate or deploy linkages with the services of E. Sun Commercial bank through its payment gateway of Web ATMs onto their common communication tools such as e-mail and MSN since communication by mail or MSN is cost-effective, easy to do and proven in its ability to move suspects, prospects and customers up the loyalty ladder, and to increase their value at every step. Similarly, it is good to let customers know that E. Sun Commercial Bank is a niche Web ATMs service provider. Always give its customers a reason to respond to financial demand timely online, by making a good offer through the services or channels of E. Sun Commercial Bank.

Finally, the site of Web ATMs on the platform of E. Sun Commercial bank is planned to add new functions enable patrons to accumulate bonus with their like-mind group member for long-term relationship performed. For each transaction on the platform of Web ATMs of E. Sun Commercial Bank, patrons will be given bonus or coupons and allow this like-mind group to use them to shop or organize activities for themselves at the contractual partnership stores with E. Sun Commercial Bank. This new function and communication style is expected to activate and sustain a more stable program to promote utility rate of Web ATMs. E. Sun Commercial Bank believes that "Consumers" are customers or potential customers, whether they are members of the public, organizations or businesses. It is a good belief based on consumer thinking that one way to develop a competitive edge in the marketing world is to place greater emphasis on tying privacy policy to brand. This strategy places a direct link among user, purchase and its like-mind group members while developing the beginnings of long-term relationship.

Now sites such as Afternoon Tea Time Break Platform of E. Sun Commercial Bank are using the same tools to assist patrons and to expand their social networks. These social networks, in turn, could encourage self-management and help support newly patrons for the like-mind group members. At last patrons enjoy the convenience, security and more enjoyable connections with groups. E. Sun Commercial Bank not only creates superior value for its customers but also generates a rich income stream, as well as keeping customers' loyal more intensively.

6. Apocalypses of Web 2.0 to Web ATMs

Web 2.0 is not only a term used to herald the *second wave* of the World Wide Web but also represents a broad collection of recent trends in Internet technologies and business models. Among some key trends, particular focuses have been given to user-created contents, lightweight technology, service-based access and shared revenue models.

Amol (2006) indicated that Web 2.0 is already part of our mainstream culture. A marked contrast with what happened during the first wave of Web development, which was characterized by a hierarchical structure (ruled by Webmasters) offering static websites broadcasted and distributed mostly through hypertext links. Some features, which are all about connecting people to people, could be

found in Web 1.0, but appear to be essential for Web 2.0 applications that are already having a major impact on Web ATMs issues.

The following discussions, authors would like to make an attempt to introduce potential impact on the development of contemporary Web ATMs from a macroscopic Web 2.0 perspective. Although it may not be exhaustive, it is believed that some of the more practical features of Web 2.0 that could, in the near term, significantly impact the development of online financial services.

6.1. Decentralization (moving financial information closer to their patrons) Web-centralized platform realization

The first important concept that learned from the philosophy of Web 2.0 is Web-centralized platform realization. Amol (2006) indicated that the power of Web 2.0 does not reside in any one server, individual or organization. Instead of relying on command-and-control monolithic systems to generate value or efficiency, Web 2.0 operates by allowing individual users to interact with a site and affect its behavior based on a common set of low level rules. Over the history of financial service, patron should make financial service around the brick-and-mortar bank, proprietary banking website or even take time to find the entity ATM machines. Nowadays online service of Web ATMs architecture allows customers make transfers between accounts, pay bills or taxes and carry out other financial transactions through any of the banking or portal site with the services of Web ATMs at any time of the day or night, and at any place, including the home or office (Dai & Grundy, 2007). All services could be gotten on client centric architecture of the Web ATMs no matter to same-bank or interbank account transfers. This bottom-up rather than top-down approach of Web ATMs is notable and important on the way to the ideal EC development, particularly in C2C business model.

6.1.1. Abundant and customized user experience

Shah and Siddiqui (2006) stated that to succeed in the e-banking arena, companies need to transform their internal foundations to be effective. The new type of business would consist of finely tuned integration of business, technology and processes (El Sawy, Malhotra, Gosain, & Young, 1999). Here, they drew the same conclusion that one critical issue is re-engineering of the business processes, which also includes technological processes. As highlighted in the scenario above, the power of Web ATMs system could even enable the patron to customize specific contexts of the information format on display interface by adding layers of message board. This mechanism allows the host of webpages to configure display format of check sheet in the light of the purposes for bookkeeping. Therefore, the information is collected upon the demand of users. This is also a quite important breakthrough from user experience point of view.

6.1.2. Real-time and two-way interaction

The Internet as a channel for services delivery is fundamentally different from other channels, such as branch networks or telephone banking, because of its interactive nature (Shah & Siddiqui, 2006). Therefore, it brings up unique types of challenges and requires novel solutions (King & Liou, 2004; Southard & Siau, 2004; Yan & Paradi, 1998). Here, Web ATMs not only enhances its secure mechanism with the state-of-the-art IC card and smart card reader but also provides customized information format which could be connected to the money flow, thus providing greater security control and significance and applicability to account management. Patrons could enjoy secure online transaction and also obtain real-time transaction information and potentially relevant documents that could influence their decision-making in several seconds. Therefore, such design of combined information and money flow together could prove to be more beneficial than the traditional top-down approach especially to the development of EC.

6.2. Leveraging the long tail of Web ATMs (meeting the diverse demands of patients and providers)

The second concept that learned from the philosophy of Web 2.0 is leveraging the long tail of Web ATMs. As we all knew well, the power of World Wide Web had not only changed the people's life but also changed modern business operation. Customers can be served and services can be provided right over the Web. The type of Electronic Service in natural should not be limited by the geography and time.

From an economic standpoint, the long tail, however, represents the numerous fringe individuals and groups that are poorly served online by brick-and-mortar banks because of provision locally or limited technology involvement in reality. With Web 2.0 technologies, these groups are not only easily accessed from anywhere on the Web, but as a collective their numbers are significant, and in some cases are even greater than the mainstream (Amol, 2006; Anderson, 2004). That is to say, the long tail has many potential applications within the Web ATMs system.

Through the platform of Web ATMs, these disperse individual will be possible to be congregated together and the provision of better services could be expanded over the Web. Therefore, for patrons located in a geographically remote or isolated community, the benefits of leveraging the long tail would only be magnified while the shortcomings of the traditional financial services become accentuated and these shortcomings could be possible to be solved through the introduction of advanced technology (Cho, 2006).

6.3. Alternative network effects (finding and supporting one another)

The third concept that learned from the philosophy of Web 2.0 is alternative network effects. Amol (2006) indicated that Web 2.0 enables large numbers of individuals to unite and collaborate around a common resource. The most recent and notable example of individuals congregating at a virtual site to benefit from the network effect is MySpace. Actually, harnessing these network effects through Afternoon Tea Time Break Platform in the Web ATMs system, indeed, could provide some incentives for further promotion and address marketing strategy for such innovative service.

Stamoulis (2000) pointed out that he sees re-drawing the Internet market map as a vital prerequisite for e-banking strategy, because the Internet requires different marketing methods than other service distribution channels. He suggests identification of a niche market and focus on exploiting it, is very important for banks. Since card transactions normally take place between two parties that do not know one another, this is made possible by the two-way relationship that exists between payee and payer. Virtual communities are a good example of this phenomenon. Now sites such as Afternoon Tea Time Break Platform of E. Sun Commercial Bank are using the same tools to assist patrons and expand their social networks. Here, Patrons can connect, communicate and share with like-minded individuals through payment or transfer transaction. These alternative social networks, in turn, also could encourage self-management and help support newly patrons who have enthusiasm to organize activities for the like-mind group members. Therefore, it is expected that patrons not only enjoy the convenience, security and more enjoyable connection ships with groups on the Web.

7. Summary

Amol (2006) stated that, we have witnessed the dramatic transformation of major industries by information and communication technologies since the mid-1990s. The introduction of online consumer services has led to irreversible and invigorating changes in

very traditional sectors. The banking sector, however, somehow remains trapped in the pre-Internet era. Online consumer financial services from product selection all the way to the service delivery and payment realizations are still hard to be fulfilled entirely on the Web except few payment instruments with little functionality and some risk concern such as credit card or online banking services. Here, somehow it is because the banking system revolves around proprietary banking service under the control of managers, IT specialists or banking professionals, and designed to reinforce inefficient processes that are clearly unsustainable. Besides, current payment mechanism lacks of an inter-platform and integrated architecture and transactional processes. Therefore, patrons are still forced to conduct online transaction and make another effort to realize payment transaction. Such financial processes continue to consider the public as the passive recipient of services but not services triggers.

With Web ATMs and Web 2.0, we now have an opportunity to make amends. Modern electronic financial services will be more flexible and modular, allowing capabilities to be added as and when required on Web. Such safe payment services will not only extend their sales opportunities but also benefit to the whole economic benefits, cost-effective of banking industry. Most importantly, this does mean that there is a big breakthrough on the innovative payment instrument of money flow of e-commerce.

Last but not least, Web ATMs applications, by themselves, will not solve all the problems of the banking system. However, if coupled with other sagacious strategies such as from the concepts of Web 2.0, innovative applications to support coordinated services and intelligent online banking services, Web ATMs could play a critical role. Therefore, these innovative technology or strategic thinking for change may be our better chance yet to steer the banking system in a direction that is consistent with the needs and expectations of a population, especially in C2C business model.

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