CHAPTER 10

THE SUPERVISORY IMPACT OF TECHNOLOGY ON SEACEN FINANCIAL INSTITUTIONS: ISSUES AND CHALLENGES IN VIETNAM

by Phan Thai Dung[1]

1. Introduction

In the international economic integration process, the banking system is very important. A banking system which operates effectively is essential for the optimal allocation of financial resources which ultimately stimulate growth . However, in a market economy, risks in banking operations are unavoidable and can lead to adverse chain reactions. The collapse of a bank has negative impacts on the socio-political-economic situation in a country and could spread across borders.

The Vietnamese banking system, which has switched to a market based one, has developed in depth as well as breadth. Banks are the most important financial institutions in the economy. The commercial banks make up the biggest proportion in terms of assets, market share and numbers. Banks have gradually evolved and are using technology to provide the best services for the customers. However, in the process of innovation, Vietnamese banks' operations have faced serious risks from the application of information technology. This research study is undertaken to analyse issues and challenges of supervising operations of information technology and also explore steps that can be taken to overcome the challenges.

2. The Overview of Financial Institutions

The establishment in 1987 of the first commercial joint-stock bank in Vietnam- the Sai Gon industrial and commercial joint-stock bank, initiated the promulgation of commercial banks in Vietnam. The Vietnamese banking system has gained great strides. Currently in Vietnam, there are 5 state commercial banks, social policy banks, 37 commercial joint-stock banks (25 urban commercial joint-stock banks and 12 rural commercial joint-stock banks), 37 branches of foreign banks, 5 joint-venture banks, 45 representative office of foreign credit financial organisations, 5 financial companies, 9 financial renting companies, 904 people's credit funds and about 1635 branches. Among them, the commercial banking system plays a vital role in providing user-friendly banking services. However,

1 Author is Chief of Division of the Informatics Technology Department of State Bank ofVietnam.

in order to consider more objectively the progress as well as the limits of the commercial banking system in Vietnam, we need to consider the potential of banks in Vietnam.

First of all, the financial potential of Vietnamese commercial banks has improved considerably in recent times. However, the starting capital of the Vietnam commercial banking system is only about US$ 6.5 billion and total assets of US$ 60 billion.

Secondly, in term of profitability, the return on asset (ROA), and return on equity (ROE) of Vietnamese commercial banks are still low compared with the other countries in region. The ROE is about 9.99% to 44.88% while the ROA is about 0.7% to 2.91%.

Thirdly, in terms of the level of financial soundness, the bad debt ratio of all Vietnamese commercial banks has decreased sharply in recent years, from 8.5% in 2001 to 3,98% at the end of December 2007.

Fourthly, in terms of technological development, Vietnamese commercial banks have progressed rapidly to be on par with the more advanced countries in region. However, the technology application indexes of Vietnamese commercial banks are still far lower than many countries in region.

Fifthly, in terms of quality of human resources, commercial banks are still lagging in terms of appropriate training, professionalism and information technology know-how. The qualifications of banking staff are lower than other countries, especially in terms of executive and managerial skill and application of modern technology.

The commercial bank system was established during the first period of Vietnam's conversion process which is connected closely with the innovation process of the banking system. After nearly 20 years in operation, the commercial banks have undergone many challenges in their development. During the first period, the commercial joint-stock banking system met many with difficulties because the legal system was not sufficiently comprehensive and the regulations for banking operation have yet to be promulgated. However, with the implementation of the state's policy on commercial banks, the development of commercial banks has been rapid with some banks gaining huge strides in terms of branding and prestige in the domestic market.

From 2005 to now, the development of commercial banks have been stable. Their business activities are profitable with adequate provisioning for risk in accordance with regulations and the guarantee of a safety net in terms of deposit

insurance. Some commercial banks have a development strategy for the long-term from 5 years to 10 years which includes a clear orientation and direction on credit activities, foreign exchange, payment and new banking services (payment card, electronic banking, etc.)

For the improvement in services, the commercial joint-stock banks have attached special importance to modernising technology and broadening their activities through the new services such as factoring and Internet Banking. Some banks such as the Asian Commercial Joint-stock Bank and Technology Commercial Bank have been allowed to use risk preventive tools on the foreign exchange market such as dealing for account, interchange, option, etc. The commercial join-stock bank is better able compared with the state commercial bank for keeping up with international best practices. For example, recently the commercial joint-stock banks have put into practice, the government regulations on classifying debit and deduction using provision to assess credit risk more promptly and smoothly than the state commercial banks.

The rapid development of the commercial banks in the recent 5 years has proved their competitive ability. Brand names such as ACB (Asia commercial bank), Sacombank (Sai Gon Thuong Tin commercial joint-stock bank), EAB (East Asia commercial joint-stock bank), VIB (International commercial joint-stock bank), Habubank (Ha Noi Building joint-stock bank), Techcombank (Technological and commercial bank) are familiar with the population in the country through their credit products, financial services and support services.

However, the Vietnamese commercial banking system still has many weaknesses and lag behind somewhat compared with other banks in region and in the world. However, the banking system has made huge gains when compared to the first period (the period of innovation and conversion to a market economy). In the future, with the further development of our country, we believe that the commercial banking system will progress considerably.

3. Survey of the IT Implementation

3.1 Communication Conditions

In the "doimoi" period, Vietnam developed its communication infrastructure rapidly. From the beginning with only one state-owned company providing communication services, there are now five companies providing communication infrastructure, including two state-owned companies and three joint-stock ones. The competition amongst companies have increased the development of communication infrastructure. While the first company provided only landline services and X25 leased-line, companies are presently serving leased line cable with

broadband, applications and mobile phone services. The utlisation of services of the Vinasat satellite will make gigantic development steps for the communication infrastructure. In addition, some commercial banks have equipped the network with speed in the range of 1GB to 40GB.

In terms of the switch system, the International Gateway Switch is the most up-to-date switchboard generation in the world. The National Transit Switch is a modern switchboard which is capable of switching on the volume of information in the national network column. The Local Tadem Switches are located in Hanoi and Hochiminh City, with many other local switches located in provinces and cities. There are also satellite switchboards and subscribers' gathering systems. The Ministry of Post and Telecommunication of Vietnam (VNPT) has implemented a new generation of network NGN and is gradually converting the volume on PSTN into NGN as well as providing application services of NGN to customers.

Regarding the transmission network, the international transmission system consists of three international telecommunication centres with various switchboard systems, digital transmission linking the telecommunication network of Vietnam with the global telecommunication network. The international switchboards are connected to many different countries and transmitted through optical cables and satellites. Three centres of international telecommunication are connected to each other via an optical cable system capable of automatically processing problems and self-fixing. For trans-province transmission, the transmission network is on the North-South 20 Gbps optical cable backbone on the 1A national road and the 500KV electric line to ensure higher level of safety and wider band. This line also has another standby 140 Mbps satellite system, besides, other backbone lines of Viettel, etc.

The Transprovince transmission cable is almost opticalised while the transmission for the inner province is being extended and opticalised. The access network consists of three types – the local network, unwired subscriber system and VSAT system. The local cable network consists of copper cable and optical cable, providing telecommunication services to subscribers. The unwired subscriber system supports local cable networks and best suits high rise buildings and areas which are difficult to install the copper cable network. The VSAT system is used in mountainous areas and islands.

In terms of mobile network, there are already four providers selling services with two other providers preparing to sell national mobile services. MobiFone and Vinaphone of VNPT use GSM technology subscribed by 8 million users with capability to roam more than 84 countries. SPT uses CDMA1x technology, providing service from July 2003 and has currently approximately 0.14 million subscribers. From 2004, S_Fone, MobiFone and Vinaphone officially provided

messaging services across networks, accelerating the development of the mobile network. MobiFone and Vinaphone use GSM technology providing GPRS/ MMS preparation for the 3G strategy. Hanoi Telecom which uses CDMA2000 technology, is preparing to participate in the market. VP Telecom which uses CDMA450, is experimenting with its network and services in providing unwired fixed services. Local mobile networks consisting of unwired fixed phone and local mobile phone using IPAS system of PHS-IP technology are available in Hanoi and Hochiminh City.

In terms of Internet infrastructure, Vietnam has five providers providing internet services which are upgraded from dial-up technology to ADSL and high speed leased-line services. This development has created and improved the supply of Internet services of small companies directly to the public, leading to high volume of use of internet services from the public. As a result, credit institutions are also facilitated to provide Internet services to a relative high volume of clients. Young people make up a large proportion among the users.

International connection is implemented through six dimensions with the total band increasing from 1038 Mbps to 1892 Mbps. In terms of domestic connection, from 2003, IXP companies have implemented the same level of connectivity through VNNIC (Vietnam Internet Centre). Six companies are being licensed to provide Internet connecting services, namely VNPT, Viettel, FPT, SPT, ETC and Hanoi Telecom. Seven companies providing services to the public are VNPT, FPT, SPT, Netnam, Viettel, OCI and Hanoi Telecom.

According to VNNIC, as of year end 2007, total Internet subscribers reached more than 2 million with 0.5 million subscribers for provided IP. The wideband Internet access service has been available since 1997 including ISDN, leased line, VSAT. However, the client base is still small with the majority of users being institutions due to the high cost. From mid year of 2003, when VNPT provided ADSL services, up to now, there are three more providers of this service to the public namely FPT, Viettel and SPT. Currently, there are approximately 35,000 Internet access subscribers using wideband. Other types of Internet access services including Wifi and GPRS are also gaining popularity.

The number of Internet users is approximately 6.2 million; the density of Internet users is approximately 7.4%. Along with the number of subscribers and the number of Internet users, the number of Internet domain reflects the popularity of the Internet and the level of Internet application in socio-economic activities.

In terms of IT education, IT training modules have been included into the curriculum of primary schools. For ministries and industries, IT training has been included in the computerisation programme. On average, each official is equipped

with one computer. Specialised soft wares are also installed on the computers. 80% of activities are computerised. Companies which have Internet services are initiating online shopping. Laws on electronic transactions and online shopping have formed a legal framework for the development of e-commerce.

From 1980s, some universities have started to establish informatics faculties. Presently, almost all universities in Vietnam have informatics as a subject and students are trained in general informatics. Currently, there are about 15 universities providing basic training on informatics.

In 1990s, IT staff in Vietnam were employees who had switched from mathematics or physics disciplines. Currently, on the national level, it is anticipated out of 20 thousand employees, approximately 2 thousand people are specialised in informatics software. In addition, there are more than 50 thousand Vietnamese residing overseas working in this field.

Seven major universities in Hanoi and Hochiminh city and some mountainous areas are sponsored by the State to invest in faculties of information technology with the aim to generate 2 thousand IT graduates and software engineers each year. On average, approximately 3,500 people are being trained in basic informatics each year.

Apart from the faculties of informatics in universities, a number of information technology training centres have been established, contributing to the training of thousands of users and information technology officials.

12.3% of investment for information technology training reflects the current development of human resources applying information technology in banks. However, since this is an average rate, the allocation rate of training expenses of the different banks can vary greatly. However, in general, this reflects the banks' attitude for IT development. While banks are beginning to realise the importance of human resources in information technology, training however, has not been professional nor disciplined. More than 40% of banks surveyed responded that the only form of training on IT skill for employees is on-the-spot training, where employees are self-learnt and self-guided. Only a small percentage of banks are able to systematically coordinate different forms of training such as internal training courses, sending employees to attend training courses and on the job training.

Information technology qualification of employees in banks is currently rather low. (the rate of employees who can use computers average at 51%. The usage of the computer is limited to supporting specialised activities such as finance and accounting, internal management, etc). The level of awareness and

implementation of IT training as aforementioned, cannot meet the demand of the increasing application of information technology in banks. The survey results show that a close correlation between the rate of employees using computers and the training activities of banks.

3.2 Payment System

3.2.1 Interbank Payment System (IPS)

The Interbank payment system was established in February 2002. It operated simultaneously with the automatic clearing system. The transactions amongst the members of the system may be completed within 8 seconds. However, this system has not been set up in the whole country and is currently only operating in five big cities (Hanoi, Haiphong, Hochiminh City, Danang and Cantho). This system consists of two sub-systems: high value transfer system (HVTS) for transactions with a value over VND 500,000 (approx. US$ 33) and low value transfer system (LVTS) for the rest of the transactions. The design of the system was based on the Korean Interbank Payment System (KIPS), and was developed by Hyundai Information Technology Corporation. It is based on high-technology such as leased line, UNIX servers, and online database of banks. Recently, 81 banks participated in the system, with a total of 378 branches of commercial banks, credit institutions and financial firms. In 2008, the World Bank invested in the State Bank of Vietnam to develop and expand the payment system to the rest of the country.

If the balances at the State Bank of Vietnam (SBV) are sufficient, the transactions will be immediately transferred by the HVTS. Otherwise, the transactions will only be completed when there is sufficient balance in the account. The low value transactions are transferred to the LVTS, and at the end of the day they will paid by SBV through the clearing accounts.

Provincial payment centres (PPC) undertake local payments in the provincial areas. The inter-province transactions are transferred by bank members to the National Clearing System, and finally transferred to the receiving (beneficiary) banks.

3.2.2 Electronic Clearing System

This system, which was set up in 2002, was designed to replace the paper based clearing system. It is similar to the semi-automatic clearing system with each SBV provincial branch playing the core role in inter-province transactions. There are 58 provinces undertaking clearing in Vietnam. However, the clearing system will be replaced upon the implementation of the electronic payment system.

3.2.3 Credit Card and Debit Card System

Credit cards have been issued since 1996 by some domestic commercial banks. Up to April 2007, there are approximately 20,000 places accepting these cards at restaurants, hotels and supermarkets. In recent years, there has been a dramatic increase in debit cards in domestic banks due to their convenience for payment. Although appearing after credit cards, debit cards are more popular than credit cards, making up 95% in the number of cards.

Current credit cards used include Visa, Master and Amex. Currently, shops accepting credit cards still charge customers a fee of 3% of the total amount and remains a hindrance to users.

While some banks have issued credit cards for use in the domestic market, they are unpopular with the major places accepting these cards being shops or supermarkets collaborating with the banks.

3.2.4 ATM Card System

Currently, almost all banks have ATM cards with ATM withdrawal spots and ATM transaction POS. However, the ATM system has not developed sufficiently yet and is operating mostly based on magnetic technology. Currently, there are approximately 8.3 million domestic key cards and international key cards with the average annual growth rate of more than 100% compared to the previous years. There are 3 inter-institution cards - Smartlink, VNBC and Banknet. Since the beginning of 2008, Vietnam has linked all the ATMs of banks via the national financial switch company (Banknet).

While the ATM network has developed and expanded in recent years, it is still not widely shared yet, limiting the participation of users.

3.4 Online Banking Transaction

In Vietnam today, some banks are beginning to implement online banking services, enabling customers to use the Internet to conduct periodic transactions such as account balance checks, fund transfers within the same bank system, or payment of utility bills (electricity, water and phone). The following banks offer Interbank banking services:

- Vietnam Bank for Foreign Trade (Home banking and Internet banking)
- Vietnam Bank for Industry and Commerce
- Vietnam Technological and Commercial Joint- stock Bank (home banking)
- Asia Commercial Joint-Stock Bank (home banking and internet banking)

However, up to now, the scope of application for these services is still limited. Most banks have just begun to provide this service to a small base of customers such as major partners, credit institutions and companies. Transferring of money through the Internet is only conducted if the receiver's account is in a banking system. Although transfers and bill payments can be implemented online, the payment documents still require actual signatures, rendering the paying procedure an incomplete electronic procedure.

3.5 Internet Banking

In recent years, Internet banking in Vietnam has developed very rapidly. Some banks have introduced internet banking such as account access, online bill payments and transfers.

The regulation for vouchers have yet to be adjusted and payment orders that are transferred via the electronic medium (without actual signature of the account holders) do not have legality and are not accepted by banks. As a result, cards issued by Vietnamese banks cannot be used for online payments. This is a maor obstacle for transactions for online shopping. Internment is when all interactions between the sellers and the buyers are conducted online using electronic documents. In the effort to facilitate the payment medium for the customers, some goods/services suppliers are overcoming this obstacle with solutions depending on the situation.

3.6 Mobi Banking

Although the Mobi Phone is very popular with more than 10 million users, Mobi Banking is still at the initial stages of development. Considering the potential of Mobi banking, some banks have provided their customers with services such as phone payment, internet payment, balance checking and transfer through accounts.

3.7 Electronic Cash and Prepaid Cards

Presently, electronic cash is in the form of card usage such as phone cards, internet cards, prepaid mobiphone cards which are very common for telecommunication.

In recent years, the bank system of Vietnam has developed rapidly in terms of the quantity of banks. Banks have invested in modern information technology to better meet the demands of customers. However, the implementation of information technology depends on the abilities of people, finance and the development vision of each bank.

State-owned commercial banks which have been in existence for a long time have made huge investments in modern technology. However, there are still many newly established banks which face difficulties in areas such as capital, technology and skilled people. As a result, information technology has not been sufficiently invested in by these new banks to meet the challenges in competition and integration.

While some banks have chosen to outsource for solutions from overseas, some banks have opted to hire domestic companies to develop solutions, with some banks even taking upon themselves to develop their own internal solutions. Therefore, the differences in the levels of technology of banks and the use of different technology have affected the application of technological standards and the supervision of information technology.

Are the following IT Infrastructure installed in the Vietnam?

No.	Item	Yes/No
1	Communication Network	Yes
	Cable (Phone line)	Yes
	Satellite	Yes
	Fiber Optic	Yes
2	Use of Cellular Phone	Yes
	Is it relatively wide spread?	Yes
3	Use of Internet	Yes
	Is it relatively wide spread?	Yes
4	National Payment System	Yes
5	Operated by government agency / central bank	Yes
6	Operated by an independent or private company	No
7	Automated/Computerized Payment System	Yes
8	RTGS	No
9	National Securities Settlement System	Yes
	Operated by government agency / central bank	Yes
	Automated/Computerized Settlement System	Yes

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Are the following IT-related products implemented in Vietnam?

No.	Item	Yes/No
1	Credit Card	Yes
	National (only used in the country)	Yes
	International	Yes
2	Debit Card	Yes
	National (only used in the country)	Yes
	International	Yes
3	ATM	Yes
	Individual bank	Yes
	Nationally-Shared ATM	Yes
	Internationally-Shared ATM	No

4	Electronic Fund Transfer (EFT)	Yes
5	EFT at Point of Sale	Yes
	National (only within the country)	Yes
	International	Yes
6	Remittance Service	Yes
	Domestic companies	Yes
	International companies	No
7	Phone Banking	Yes
	Informational	Yes
	Transactional intra bank	Yes
	Transactional inter bank	No
8	Mobile/SMS Banking	Yes
	Informational	Yes
	Transactional intra bank	Yes
	Transactional inter bank	No
9	Internet Banking	Yes
	Informational	Yes
	Transactional intra bank	Yes
	Transactional inter bank	No
10	Pre-paid card	Yes

Regarding IT-related Applications in addition to IT-related products, are the following applications implemented with IT?

No.	Item	Yes/No
1	Core Banking: General Ledger, Third Party Fund, Loan, and Consumer Information File	Yes
2	Treasury	No
3	Remittance	Yes
4	Trade Finance	No
5	Corporate Online Service	No

4. Impacts of IT Implementation on Financial Institutions

4.1 Operational Risks

To effectively manage the operational risks arising from the operations of information technology system, banks have to assess the specific and general operational risks. General operational risks include:

- Technical risks: Risks arising from the technical system
- Human risks: Risk arising from technical staff
- Risks arising from people using the products and services
- Risks from the third-partyimplementing warranty and maintenance
- Risks caused by lack of operational processor incorrect operational process
- Risks caused by the impact of environment.
- Risks caused by attacks

4.2 Technical Risks

Technical risks always arise from the errors of information technology. In order to have a good information technology product, there must be compliance in the deploying process via the following steps: general design, design detail, selection of technology, software design, proper testing, testing in the actual environment and implementation. If we these processes are not well supervised, the product may not meet requirements. In the process of deploying products, information technology will face risks of unusability and have this have major implications on cost and wasted effort.

4.3 Human Resource Risks

Human resources are important factors in the implementation of financial products. The selection of the system-designer is a very important process. A well designed product will help avoid many risks in the financial product. To minimise risks, in the process of selecting the provider, the institutions must rigorously test the aptitude of staff deploying the financial products. With a good deployment, the hand over to the technical staff will be much smoother and efficient.

4.4 Risks Arising from People Using Financial Products

New products will have risks from users if the products are not user friendly. If the interface and structure are too complicated, users will be confused. Training and guidance for the users are important elements in the process of introducing the applied products to users.

4.5 Risk from Third-Party, Warranty, Maintenance

In cases of external leasing and collaborations with third-parties that provide financial products, the financial institutions must carry out the following steps. Firstly, they must assess the specific risks, supervise and ensure information security. Secondly, they must have backup solutions in case third-parties are not available. Thirdly, they must appraise the technical and the financial capabilities of the third-party. Fourthly, the clauses of agreement with the third-party and assignments of particular responsibilities for each party muct be clear and lucid. There must be penalty clauses if risks occur. Fifthly, they must monitor and assess the coordination process of the third-party.

4.6 Risks Caused by Lack of Operational Process or Incorrect Operational Process

During the process of deploying technology, the trial and test scripts must be established in case of unforeseen circumstances and these must be built into the operational process. The operational process will continually be perfected in the trial periods in the actual environment. Establishing a good operational process has very significant influences on the success of applying financial services.

4.7 Risks Caused by Impact of Environment

The environment, such as power source, air-conditioning, exit and entrance, windows, alarm-system and etc., has an impact for the application and deployment of information technology. To avoid risks of systems failure, attention has to be given on building the right physical environment, the processes, the regulations, the technical standards, the technical parameter to ensure security.

4.8 Risks Caused by Attacks

Hackers are increasingly wrecking more havoc on the IT systems of the financial institutions with more sophisticated technology causing major damages. To avoid such occurrences, these risks have to be assessed at the outset from the very inception of the system. Security solutions capable of preventing such risks must be in place commiserating with the level of services and expenditure of the financial institutions.

Vietnam is in the process of integrating and developing its financial system and many credit institutions are competing in order to provide the best IT-applied services for customers. Coming out with IT services that are not sufficiently secure will have many risks.

The choice of suitable technology is a very difficult task. As the general standards have not been established, the choice of technology in financial institutions is currently very much dependent on the technological provider or by gut feeling. As a result, some institutions choose unsuitable technology leading to project failure and wastage of resources. To overcome this, the general standards for all financial institutions should be established to prevent risks.

Vietnam has developed the system for training in information technology. There many universities majoring in training human resources for information technology such as FPT University, Encyclopedic University, and Natural Scientific University. Moreover, every university has its own informatics technological faculty. However, universities are just providing the basic knowledge because they lack the physical facilities for in-depth training. After university, the institutions have to retrain the graduates for specific requirements. Many financial institutions usually require IT personnel to have professional experiences. The qualifications of IT personnel have significant influences on the training time. Currently, some IT companies as well financial institutions have established their own training schools to solve their personnel issues.

80% of Vietnam's working population are involved in the agricultural sector. Financial institutions therefore face many difficulties in introducing financial products for the people due to their lack of knowledge and perceptions. The economy is still very much a cash based one. In recent times however, the government has initiated a policy of " using less cash", which encourages the credit institutions to introduce products which uses less or no cash in the market. However, in response, the financial institutions have just provided mainly ATM services. The major customers are usually the state staff, big companies and enterprises that have the salary payments through accounts.

The electronic commerce of Vietnam is still under developed and has just mainly stopped at providing WEB and basic products. There has not been cooperation between the financial institutions and the services seller yet. The government has initiated the law on electronic transactions, establishing the legal foundation for enterprises providing electronic commerce.

Some financial institutions have not attached special importance to investing on IT environment. Many do not have internal power sources in case of power cuts, proper fire prevention system, efficient air-conditioning for IT hardware, and systems for controlling entrance and exit. These systems require high initial outlays in terms of finances. As there are insufficient investments for the supporting environment, the associated risks for customers are also high.

In recent years, the financial institutions have paid special attention to ensuring security and prevention of unauthorised incursion into their IT systems. However, risks of hacking remain due to the lack in investments for properly trained human resources. However, since Internet financial products and services of the financial institutions are still not very significant, the risks are not excessive.

IT Risks

On the impact of the level of IT Implementation in the country, what are the risks that need to be addressed and controlled in the financial system?

No.	Item	Yes/No
1	Operation Risk	Yes
2	Liquidity Risk	Yes
3	Credit Risk	Yes
4	Strategic Risk	Yes
5	Reputation Risk	No
6	Legal Risk	No
7	Compliance Risk	No

4.9 Strengths and Weaknesses of Supervisory Procedure in Vietnam

Currently, some long established state financial institutions have implemented the necessary regulatory framework for controlling risks. However, some of the smaller financial institutions which do not have an extensive IT system have not placed not much emphasis on establishing a regulatory framework for IT. IT supervision in Vietnam is carried out by an internal IT audit division. The financial institutions which have regulatory frameworks such as security policies would have risk prevention policies. In this regard, the internal audit division will have overall charge of policies, regulations and processes. In case of policy infringements by the audit division, the supervisor will have the overriding authority to make rectifications.

Information technology of financial institutions is still at the initial state of development in Vietnam. Investment in new facilities and advanced technologies would reduce risks from obsolete technology. Financial institutions of Vietnam have many opportunities to learn from experiences of foreign financial institutions on the application of information technology and training of personnel.

However, IT supervision has not gained much ground as administrative procedures and processes have yet to be properly established and tested to assess risks. In addition, there have been little emphasis on financial institutions' risk due to the following reasons:

- The qualifications of supervisors have yet to meet necessary requirements and training is still insufficient. Many do not have experience in IT.

- The framework and procedures are insufficient and there is no clear responsibilities of IT staff in providing information to supervisors.

4.10 The Main Directions

- Better training for the supervisors.

- Perfect the regulatory framework and responsibilities in providing information for supervisors.

- Equip the system with advanced information technology, ensure security, reduce risks, and apply digital signatures and the technology confirming users such as biometrics, fingerprint scans, etc.

5. Prevailing IT Supervisory Framework and Regulations

5.1 Present Supervisory Framework and Regulations

IT services in Vietnam are very diversified with no general standards for financial institutions. Investment in technology of each financial institution depends on their requirements and limits in expenditure. Some financial institutions acquire their IT solutions from foreign countries for local application while some medium and small-scale companies opt to hire domestic companies to develop solutions. Some small scale services are developed by internal IT staff of the financial institutions. With this diversification, assessing and controlling risks are very difficult. Financial institutions should take their own responsibility on IT risks. In Vietnam, there is no regulation of IT supervision for the financial institutions. There is currently only one document on information security for credit institutions. The implementation of security features has yet to be emphasised due to the following reasons:

- Vietnam has about 100 financial institutions which are very diversfied. Controlling risks in IT would require a large IT workforce.

- The regulatory framework, procedures, standards for control risks have not been widely established. There are also no sanctions to deal with violations.

To implement supervision and assessment of IT risks in the financial institutions, there is need to:

- Develop IT supervisory staff who have the ability and technological qualification to manage IT.

- Develop a regulatory framework, procedures and standards to manage IT and use professional tools to assess risks.

5.2 Building a Supervisory Framework to Control IT Risks

- Unify managing and controlling risks of information technology in banks' operations

- Actively prevent and restrict IT risks in bank's operations

- Define responsibility, authority for every individual, organisation in managing and controlling risks in banks'operations.

5.3 Discuss the Regulations in IT Supervision

This includes regulations and guiding operations to audit IT. In order to supervise IT, we need to have the specific regulations according to the product's cycle. This process should be in place at the planning stage before the products are applied on a big-scale:

- Plan and project: The development strategy must a general one. We must define the development incentive, the market needs for products and services (includes the economic-socio-technological factors)

- Define the development potential of market through estimating market needs, assessing competitive competence in comparison with competitor in providing products and services of banks.

- Consider administrative ability and control risks. Compare between the risk administrative ability and the level of applying of the financial products and services

- Building projects: Define the general target and the quantitative target specifically for each financial product and service.

- Define risks: We must consider the risks and propose forward solutions to deal with main potential risks of financial services which may consist

of the following: demonstrative risk, prestigious risk, legal risk, risks involving customers and third-party. The potential risks must be mitigated arising from the implementation of the financial products and services. Hence, it is necessary to define the degree of maximum damage that the financial institutions have to suffer in the provision of financial products and services and there must be solutions for management for each form of risk.

5.4 Build Specific Deployment Plan

This includes finance, deploying itinerary, technological risk, facilities, personnel and other involved problems.

- Assign a duty to each member; build a plan to provide financial products and services. There is also a need to specify responsibility for each professional division, technological division, and administrative division.

+ Responsibility of professional division: take responsibility for building procedures; stipulate the professional competence for the financial products and services.

+ Responsibility of technological division: Establish an application programme, ensure safety and security, effectiveness, and compliance with the legal regulations and international integration; frequently check, assess and propose forward solutions for processing risks for each specific application.

+ Responsibility of administrative division: Divide the responsibilities among the members clearly to meet requirements of operations thoroughly; carry out and supervise the technical process, other organisational management; operate and supervise software, hardware, communication network, database, information system.

+ Responsibility of division for checking, collecting and analysing risks in financial products and services. This division makes periodic and unannounced inspections, checks the system of the financial products and services to minimise risks in financial products and services. The risk management division takes responsibility for collecting, analysing and reporting any breakdowns in financial products and services.

+ Responsibility for the third-party which must adhere to the following steps:

Assess all risks completely and the effect of each risk on operations, reputation, brand name of the bank; assess solutions on information security based on the overall solutions of financial institutions and third-parties. There should be spare solutions in case of interruptions or unavailability of third-party solutions. The technical ability and the financial capacity of the third-party must be assessed properly. In the contract with the third-party, the responsibilities and authority of each party must be defined as well as the usage of logos in the process of providing the financial products and services. The financial institutions have the right to make periodic checks on the provision of technical-support services of the third-party as well as the collaboration and cooperation process such as potential risks, level of safeness, data security in the present and in the future and suggest solutions to enhance the systematic security and data security.

5.5 IT-specialised Supervisor/Auditor

In Vietnam, some of the state commercial joint-stock banks sometimes transfer staff from the IT division to IT audit division and some from the professional divisions to IT divisions. Some professional auditors double up as IT auditors.

Training for IT supervisors is still insufficient. The IT division takes the main responsibility for deploying IT and training is usually only in the form of technological transfer. Therefore, IT supervisors are not properly trained nor supervised to identify risks in the new system. Supervisors are expected to take over after the IT process has been put introduced and they therefore do not have the ability to detect the errors in the process. To increase the level of expertise for IT supervisors and auditors, there should be specific training programme for IT staff.

Basic knowledge for IT staff must cover every aspect from hardware, software to information security, etc. IT staff must have the basic knowledge at least to understand the operational regulations and detect weaknesses of system.

In the process of deployment and transfer of information technology training, it is very necessary to encourage the supervisor's participation in order for him/her to gain the basic concepts of the project, facilities, software and technology used.

For institutions (e.g., financial companies within the postal corporation, petrol corporations) that that do not fall under the IT risk management of banks, the control of their IT risks is undertaken by their management offices. In Vietnam, overall IT management is the responsibility of the department of information and propaganda of the government. The department of information and propaganda

will initiate regulations such as law on information technology, law on electronic transaction and digital signature. The units have to comply with the regulations of the government and the department of information and propaganda. However, there is yet to be any legal framework to manage risks of non-bank institutions. Currently, the use of technology in non-banks financial institutions is based on the agreement between the non-banks and their customers. However, as IT applications in non-banks are still minimal due to the lack in professional competency, the associated IT risk remain low.

Regarding IT supervisory framework

No.	Item	Yes/No
1	Is IT Implementation reported regularly?	Yes
2	Is IT audit conducted?	Yes
	By bank/IT supervisors from supervisory authority	
	Off-site	Yes
	On-site	
	By internal or external (third party) auditors (on-site)	No
	Special IT audit/examination outside regular examination (on-site)	No
3	Does the formal framework exist?	No
4	If yes, is it stipulated in a regulation?	No
5	Is there minimum requirement in IT Implementation? Are the following items implemented:	
	Active supervision by Top Management (IT Steering Committee)	No
	IT Policy and Standard Operating Procedure	No
	IT risk is included in the risk-based management	No
	System development life cycle	Yes
	All layers of IT system	Yes
	Internal control system for IT Implementation	No
	Business Continuity Plan and Disaster Recovery Plan	Yes

	Periodical IT audit (internal/external)	No
5	Because it involves supervision procedure, is IT outsourcing especially regulated?	Yes
6	Because it involves consumer protection, is E-banking products especially regulated?	Yes
7	Are any IT-related laws (cyber law, e-commerce, m-commerce, digital signature) installed?	Yes

Regarding on-site IT Audit,

No.	Item	Yes/No
1	Is it conducted regularly?	No
2	If not regularly, is it conducted case by case?	Yes
3	If regularly, objects of audit:	No
	Organization and Management	
	System development process	
	Operation	
	Software and Application, including E-Banking	
	Security (authentication, authorization and protection – including audit trails, encryption)	
	BCP/DRP	
	Communication Network	
	Outsourcing process	
	Internal Auditing	

6. Issues and Challenges

6.1 Issues

Vietnam is in the process of integration and development and IT application is, therefore, still rather new. In order to develop IT and prevent risks, we need to establish policies for change, update the knowledge of new IT application for staff at management levels. It is only from there that we can implement IT strategies and legal frameworks.

In terms of human resource potential, as Vietnam is still developing, the need for IT personnel is very urgent. There is still a lack of institutions of higher learning emphasising on IT. To rectify this, some universities have initiated more disciplines concentrating on information technology. However, it is also realized that the qualifications of IT graduates are not able to meet the requirements in the work environment and it normally takes about 1 to 2 years to retrain IT personnel.

In terms of reimbursement, salaries of IT staff in financial institutions are far lower than the major corporations and the IT specialised companies while salaries of IT staff in state banks are even lower than other financial institutions and securities companies. In recent years therefore, there have been many turnovers in IT personnel of financial institutions, causing an imbalance in IT staffing among institutions. Security companies have attracted many IT staff who have worked for the financial institutions, causing a shortage of IT personnel in financial institutions.

Since information technology in Vietnam is still very new, financial institution are at the initial stages of IT applications. These institutions are in process of initiating the legal framework and the regulations to supervise information technology innovations and avert risks.

Transfer of technology between countries is still limited for Vietnam as it has just recently joined the WTO and other regional organisations. Moreover, professional ethics are still a shortcoming in financial institutions. There have been incidences where staff having IT savvy, have siphoned funds from financial institutions and customers as supervision is still weak.

6.2 Challenges

Vietnam is in the innovation process and its IT infrastructure is still backward, yet to meet international requirements. However, communication and the internet-lines with high speed are being developed and built in 63 of provinces and cities.

The equipment and facilities in the credit institutions are still insufficient due to financial limitations. Human resources in IT is still lacking in terms of qualification and quantity and there is a general lack of experience in implementing financial IT.

The top management level of financial institutions has not taken the operation, deployment and implementation of IT seriously. In addition, hackers have, in recent years, attacked and violated the IT systems of some financial institutions due to weak security systems and facilities.

7. Policy Recommendation

IT risk can pose great losses both in terms of costs and reputation of financial institutions. In order to reduce IT risks, there is a need to increase the awareness of the top management. The IT units must make regular updates and reports on risks to management for arriving at solutions and forecasting future potential risks.

7.1 IT Risks Policy

Before initiating policies, the following main risks must first be defined - demonstrative risk, reputational risk, legal risk, customer risk and the third-party risk. The estimated risks and the maximum damage from risks that the institutions can suffer from have to be defined.

The ability of administering and controlling risks and the ability of the internal controlling system in supervising risks to ensure operations security in IT systems must be in place. In addition, there is also the need to define the specific time -points in carrying out the proposed target, establish the plan of checking and assessing the implementation state of the project's content.

The responsibility among units must be equitably allocated, namely units responsible for IT implementation in the professional division, technological division, systems management division as well as users' responsibility.

7.2 The Supervisory Framework

The supervisory process must be improved systematically in order to ensure the proper assessment of operations in financial products. Inspection and supervision must ensure that confidential information involving customers at financial institutions are secure. There should be provisions against the usage of information for purposes contrary to regulations and they should not also be revealed to third-parties.

7.3 FI Supervisor and IT Auditor

FI supervisors and ITs auditor must comply with regulations and professional procedures to ensure compliance and the safe and secure application of IT products. They must inspect IT systems periodically or randomly to minimise risks in IT system.

The IT system programme must have functions of reporting, inspecting and management including:

- Journal on system cable
- Transaction journal
- System value journal
- Other reports

The internal inspection and supervision for IT must have the proper procedures and guidelines for internal inspection and supervision. According to the level of risk, the internal inspection and supervision for IT operation should include the following contents:

- Inspecting access action
- Inspecting copyright
- Inspecting current data and stored data
- Inspecting compliance of procedures
- Inspecting current file in usage

8. Conclusion

Currently, Vietnam is a developing country with a low per capita income. Hence, this is one main reason for the limited development in IT applications of financial institutions. Other factors include are lack of funds/resources to invest in IT modernisation; lack in technology know-how and training.

Closing the financial IT gap between Vietnam with other countries and the rest of world would require the government giving focus on investments with sizeable capital for IT (such as hardware, software, network and telecommunication education, innovations in products, software, automation in banking services, etc.). Establishing a technical base for an open cashless payment services and developing new services for financial institutions should be given preference in the development of financial IT. The next step would be to upgrade and improve the national payment system. To minimise risks for financial institutions, the supervision of IT products and services should be prioritised.