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A Study of E-Banking Security Measures Adopted by the Indian Public Sector Banks with an Outlook For Globalization

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Abstract

Nowadays e-banking services that take place through virtual and public channels play special role in the life of people around the world. Therefore, lack of security on performance of national and international banks in the context of globalization and distrust of people to these services will lead to undesirable effects. Hence, security is one of the most important elements that will affect banking transactions and its shortage prevents the development of business. For the same reason, the need for information security is determined in the banking system. Accordingly, several factors in art infrastructural facilities (AIF) area and operational risk management (ORM) area are considerable which are presented as research variables. The results suggest that in order to provide more security in e-banking transactions, banks have to create security policies such as internet security. In addition, they need to strengthen infrastructural factors in the fields like getting access to other banks, quality of infrastructure, and reserve bank of India (RBI) activity for e-banking supported systems.

Keywords: Electronic Banking. Security. Operational Risk Management. Art Infrastructural Facilities. Globalization

1. Introduction

"Globalization" is understood here to mean major increases in worldwide trade and exchanges in an increasingly open, integrated, and borderless international economy (Bimaljaiswal & Shiva Manoj, 2014). The financial services industry has been open to historic transformation. The so-called e-developments are emerging and advancing rapidly in all areas of financial intermediation and financial markets of the world. They are e-finance, e-money, e-banking, e-brokering, e-insurance, e-exchanges and even e-supervision. In this way competition and the constant changes in technology and lifestyles have changed the face of banking. Nowadays, banks are seeking alternative ways to provide and differentiate amongst their varied services (J. Singh, 2012). So it is the requirements of each country to enter in international markets by the modern banking system. Along with the promotion and development of new technologies, because of traditional banking weaknesses, the banking system use information technology, network and Internet as the first organizations. Thus e-banking replaced to traditional banking. But as the relationship between these networks have been designed without taking into account security issues, despite the benefit of technology advances to humanity, are increased threaten and abuse remarkably. So security topic is propounded to avoid this kind of risks that is important factor for the acceptance and use of electronic banking services. E-banking Applications, such as e-commerce, give offers for using of transactions with more convenient. (Otto & Chung, 2000). Security in a general view means keep unauthorized people from accessing information and allowing authorized persons to access valuable assets of bank. Most of banking activities involve personal and vital information of customers. Thus, the security of this information has great value (Suh & Han, 2003). If users feel secure about electronic banking systems, they accept these and trust that. Hence, trust plays an important role in their security (Patton, 2004).The security mechanism has been given great importance in e-banking according to necessities such as confidentiality, integrity, and accuracy used for the specific purpose of security. (Kesh & et. all, 2002). However, the internet banking services have to be at top level of security and risk free in order to be trusted by customers (H. U. Khan., 2014) and also we should attention that very strong and complex security methods can increase security of internet banking, but reduces the usability of this service (D. K. Smetters, 2014).

2. Review of Literature

In the context of globalization, security and trust is the most important concern of e-banking users. In this case, when the e-banking users are connected to the internet to use the services of this type of banking, trusting to the system is so important. This is occurred when the users believe that the bank provides them right conditions for a successful transaction. K. Chang examines how the level of globalization as well as the incremental globalization of each country is associated with bank efficiency, which is measured by banks' net interest margin (NIM). Using a panel of 35,501 observations in 141 countries over the period of 1987–2008, he found that there exists an inverse relationship between NIM and change in globalization of each country, which implies that globalization reduces banks' NIM and improves the efficiency of banking system (K. Chang, 2013).

Sharma S. & et.al examined and compared the perceptions of customers regarding SQ in public and private sector banks. Percentage and weighted average scores were used for data analysis. It is found that SQ was positively associated with customer services and there was significant difference in the quality of services provided by selected banks. Banks located in small cities and towns were lagging behind their counterparts in big and metropolitans cities (Sharma S., & et. al, 2007). The internet banking service encounter quality security of the click-and-mortar in Jordan, retail banks are much closed to the UK banks. Further quality of internet banking service encounters quality of the click-and-mortar retail banks in the UK that are very close to the dot com and retail banks in the UK (M. Yazan K.A., 2008). Mallya M D analyzed the role of IT in improving customer service. Bank customers can look forward to more exciting, innovative and technology-based products. Customers who can enjoy the use of computers can do most of the banking at home/office and experience the benefits of virtual banking (Mallya M. D., 2009). E-banking was a relatively new concept in the global banking scenario so the best of this concept was yet to come. V. Bharathan attempted to address the security and authentication issues in an internet banking and reiterates the point that online banking becomes less secure if users are careless, gullible or computer illiterate. With the globalization of business and services, our country cannot lag behind in niche area of internet banking (V. Bharathan, 2008).

Bansal & et.al, studied five dimensions: security/privacy, reliability, efficiency, responsiveness, and site aesthetics. Findings indicate that all dimensions carry significant impact on the overall internet banking service quality perceptions and customer satisfaction. However, security/privacy and efficiency dimensions carry the maximum impact on the overall internet banking service quality and satisfaction respectively (Bansal & K. K. Gupta, 2012).Kumar and Saini studied the adoption of electronic banking technologies by Indian consumers. Urban consumers are more confident than their rural counterparts in accepting the new technology. Further younger consumers reveal more openness to change and more familiar with the technology (Kumar & Saini, 2009). Internet banking was found to be easier and speedier than conventional banking and trust was found as most important factor followed by accuracy and confidentiality (Gupta P.K., 2008).

Undoubtedly, technology is the single biggest strategic issue in banking that has also created challenges for the regulatory framework of e-banking (Nin L. Kabrin, 2001). N. Saleh Mand and Schechter Andrea in their study showed that electronic banking provide lot many benefits to customers. However, there are many risks such as regulatory risk, operational risk, and reputational risk which are faced by the banks (Nsouli Saleh M. & Nad Schaechter Andrea, 2002).

Researchers and experts have been giving full attention to subjects about online banking security. Their research include the Framework for the Governance of Information Security in Banking System (M. Ula, & et. al, 2011).Also, the security internet banking issues are facing today and solutions for online banking security threats. TC. Shan and WW. Hua assumed up security issues in two categories: system security issues and information security issues (TC. Shan and WW. Hua, 2006). Researchers introduced new approaches for online banking security (A. Hisamatsu, & et. al, 2010). The survey conducted by Data Security Council of India (DSCI) in 2010 indicates that the concentration of the data

governance processes so far has focused on integrity of data, but there is a need to increase efforts in the direction of data privacy (Kesh, S. & et. al, 2002). Kenneth Edge et.al defined attack and protection trees and discussed how they can be implemented in the security analysis of an online banking system to maintain user's trust and confidence in the security of their online bank accounts (K. Edge and et & et. al 2007). Many researchers have done studies of several banks in their countries to compare their systems, but in India, the research on online banking security is still in its infancy. Until now no comparative study, regarding security system of different type of banks has been done in India.

Hameed Ullah Khan in his research concluded that the proposed system would help the customers for using the internet for their business. The online banking helps every one for better services on the cost of security. The system allows customers to transfer money, account inquiry and get the balance sheet and many other services (H. Ullah Khan, 2014).

3. Research Framework

In this research, the following model is presented based on previous experience. The research and interview in this field in order to detect the presence or absence of security tools in both the AIF and ORM for e-banking implementation are utilized. E-banking security tools which are applied to increase the safety of related factors in the context of globalization are presented in the mentioned model. In addition, 16 important factors that influence the adoption of e-banking are also identified.

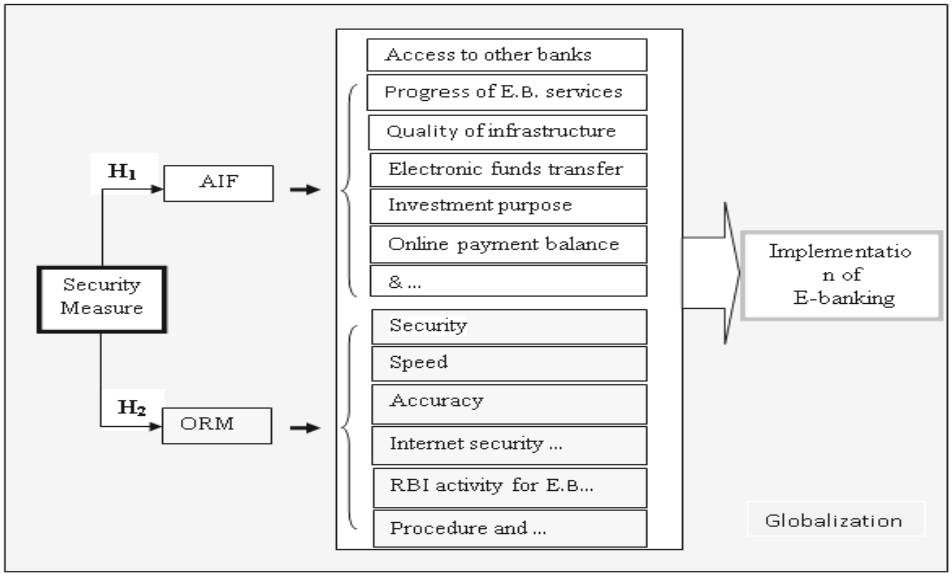

Fig 1- Research Variables

4. Research Methodology

The present study is of analytical and exploratory nature. Accordingly, the use is made of primary data. The primary data is collected with the help of questionnaires from a sample of respondents (100 bank officers and 200 customers) from Pune City using the e-banking services provided by the various branches of public sector banks (PSB). In other words, in the present study there are two types of data that are primary and secondary. The primary data are the first hand information and the secondary data are collected from the sources like publications of PSBs, RBI reports, and Journals Of banking and finance.

The key intention of the study is the evaluation of e-banking measures adopted in IPSBs with reference to Pune City with an outlook for globalization. In the present study, the samples are divided into two subgroups based on service users' opinion regarding e-banking. Regarding to research population and by considering unlimited one, Morgan table has been used to determine sample size. The stratified random sampling technique is used for selection of service users for collecting data from Pune City for the study purpose. This method is used to make research procedure faster by obtaining a large number of accomplished questionnaires rapidly and efficiently. This helps to choose the banking sector in Pune City and their websites. These websites help to get all essential information of the e-banking services.

Several public sector banks operating in Pune City were selected for the purpose of the study. The survey of 200 e-banking service users of the selected public sector banks has been done. The required data has been collected from respondents through the well-structured and pre-tested questionnaire.

The number of sample units that are to be selected from stratum decided by the researcher in advance. This number is known as quota that is fixed according to some specific characteristics such as usage of e-banking services via - ATM, internet and mobile. Quota sampling technique is used for selecting of e-banking service users for the research purpose. From study area, 50 service users per bank have been selected. The researchers applied their judgments in the choice of the sample and get the required information quickly.

To formulate the research methodology it can be stated that there are three parts for the first step of the study which as follow:

a) Selection of the Banks

The researcher has selected four banks out of 21 public sectors. The selected banks for the study can be justified as follows:

- **State Bank of India (SBI):** This is the biggest public sector banks and has played leading role in development of e-banking in India.
- **Bank of Maharashtra (BOM):** The bank has had head office in Pune city since many years.
- **Bank of Baroda (BOB):** It is the second largest bank in India.

Andhra Bank: Andhra bank is a medium sized Indian Public Sector Bank (hereafter it is called IPSB) and it was pioneer in introducing credit cards in India in 1981.

b) Selection of the Bank Branches

The researcher has selected 10 % branches of each of the selected banks. The accessibility of sampling method has been used for the selection of bank branches and the total of 100 bank officers were selected for the purpose of study. There were 5 officers from five category (Branch Managers, Bank accountant, Recovery officers, General front desk employees, Assistant branch manager) from each selected bank (5 officers x 5 categories x 4 banks = 100 respondents).

c) Selection of the Service Users:

The selection of the service users is an important part of this research work. No particular sampling technique has been used by the researcher in this case. The researcher has continuously visited the selected bank branches for 6-7 days for identifying the e-banking users and requested them to fill up the questionnaire. The researcher has selected 10 service users per bank branch (among selected banks) for obtaining the required primary data. Therefore, 200 (20 bank branches X 10 service users) service users are predictive samples for in-depth qualitative investigation.

5. Techniques of Analysis of Data

The statistical test for measuring of the quantity variable normality is *One-Sample Kolmogorov-Smirnov* Test. Regarding to its output if $Sig. > 0.05$, then the population distribution is normal and if $Sig. < 0.05$, then the population distribution is not normal.

Table No. 1- Variable Normality

Variables	No.	Sig. (2-tailed) 1-Sample K-S Test	Result
AIF	X^1	.000	Not normal
POR	X^2	.000	Not normal

Regarding to above table, the population distribution is not normal so there is necessary to use nonparametric test in our investigation. The test which is chosen by the researcher in this part of the present study is *Binominal Test*. The researcher has used data analysis tools such as Excel and SPSS to analyze the data. Moreover, the hypotheses tested by Chi-square statistics. The analysis of answers has done in 95% level of confident.

H1: Indian banks lack state of the AIF for developing E-banking.

Table No. 2: Descriptive Statistics for AIF

No.		N	Min	Max	Mean	Std. Deviation
5	Getting access to other banks	389	1	4	2.23	0.751
6	Feeling progress of E-banking services	389	3	5	4.12	0.436
7	Quality of infrastructure	389	2	5	3.61	0.657
10	Backup server	389	3	5	4.06	0.359

No.		N	Min	Max	Mean	Std. Deviation
11	Power set	389	4	5	4.13	0.337
12	Number of computer	389	4	5	4.16	0.373
13	Electronic funds transfer	389	4	5	4.16	0.373
14	Investment purpose	389	1	4	2.23	0.751
15	Online payment	389	4	5	4.13	0.34
16	Checking the account balance	389	2	5	3.42	0.94
31	Valid	389				

Table No. 3: Binomial Test for AIF

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (1-tailed)
`Getting access to other banks	Grope 1	<=3	51	0.1	0.6	0.482
	Grope 2	>3	338	0.9	0.6	.000[a]
	Total		389	1	0.6	.000[a]
Feeling progress of Eb services	Grope 1	<=3	16	0	0.6	.000[a]
	Grope 2	>3	373	1	0.6	.000[a]
	Total		389	1	0.6	.000[a]
Quality of infrastructure	Grope 1	<=3	163	0.4	0.6	.000[a]
	Grope 2	>3	226	0.6	0.6	.000[a]
	Total		389	1	0.6	.000[a]
Backup server	Grope 1	<=3	13	0	0.6	.000[a]
	Grope 2	>3	376	1	0.6	.000[a]
	Total		389	1	0.6	.000[a]
Power set	Grope 1	<=3	0	0	0.6	.000[a]
	Grope 2	>3	389	1	0.6	.000[a]
	Total		389	1	0.6	.000[a]
Number of computer	Grope 1	<=3	0	0	0.6	.000[a]
	Grope 2	>3	389	1	0.6	.000[a]
	Total		389	1	0.6	.000[a]
Checking the account balance	Grope 1	<=3	0	0	0.6	.000[a]
	Grope 2	>3	389	1	0.6	.000[a]
	Total		389	1	0.6	.000[a]
Investment purpose	Grope 1	<=3	231	0.6	0.6	.421 [a]
	Grope 2	>3	158	0.4	0.6	.000[a]
	Total		389	1	0.6	.000[a]
Online payment	Grope 1	<=3	0	0	0.6	.000[a]
	Grope 2	>3	389	1	0.6	.000[a]
	Total		389	1	0.6	.000[a]
Electronic funds transfer	Grope 1	<=3	150	0.4	0.6	.000[a]
	Grope 2	>3	239	0.6	0.6	.000[a]
	Total		389	1	0.6	.000[a]

a. Alternative hypothesis states that the proportion of cases in the first group <.6.

H2; Indian Banks does not observe the Principle of Operational Risk (POR) for the development of E-banking

Table No. 4: Descriptive Statistics for POR

		N	Min	Max	Mean	Std. Deviation
1	Security	389	1	5	3.7275	.91538
2	Speed	389	1	5	3.5013	.97024
3	Accuracy	303	1	5	3.9175	.99492
4	Procedure and Process	389	1	5	3.4370	1.17941
5	Documentation	389	1	5	3.7558	.93583
6	Internet security	389	1	5	2.8920	1.20935
7	RBI activity	389	1	4	2.23	0.751
8	Support services	389	1	4	2.230	0.7510

Table No. 5: Binomial Test for POR

		Category	N	Observed Prob.	Test Prob.	Exact Sig. (1-tailed)
Security	Group 1	<=3	122	.3	.6	.000[a]
	Group 2	>3	267	.7		
	Total		389	1.0		
Speed	Group 1	<=3	140	.4	.6	.000[a]
	Group 2	>3	249	.6		
	Total		389	1.0		
Accuracy	Group 1	<=3	53	.2	.6	.000[a]
	Group 2	>3	250	.8		
	Total		303	1.0		
Procedure and process documentation	Group 1	<=3	123	.3	.6	.000[a]
	Group 2	>3	266	.7		
	Total		389	1.0		
Internet security	Group 1	<=3	61	.2	.6	.000[a]
	Group 2	>3	328	.8		
	Total		389	1.0		
RBI activity for e-banking	Group 1	<=3	234	.6	.6	.497
	Group 2	>3	155	.4		
	Total		389	1.0		
Supported services	Group 1	<=3	51	0.1	0.6	0.482
	Group 2	>3	338	0.9		
	total		389	1		

6. Conclusion

As we know, e-banking systems face more serious threats than traditional banking. To ensure security in electronic banking, banks should take security measures. There is a wide range of security measures that include AIF such as access to other banks, progress of e-banking services and quality of infrastructure; as well as ORM such as internet security, accuracy and security policy.

In spite of significant improvement in IT, some of the AIF factors and facilities are not completely performed. For example, getting access to other banks in this field, as one of the vital factors that have a large impact on e-banking implementation in the context of globalization, does not exist effectively. Lack of effective communication between banks will increase the risk. The risk of lack of interbank communication is bolded in money laundering area. It will also conclude in a memorandum of association between banks and will result in the development of different areas. The factors such as investment Purpose are among the issues that need to be emphasized more and improved by IPSBs because of their vital infrastructural and developer role as an e-banking security measure. This mechanism makes it necessary to use the investment opportunities, new lending and lending in order to obtain higher yields.

According to the obtained results, POR need to be observed for the development of e-banking in IPSBs. So, all these factors have been vital for the development of e-banking but in some cases like RBI activity for e-banking supported system, RBI does not provide sufficient e-banking support services. Lack of support services will lead to a lack of information and communication infrastructure development which include uninterrupted, stable and secure services in the e-banking. Despite banks' efforts regarding security of e-banking transactions, the security policy of banks has not been able to evoke customer's confidence yet.

The results also indicate that banks do not have suitable infrastructure for e-banking yet. This is while proper infrastructure will lead to the development of communication platforms, information transfer and the Bank Secrecy.

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