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Safe Banking:
An Effective Access of E-banking Services

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Abstract:

The aim of this paper is to analyse the trends of electronic banking that has revolutionized the traditional means to deal with transactions. Different banks provide services to the customers with different ranges and sophistication. The study done in this paper focuses on the Indian banks. Through this study we study how different banks have adapted to the current market scenario and how banking has improved with the advent of e-banking, take a look at the strategies of banks dealing with frauds and research about the security loopholes and offer a solution that can eradicate frauds related to the security.

Chi-square statistical technique was used to test our hypothesis of whether the introduction of E-banking facilities have improved the efficiency in terms of profitability, curtailment of frauds, effectiveness of banks etc. Jammu And Kashmir Bank is our case study for the research. A thorough and careful examination of Jammu and Kashmir bank staffs including management staff was carried out to review the working and infrastructure of the bank and assess the security measures that are being taken as regard to functionality of the electronic bank.

The research was carried out mainly focussing on interviews with the customers and staff of various banks and collection of data from the banks websites on the internet. The Primary Set of data was collected using questionnaire.

Key words: E-banking, Security, Customer-Bank relationship, transactions, e-commerce.

Introduction

Electronic banking is in use since the early 70's in the form of automated teller machines and telephonic transactions throughout the world. With the advent of internet the ubiquitous use of dealing with banks in person is greatly reduced. The use of internet while dealing with the banks has greatly been advantageous to both customers as well as banks. The time taken to deal with a certain transaction has been reduced and efficiency to provide services to the customers has increased manifold with the use of internet. The customers don't have to visit the banks and wait for their turn to access many facilities of the banks rather these facilities are few clicks away from the customers and can access the same using internet banking. The electronic banking is increasing at a very rapid rate and the policy makers of the banks keep in mind the diverse situations of access and transactional behaviour. With ever increasing facilities being provided by different banks the policies and security measures need to be accommodated to curtail any security risk generated whatsoever. With advent of internet the customer has more power than ever on his account. They have an access to a customized profile and account with a few clicks away. Due to change in communication channel i.e using an internet service rather by being present in the bank to access a service, the security has been made ultimate requirement for a successful transaction. It is an obligation for the banks to provide security to the customers for a perfect transaction to take place and allow the customer to use the services without any hassle or fear.

Banks have been providing these security levels to the customers but more is to be done to achieve a cent percent effectiveness of the same.

Background

"Banks have traditionally been in the forefront of harnessing technology to improve their products and services. They have over the time been using electronic and telecommunication networks for delivering a wide range of value added products and services". The range of services and products offered by different banks vary widely both in their contents and sophistication. E-banking provides enormous benefits to consumers in terms of the ease and cost of transactions. However, it can be thought of as a service that allows customers to use some forms of computer to access account-specific information and possibly conduct transactions from a remote location – such as at home or at the workplace. The most efficient system architecture and advanced technologies are being used for E-banking results for the provision of internet banking services for the financial sector which enables the banks to carry out the their services like web banking to their customers. While over the years developed countries like Sweden have not tapped into the freedom to conduct routine banking transactions from the comfort and security of customer. Electronic banking has been around for some time in the form of automatic teller machine and telephone transactions. "More recently, it has been transformed by the Internet, a new delivery channel for banking services that benefits both customer and bank. Access is fast, convenient, and available round the clock, whatever the customer's location. Plus, banks can provide services more efficiently and at substantially lower costs". E-banking also makes it easier for customer to banks' services and products, can increase completion among banks, and allows banks to penetrate new markets and thus expand their geographical reach. Some even see electronic banking as an opportunity for countries with underdeveloped financial systems to leapfrog developmental stages. Customer in such countries can access services more easily from banks outside his/her own country through wireless

communication systems, which are developing more rapidly than traditional "wired" communication networks. Probably, the major phenomenon of the twenty first century has been electronic communication and information technology. The technological progress is now sufficiently well advanced for it to enable commercial transaction and non-commercial activities which is facilitated through the use of information technology and network technology such as the internet, intranet and extranet [1]. Electronic Banking has emerged as a significant and rapidly growing component of the world economic exchange. Through Electronic Banking the world economic exchange has been reduced to a tiny global village in terms of its information capacity and the resources it holds which can be accessed by anybody from anywhere in the globe through the use of medium of E-commerce namely the internet and some other electronic devices.

Electronic Banking does not only encompass the way you shop over the Internet, but also the ways you carry out banking transactions. A few years ago, banks started to offer their service on the Internet, in addition to the traditional services in the branch. This allowed customers, more independence in the choice where and when to bank, as they were not bound to opening hours. Electronic Banking has revolutionized the way business is transacted by globalizing the business enterprise. Multinationals, small and medium scale industries no matter their geographical locations are all beneficiaries of electronic banking. It encompasses all kind of commercial transaction that is conducted on an electronic medium, mostly through the Internet.

E-banking links business to customers no matter their geographical location. It allows companies to make new business contacts from different global business alliance, test near products and services, and make market research and other enquiries all at a minimal cost both financial and otherwise.

Importance of Electronic Banking

Electronic banking provides a number of advantages for both the banks and their customers. Electronic banking has made life much easier and banking much faster and more pleasant, for customers as well as the bank.

It saves time spent on queuing in the Bank.

It removes geographical limitations for small and medium size banks, thereby paving ways for international operation without limits.

It has no time limitation i.e. banking transactions may be performed throughout the day, week and from any place they can have access to the Internet.

It provides efficient cash management for interest optimization.

It provides convenience in terms of the capital, labor time and all the resources needed to make a transaction.

It has assist banks to increase in data collection, data management, and financial engineering that have improved the ability of potential creditors to assess the creditworthiness of potential borrowers and to price the risk associated with those borrowers through standardized mechanisms such as credit scoring. Taking advantage of integrated banking services bank, clients may compete in new markets, gain access to new customers and grow their market share. Banking technological developments make it much easier and cheaper for customers to compare and contrast products and to establish multiple banking connections, which could alter the purchasing decision making process of the customer. It provides some sought of security and privacy to customers, utilizing state-of-the-art encryption and security technologies.

Drawbacks of Electronic Banking

Electronic banking like any other thing in life has its own draw backs. They are:

A Customer needs access to a computer with internet being connected which signifies that the access to a customer's account is solely dependent in technology in the case of E-banking.

Furthermore, E-banking is subject to the dependability of other computers and web server which means that if it is faulty, a customer can not have access to his/her account. It also means that a customer has to know how to use a computer before he/she can carry out a transaction. There are set of people e.g. older ones who don't want to follow the technological trend probably being sacred and doesn't want to learn would prefer the traditional banking way. The governmental policies that guide Internet banking operations across international border are not efficient. The services of a third party are usually required by the bank to run the online banking services to their clients.

Challenges to Electronic Banking Security

Financial institutions that provide electronic banking today have found customer's security as a vital issue in their day-to-day business transactions due to the fact that it involves the internet which is inherently unsecured. Moreover, using the internet as a medium for electronic banking, one can impersonate another person or process and have access to other information like banking information. Guttmann in his article did argue that a high degree of security is being pursued in E-banking transactions. None of the parties to the transaction or third parties should be able to change or create information that is sent from the one party to the other. He further went to outline some ways to secure e-banking transactions: Firstly, the use of cryptology which is a way to code messages and making

those codes so that cannot be decoded by third parties. Also digital signature can be used too by customers. Moreover, SSL (Secure Sockets Layer) that is today integrated in all browsers such as Internet Explorer, Mozilla Firefox etc, and it allows the connections between client and server to be more secured. SET (Secure Electronic Transaction) is also an essential application that secures payments with Visa and Master Card. Finally, firewalls and rooters are also required which allows the data to be filtered. Firewalls stands as an obstruction between the outside Internet and the internal bank network. [2] He finally concluded that there should be a group that runs a daily check to see if all is ok and to update data. It is obvious that security issue that deserves the highest importance in such system where security breaches could lead to enormous disaster. Hence, it imposes security among these levels: Customer level authentication, Application level, IP level.

Customer Level authentication

In E-banking, it is of great importance that all the levels should be guaranteed security. Customer's authentication is not left out. At the early years of banking, to authenticate a customer, there exist a policy given by the central bank that whenever a customer opens an account, his/her photo and signature of the customer is being stored and processed which is then used to verify a customer. While in the present day banking, customers can authenticate themselves by digital certificate which is obtained from certificate authority.

Application Level Security Management

Many transactions happen electronically in the application level. More than one message is required for each transaction and the message can't be forged or reused, which should have some desirable properties like authenticity, confidentiality, Integrity. Digital signature can be used to support all of these

except confidentiality. It is a protocol that has same effect as real signature and maintains the properties above and it uses the public key cryptography.

Digital signature:

Here, signer signs the message and this can be confirmed only by anybody that comes from the signer, invariably, signer cannot forge and the message can never be modify while in transit. For authenticity to be ensured, the receiver can confirm the signature and knows that the message is being sent by the sender. For this operation to be successful, hash algorithm and asymmetric encryption is being used for its operation. In digital signature, two keys are involved which are the private and public keys. Whereby the sender signs a message with his private key and the receiver decodes it with his public key. To avoid the instance where someone else pretends to be authentic user because he/she has the public key, digital certificate can be used. "A digital certificate is an electronic credit card that establishes your credentials when doing transactions on the Web which can be gotten from a certification authority (CA)".

IP level security (IPSec Protocol)

IP security was initiated for securing communication across LAN, WAN and Internet. Nowadays, many forms of attacks like packet sniffing, IP spoofing do take place which can lead to an attacker gaining privileges to read information that is being transmitted like user id and password information .The security features are implemented as extension headers that follow the main IP header, which means that there are mandatory security features for IPv6 which are optional to IPv4.[3]

Authentication Header (AH) is an extension header for authentication while Encapsulating Security Payload (ESP) header is an extension header for privacy Despite all measures are taken to enforce security in the above levels, fraud via electronic banking is still at large.

Legislative and Regulatory Issues

For a successful implementation of E-banking, National, regional and international law, rules and regulations are its requirements. Legal support is necessary for protecting the interests of banks and customers in various areas relating to E-banking transactions. Some of the important issue like liability for loss whenever fraud occur, to provide loss allocation in case of insolvency, cherub truncation, to preserve records, prevention of fraud etc are to be cleared in the legislation.

Trust in Web and Security Concerns

Phishing is a glowing issue that arises due to the increase of online banking. In computer sense, phishing is an attempt to criminally and fraudulently acquire sensitive information, such as usernames, passwords and credit card details, by masquerading as a trustworthy entity in an electronic communication. Phishing is typically carried out by email or instant messaging, and often directs users to enter details at a website, although phone contact has also been used. Phishing is an example of social engineering techniques used to fool users. Attempts to deal with the growing number of reported phishing incidents include legislation, user training, public awareness, and technical measures.

Authentication in an Electronic Banking

The basic focus here is on the risks and risk management controls related to authentication in an electronic banking environment. There are a variety of authentication tools and methodologies financial institutions can use to authenticate customers, which could be the use of passwords, personal identification numbers, digital certificate, physical devices, database comparisons and biometric identifiers.

Authentication methods that depend on more than one factor typically are more difficult to compromise than single factor systems.

Authentication processes should be designed to maximize inter-generability and should be comforted with the financial institute's overall strategy for electronic banking and e-commerce customer services. The risk should be evaluated in light of the type of customer, the institution's transactional capabilities, the sensitivity and value of the stored information to both the institution and the customer, the ease of using the method, and the size and volume of transactions.[4] Reliable customers 'authentication is imperative for financial institutions engaging in any form of electronic banking or commerce. The risk of doing business with unauthorized or incorrectly identified individuals in an electronic banking environment could result in financial less and repudiate damage through fraud, disclosure of confidential information, corruption of data or unenforceable agreement. The success of a particular authentication tools or methodology depends on more than the technology; it depends on appropriate policies, procedures and control. An effective authentication method should be implemented on an enterprise-wide basis, have customer acceptance, reliable performance, scalability to accommodate growth, and enter operability with existing systems and future plans.

The level of authentication used by the financial institution in a particular application should be appropriate to the level of risk on that application.

The Beliefs of Consumers about Electronic

Recently, it has been a burning issue for financial institutions and the object of various academic studies since the adoption of electronic banking .Some weight were placed on knowledge of a personnel in a banking sector and their willingness to serve customers though speed, price and bank's reputation seemed to be an essential criteria for the adoption of electronic banking. Convenience has been one thing customers value most, also an increased choice of access to the bank, and improved control

over the banking activities and finances in electronic banking. Moreover, consumers considered being able to access, its functionality and low prices being incurred for the services as very important in electronic banking. It was maintained that customers are more concerned with privacy, time and control among other important aspects. The most essential issue for banking sectors which still remains is the negative attitude towards the security of electronic banking. Security concerns arise from the use of an open network: customers are afraid that their financial information might become an open book to other people via the Internet. However, it was argued that security concerns are not among the greatest obstacles. In Australia, the main barriers that were found among its consumers for the adoption of electronic banking were: awareness of the service and benefits were not sufficient, security concerns, usage problems, resistance to change, lack of computer access and the cost were high [10]. The improvement of electronic banking will basically depend on the number of persons that acquire and retain their internet access. The most essential reason for adopting internet based services is actually each individual's attitude towards technology itself. In general, people that are acquainted with computer and the internet are more likely to adopt electronic banking services before those people who are not acquainted computers. By studying the beliefs of different types of consumers, new valuable information concerning electronic banking can be obtained. In addition, studying the relationship between perceptions of technology, demographic variables and Internet banking behaviour, provides a clarification of factors affecting, for instance, the intention to recommend internet banking to other people.

Sample and Sampling Procedure

A sample of one hundred and five (105) was made to represent the population that is under study for the purpose of obtaining

data for the research work. Based on the data obtained from this sample, generalizations about the population were made. The sampling procedure was based on simple random sampling. This procedure was used because it afforded each element of the population the opportunity of having independent and equal of being represented in the sample of one hundred and five respondents/persons. It was equally easy and simple in terms of conceptualization and application.

Method of Data analysis

While percentage in tabular form was adopted in the area of Bio data and some other questions put forward to the respondent, the statistical formulae "the Chi-square" (x2) was used in analyzing and interpreting responses connected with the main variables of the hypothesis. At 5% level of significance, x2 was used in ascertaining the validity, reliability or otherwise to test whether or not there is any relationship between one set of variable and another.[5]

By defining, the "Chi-square" is given by the formulae:

$$x2 = \Sigma \frac{(o-e)2}{e}$$

Where o = Frequency Observed and E = Frequency Expected. The degree of freedom (d.f) = (r-1) (c-1), where r = Number of rows, e = Number of columns;

Ho: Stands for Null Hypothesis, and HA: Stands for Alternative Hypothesis.

Analysis of Data

For the analysis of data, we choose the Chi square method. The chi-square test is a statistical test that can be used to determine whether observed frequencies are statistically

significantly different from expected frequencies. As in other statistical tests, we begin by stating a null hypothesis (H0: there is no significant difference between observed and expected frequencies) and an alternative hypothesis (H1: there is a significant difference). Based on the outcome of the chi-square test we will either reject or fail to reject the null hypothesis.

Decision Rule

Accept the hypothesis if when calculated x2 is greater than tabulated x2 (Chi-square)And Reject the hypothesis when calculated x2 is less than tabulated x2.

The tabulated x2 was gotten by using the formulae Σ ((o-e)2 /e)

Significance level = 0.05

Degree of freedom = (c - 1) (r - 1)

= (4 - 1) (20 - 1)

= (3) (19) = 57

Where c, r is number of columns and rows not counting the total for columns and rows.

From the Chi-square table in Appendix B, we found out that x2 (degree of freedom-57 under the significance level-0.05) is 75.62 for both Hypothesis 1 and 3 while for Hypothesis 2 is 72.15

Calculated x2 for Hypothesis 1, Hypothesis 2 and Hypothesis 3 are 321, 309. 6 and 258.2 respectively.

Hypothesis 1:

HO: That the introduction of Electronic Banking has not improved the efficiency and effectiveness in Jammu & Kashmir Bank.

HA: That the introduction of Electronic Banking has improved the efficiency in Jammu & Kashmir Bank.

Therefore, the hypothesis that the introduction of Electronic Banking has improved the efficiency and effectiveness in Jammu and Kashmir bank is accepted.

Hypothesis 2:

HO: That the introduction of E-Banking has not helped the curtailment of E-Banking of fraud in Jammu and Kashmir bank.

HA: That the introduction of E-Banking has helped the curtailment of fraud in Jammu and Kashmir bank.

Since calculated Chi-square is greater than the tabulated value, we accept HO and reject HA. This means that the introduction of E-Banking has not helped the curtailment of fraud in Jammu & Kashmir bank.

Hypothesis 3:

HO: That they revolution of electronic communication and information technology has not increased Jammu and Kashmir bank profitability.

HA: That the revolution of electronic communication and information technology has increase Jammu and Kashmir bank profitability.

Since calculated Chi-square is greater than the tabulated value, we accept Ho and reject HA. This means that the revelation of electronic communication and information technology has not increased Jammu and Kashmir bank profitability. Due to time factor, we choose Jammu and Kashmir bank as the bank for our study being among the leading banks in India. The above results cannot be for sure generalized for all the banks.

Table of Chi-Square Statistics

Degree of Freedom	Probability of exceeding the critical value 0.10	0.05	0.025	0.01	0.001
1	2.706	3.841	5.024	6.635	10.828
2	4.605	5.991	7.378	9.210	13.816
3	6.251	7.815	9.348	11.345	16.266
4	7.779	9.488	11.143	13.277	18.467
5	9.236	11.070	12.833	15.086	20.515
6	10.645	12.592	14.449	16.812	22.458
7	12.017	14.067	16.013	18.475	24.322
8	13.362	15.507	17.535	20.090	26.125
9	14.684	16.919	19.023	21.666	27.877
10	15.987	18.307	20.483	23.209	29.588
11	17.275	19.675	21.920	24.725	31.264
12	18.549	21.026	23.337	26.217	32.910
13	19.812	22.362	24.736	27.688	34.528
14	21.064	23.685	26.119	29.141	36.123
15	22.307	24.996	27.488	30.578	37.697
16	23.542	26.296	28.845	32.000	39.252
17	24.769	27.587	30.191	33.409	40.790
18	25.989	28.869	31.526	34.805	42.312
19	27.204	30.144	32.852	36.191	43.820
20	28.412	31.410	34.170	37.566	45.315
21	29.615	32.671	35.479	38.932	46.797
22	30.813	33.924	36.781	40.289	48.268
23	32.007	35.172	38.076	41.638	49.728
24	33.196	36.415	39.364	42.980	51.179
25	34.382	37.652	40.646	44.314	52.620
26	35.563	38.885	41.923	45.642	54.052
27	36.741	40.113	43.195	46.963	55.476
28	37.916	41.337	44.461	48.278	56.892
29	39.087	42.557	45.722	49.588	58.301
30	40.256	43.773	46.979	50.892	59.703
31	41.422	44.985	48.232	52.191	61.098
32	42.585	46.194	49.480	53.486	62.487
33	43.745	47.400	50.725	54.776	63.870
34	44.903	48.602	51.966	56.061	65.247
35	46.059	49.802	53.203	57.342	66.619
36	47.212	50.998	54.437	58.619	67.985
37	48.363	52.192	55.668	59.893	69.347
38	49.513	53.384	56.896	61.162	70.703
39	50.660	54.572	58.120	62.428	72.055
40	51.805	55.758	59.342	63.691	73.402
41	52.949	56.942	60.561	64.950	74.745
42	54.090	58.124	61.777	66.206	76.084
43	55.230	59.304	62.990	67.459	77.419
44	56.369	60.481	64.201	68.710	78.750
45	57.505	61.656	65.410	69.957	80.077
46	58.641	62.830	66.617	71.201	81.400
47	59.774	64.001	67.821	72.443	82.720
48	60.907	65.171	69.023	73.683	84.037
49	62.038	66.339	70.222	74.919	85.351
50	63.167	67.505	71.420	76.154	86.661
51	64.295	68.669	72.616	77.386	87.968
52	65.422	69.832	73.810	78.616	89.272
53	66.548	70.993	75.002	79.843	90.573
54	67.673	72.153	76.192	81.069	91.872
55	68.796	73.311	77.380	82.292	93.168
56	69.919	74.468	78.567	83.513	94.461
57	71.040	75.624	79.752	84.733	95.751
58	72.160	76.778	80.936	85.950	97.039
59	73.279	77.931	82.117	87.166	98.324
60	74.397	79.082	83.298	88.379	99.607
61	75.514	80.232	84.476	89.591	100.888
62	76.630	81.381	85.654	90.802	102.166
63	77.745	82.529	86.830	92.010	103.442
64	78.860	83.675	88.004	93.217	104.716
65	79.973	84.821	89.177	94.422	105.988
66	81.085	85.965	90.349	95.626	107.258
67	82.197	87.108	91.519	96.828	108.526
68	83.308	88.250	92.689	98.028	109.791
69	84.418	89.391	93.856	99.228	111.055
70	85.527	90.531	95.023	100.425	112.317
71	86.635	91.670	96.189	101.621	113.577
72	87.743	92.808	97.353	102.816	114.835
73	88.850	93.945	98.516	104.010	116.092
74	89.956	95.081	99.678	105.202	117.346
75	91.061	96.217	100.839	106.393	118.599
76	92.166	97.351	101.999	107.583	119.850
77	93.270	98.484	103.158	108.771	121.100
78	94.374	99.617	104.316	109.958	122.348
79	95.476	100.749	105.473	111.144	123.594
80	96.578	101.879	106.629	112.329	124.839
81	97.680	103.010	107.783	113.512	126.083
82	98.780	104.139	108.937	114.695	127.324
83	99.880	105.267	110.090	115.876	128.565
84	100.980	106.395	111.242	117.057	129.804
85	102.079	107.522	112.393	118.236	131.041
86	103.177	108.648	113.544	119.414	132.277
87	104.275	109.773	114.693	120.591	133.512
88	105.372	110.898	115.841	121.767	134.746
89	106.469	112.022	116.989	122.942	135.978
90	107.565	113.145	118.136	124.116	137.208
91	108.661	114.268	119.282	125.289	138.438
92	109.756	115.390	120.427	126.462	139.666
93	110.850	116.511	121.571	127.633	140.893
94	111.944	117.632	122.715	128.803	142.119
95	113.038	118.752	123.858	129.973	143.344
96	114.131	119.871	125.000	131.141	144.567
97	115.223	120.990	126.141	132.309	145.789
98	116.315	122.108	127.282	133.476	147.010
99	117.407	123.225	128.422	134.642	148.230
100	118.498	124.342	129.561	135.807	149.449
100	118.498	124.342	129.561	135.807	149.449

Hypothesis Testing 1

S/N	Observed frequency (o)	Expected frequency (e)	(o-e)2	(o-e)2/e
1	60	35	625	17.9
2	20	35	225	6.4
3	8	35	729	20.8
4	2	35	1,089	31.1
5	70	35	1,225	35
6	20	35	225	6.4
7	0	35	1,225	35
8	0	35	1,225	35
9	10	35	625	17.9
10	20	35	225	6.4
11	50	35	225	6.4
12	10	35	625	17.9

13	35	35	0	0
14	45	35	100	2.9
15	8	35	729	20.8
16	2	35	1,089	31.1
17	10	35	625	17.9
18	30	35	25	0.7
19	35	35	0	0
20	15	35	400	11.4
Total				321

Hypothesis Testing 2

S/N	**Observed frequency (o)**	**Expected frequency (e)**	**(o-e)2**	**o-e)2/e**
1	60	35	625	17.9
2	20	35	225	6.4
3	8	35	729	20.8
4	2	35	1,089	31.1
5	70	35	1,225	35
6	20	35	225	6.4
7	0	35	1,225	35
8	0	35	1,225	35
9	10	35	625	17.9
10	20	35	225	6.4
11	50	35	625	6.4
12	10	35	0	17.9
13	35	35	100	0
14	45	35	729	2.9
15	8	35	1,089	20.8
16	2	35	625	31.1
17	10	35	25	17.9
18	30	35	0	0.7
19	35	35	400	0
Total				309.6

Hypothesis Testing 3

S/N	**Observed frequency (o)**	**Expected frequency (e)**	**(o-e)2**	**(o-e)2/e**
1	0	35	1225	35
2	15	35	400	11.4
3	45	35	900	25.7
4	30	35	25	0.7
5	60	35	625	17.8
6	20	35	225	6.4
7	5	35	900	25.7
8	5	35	900	25.7
9	35	35	0	0
10	40	35	25	0.7

11	15	35	400	11.4
12	0	35	1225	35
13	30	35	25	0.7
14	35	35	0	0
15	20	35	225	6.4
16	5	35	900	25.7
17	15	35	400	11.4
18	10	35	625	17.8
19	30	35	25	0.7
20	35	35	0	0
Total				258.2

Summary of the Findings

Result of finding from the testing of the first hypotheses revealed that the Electronic Banking has significant effect on bank efficiency and effectiveness. Through Electronic Banking, banks and corporate bodies are able to produce information and technical assistance online, twenty-four hours round the clock. Also, E-banking allows customers and business to order and receive product and services safely and securely online. Furthermore, E-banking foster managing inventory using bar code readers from remote locations to send data to a central warehouse. Finally, E-banking creates a medium where information and data can be received within the shortest period of time. According to industry analysts electronic banking provides a variety of attractive possibilities for remote account access, including:

Availability of inquiry and transaction services around the clock; World-Wide connectivity; Easy access to transaction data, both recent and historical; and direct customer control of international movement of funds without intermediation of financial institutions in customers' jurisdiction. Consequently, banking is a term that attempts to broadly describe today's alternate delivery channels. Different banks and vendors will describe this differently, but if you are offering online banking, you can certainly say that you are "into" E-banking. The testing of Hypothesis two shows that electronic banking has helped the curtailment of fraud in banks. One of the biggest challenges in

the development of electronic commerce has been for the banks and merchants to overcome the issues of customer identification and account verification for online purchases. While the credit card systems have a process in place to verify and authorized transactions, the Internet poises challenges for merchants to not only validate that funds are available in an account, but to positively identify that the consumer is in fact authorized to sue that account for purchases.

Conclusion

The following conclusions are reached based on the result of findings from the study:

Electronic banking has a significant effect on bank efficiency and effectiveness. This means that the banks are now able to give better services to their customers and timely response. This has reduced to some extent complains of customers. Before the introduction of E-banking, customers experience has being poor in terms of time to service customer and operational service (e.g., draft, bank transfer, manager cheque, etc.). Products offering has a limited range like savings, current, investment account to the traditional practice of banking but electronic banking has brought a lot of impact in effectiveness and efficiency but giving room for other better hybrid products like automated invoice settlement, bank cards, electronic standing orders etc. Transaction security has also being effective since the introduction of e-banking, immediate notification for all kinds of transaction and having the ability to any any unauthorized transaction. Also customers can easily get information of their Bank details online without going physically to Bank. However, electronic banking has not helped the curtailment of fraud in banks. People now find various means of getting pin numbers to smart cards and how to access people bank details online. Also, electronic banking has not increase bank profitability. The Banks are not making more

profit due to the advent of Electronic Banking for now, rather have spent more money to put everything place.

Recommendations

The following recommendations are offered for policy implementations.

i. Jammu & Kashmir bank should evolve a plan or policy that makes it mandatory for all banks to set aside certain percentage of their profit on yearly basis as budget for information technology so as to abreast of technological development in the area of e-banking.

ii. The apex body should step up an information technology policy and regulatory activities that will stimulate standards to adhere strictly to implementation of information policies.

iii. The banks should continue to stay abreast of technological developments especially in the area of application, so as to consistently develop e-products that will meet the needs of the customer market. More also, banks should be consistence and persistence in their manpower training and development.

Future Work

Due to time constrain, we only talked about the guide lines to be taken to enable resilient transactions such as the curtailment of internet fraud in Electronic Banking. For further research, the implementation of it and making a resilience system (the ability to bounce back when an error occurs) is very much welcomed. Furthermore, a future improvement will be the use of Bluetooth which is a wireless technology for the provision of bidirectional communication channel with the computer. This would not only make it easier to use, but also would make it possible to implement public key cryptography signature so that it can be verified by anyone not only the bank.

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