

# Banking Analytics - Information Technology Adoption in Indian - A Comparative Study

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## Abstract

With the economic and financial sector reforms introduced in the country since early 1990s, the operating environment for banks in India has also undergone a rapid change. To survive in this competition, the information and communication technology significantly contributed to the exponential growth and profit of financial institutions worldwide. Indian banks have been late starter in the adoption of technology for automation of processes and the integrated banking services. But with the global adoption of technology, Indian banking is also at the threshold of paradigm shift due to the latest changes. After liberalization RBI made several changes in the basic structure of banking sector and laid down numerous guidelines on electronic banking, fund transfer, core banking solution, payment system, clearing services, and internet banking. So, it becomes necessary for the banks to adapt sweeping changes in technology. This research is an effort to see whether e-banking has any impact on the employment needs and operational performance of public and private sector banks. The present paper studies the impact of e-banking on operational performance taking into consideration the comparative analysis of public and private sector banks. With the introduction of core banking solution, electronic fund transfer, real times gross settlement system and electronic clearing services, there is a major change in the methods of performing their duties and improvement in the productivity and operations. The present study has been undertaken on public and private sector banks separately and results has been drawn on the basis of mean scores.

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## I. Introduction

The last decade has witnessed a drastic change in the economic and banking environment all over the world. With the economic and financial sector reforms introduced in the country since early 1990s, the operating environment for banks in India has also undergone a rapid change. To survive in this competition, the information and communication technology significantly contributed to the exponential growth and profit of financial institutions worldwide. Technology is the key to move towards providing integrated banking services to customers. Indian banks have been late starter in the adoption of technology for automation of processes and the integrated banking services. But with the global adoption of technology, Indian banking is also at the threshold of paradigm shift due to the latest changes. There are various factors which have played vital role in the Indian banking sector for adoption of technology.

Firstly, the economic reforms introduced by the government almost fifteen years back which resulted in opening up of new vistas for banks outside the world. Government relaxed rules and regulations, and simplified the processes for the FII to make investment in the banking and various sectors. This resulted in inflow of large funds in the economy thereby improving the economy as a whole and banking sector in particular. Due to this reason, banks need to provide such services, which satisfy the urge of foreign investors. Secondly, as a part of reforms Indian banking was opened for private sector by which old and new private sector came into limelight. They gave a big boost to technology and created a platform to use it for backside and front-side operations. When they started adopting it, this put a tremendous pressure on the nationalized and public sector banks. With the result of such healthy and competitive environment, overall banking system became more work prone, efficient and techno-savy. Thirdly, for the economic development of a country, infrastructure plays a vital role. In the last few years, with the development of telecom sector, communication infrastructure, BPOs, the entire country became a single hub of transmitting the information and the major cities got connected with one another, which helped in the reduction of total cost. This had directly helped banks. During the same period banks were busy in connecting their branches with centralized database and core banking solution by offering anywhere, anytime services. Fourthly, Indian software industry has also impacted

the Indian banking sector. To provide excellent services to the customers, banks need to have web based portals, wide area network (WAN), local area network, internet, etc. and all these services are provided by the software industry to Indian banking at reasonable prices and at the right time. Fifthly, most of the banks in public as well as private sector have technology thrust from RBI to adopt the changes in order to improve the operational efficiencies, security measures, risk reduction and quality up-gradation. After liberalization RBI made several changes in the basic structure of banking sector and laid down numerous guidelines on electronic banking, fund transfer, core banking solution, payment system, clearing services, and internet banking. So, it becomes necessary for the banks to adapt sweeping changes in technology. Further, Indian Banking Association (IBA) has helped banks to create a forum to discuss various issues on computerization and automation of processes which further resolve the problem of adaptation. This change somehow affects the human resources of the banks as there is a change in their working hours, processing time and IBA created a very convenient environment to resolve the issue directly. Last but not the least one is the role played by Central Vigilance Commission for the facilitation of branch computerization by issuing the directive measures for speeding the branch computerization process. This issue was directly related to improve the vigilance administration in the banks. This helps in improving the automation process and to take strict action for the banks, wherever required.

All the above factors led to transformation in the Indian banking sector, and with the advancement and adoption of technology a lot of changes have been made in payment system and banking system as a whole. This evolution has transformed the way banks deliver their services using technologies and electronic modes. Now banks can reach their customers anywhere, anytime; and customers are able to get instant access to their accounts from any corner of the globe anytime. With increasing competition the customers are also becoming more demanding. To meet customers' expectations banks will have to offer wide range of services like ATM's, telephone banking, mobile banking etc. by upgrading their branches. The key to attract and retain the customers lies in efficient customer service including customized and value added products to meet various needs of individual customers as well as to meet the diverse needs of customers.

But the profitability of the banks and the qualitative services to the customers could be provided only if the employees working in the banks are familiar with the usage of technology. Because they are the people behind the scene who make possible the required benefits to the customers and the banks. This research is an effort to see whether e-banking has any impact on the employment needs and operational performance of banks.

## **II. LITERATURE REVIEW**

Many studies have been conducted at the national and international level to study the impact of e-banking on operational performance, productivity and profitability of banks. **Idowu, P.A. et.al (2002)** highlighted that information technology is rapidly changing the banking industry. The author evaluated the impact of IT on banking industry in Nigeria. The study revealed that IT had appreciable effects on bank productivity, cashiers work, banking transaction, bank patronage, bank service delivery, customers' services. **Singh and Chatwal (2002)** described that technology has provided customers new ways of delivering the products. Bank began to look e-banking as a mean to replace traditional banking. As customers became more sophisticated it become imperative for banks to consider the use of technology to respond to their continuously changing requirement. **Gurau (2002)** analyzed the situation of online banking in Romania and the appropriate strategies for successful implementation and development of online banking services in the Romanian context. The author revealed that successful introduction of e-banking services proved to be a complex operation which requires the harmonization of all interacting elements of economic and financial system. **Aki (2002)** highlighted the impact of management of technology in banking. The researcher evaluated that new technologies cannot replace the branch network as a means of collecting local customer information and satisfying their needs but it can support new methods of service provision and analyze codified information. **Arora(2003)** made an attempt to prove that technology had a definitive role in facilitating transactions in banking sector and the impact of technology had resulted the introduction of new products and services by various banks in India. The author discussed various initiatives taken by the banks to manage transformation and these initiatives had brought customers the much demanded convenience of anywhere, anytime banking. **Paul (2006)** discussed the role of technology and scope of remote channels ,their implication, strength, weakness, opportunity and threat in banking sector. The researcher found that with the introduction of RTGS, NDS, CFMS safety, security, efficiency and soundness in payment system has increased. The author revealed that the technology has a great impact on structure of banking sector in the form of bank branches, bank personnel and alliances.

The above review indicates that e-banking has influenced the operational performance of banks in India. But there has not been any systematic and comprehensive analysis to study its impact taking into view the perception of employees. So, this paper tries to fill this research gap and evaluate the impact of e-banking on the operational performance of banks by considering the view point of employees.

The whole paper has been divided into three sections. Section-I discusses the database and research methodology and a brief description about the sample. Section-II is applied to compute the difference of mean scores between public and private sector in different parameters like e-banking impact on workload of employees, personal development and relations, processing of transaction, Convenience and Security, Employees' Perception on Core Banking Solution. Section-III discusses the summary, conclusion and recommendations of the study.

**NEED, OBJECTIVE AND RESEARCH METHODOLOGY:**

The present paper studies the impact of e-banking on operational performance taking into consideration the comparative analysis of public and private sector banks. With the introduction of core banking solution, electronic fund transfer, real times gross settlement system and electronic clearing services, there is a major change in the methods of performing their duties and improvement in the productivity and operations. E-banking has led to change in working hours, reduction in processing of work, employee productivity, decision-making processes, working conditions, relationship of employees with the bank and customers, etc. Further, centralized data base, online data availability, any branch banking, paperless transactions and up-to date information have led to sweeping changes in productivity and operational performance of the banks. The specific objectives of the paper are to study the impact of e-banking on workload of employees, to know employees perception on convenience and security, to have an insight about the employees' perception on modes of e-payment. The present study has been undertaken on public and private sector banks separately and results has been drawn on the basis of mean scores.

**Sampling and Data Analysis:**

The study is mainly based on the primary data collected from the employees working in the banking sector of Punjab region confined to five districts, viz. Ludhiana, Patiala, Jalandhar, Bathinda and Mohali with the help of a well drafted pre-tested questionnaire. Sample of 100 employees was drawn from seven banks in all, four from the public sector and three from the private sector. These banks include State Bank of India, Punjab National Bank, Canara Bank, Bank of Baroda, HDFC Bank, ICICI Bank and AXIS bank. A specifically designed questionnaire was used as tool, and bank employees were requested to fill it during office hours. Different branches from different regions were selected for the purpose. At least five employees from every branch were requested to fill the questionnaire. The respondents were selected among the people working at different levels like executive manager, assistant manager, relationship manager, branch manager, officer, cashier, clerk, front desk executive. Some of the employees refused to respond due to lack of time especially from the private sector banks. Descriptive analysis was used to present the profile of respondent. It includes average, frequency and percentage of data value for each of the variables etc. T-test was used to study the level of significance for services between the public and private sector banks. SPSS 22 versions is used to analyze the required data. Following table indicates the demographic profile of employees working in various public and private sector banks.

**Table 1  
Socio-economic Profile of Employees**

Socio-economic Indicators	Frequency	Cummulative Percentage
<b>Gender</b>		
Male	66	66
Female	34	34
<b>Total</b>	100	100
<b>Age</b>		
Below 30 yrs.	43	43
30-40 yrs.	35	78
40-50 yrs.	20	98
50-60 yrs.	2	100
<b>Total</b>	100	
<b>Educational Qualification</b>		
Matric and Undergraduate	2	2
Graduate	23	25
Post-graduate	49	74
Professional Degree	26	100
<b>Total</b>	100	
<b>Experience</b>		
Below 5 yrs.	40	40
5-10 yrs.	32	72
10-15 yrs.	13	85
15-20 yrs.	15	100

Total	100	
<b>Position</b>		
Executive Manager	15	15
Assistant Manager	15	30
Branch Manager	13	43
Clerk	22	65
Cashier	17	82
Front Desk Executive	10	92
Senior Officer	8	100
<b>Total</b>	100	

In this part, T-test was applied to compute the difference between public and private sector in different parameters like e-banking impact on workload of employees, personal development and relations, processing of transaction, Convenience and Security, Employees' Perception on Core Banking Solution. This test helps to signify the statistical difference between different variables and the scope of further improvement through their mean values.

**Table 2**  
**Sector-wise Employees' Perception on Workload**

Statements	Public	Private	t-value	p-value
Increase in no. of Hours	3.90	4.02	-0.713	0.477
Increase in Decision Making Process	3.74	3.66	0.545	0.587
Division of Work	3.70	3.84	-0.693	0.493
Increase in Productivity	4.02	4.12	-0.536	0.594
Increase in Knowledge	3.98	4.12	-0.816	0.416
Reduction in Processing Time	3.72	3.62	0.990	0.890
Team Performance	3.60	3.62	-0.100	0.920
Minimization of Cost	3.60	3.50	0.450	0.653

\* Values are significant at 5 % level

Table 2 shows no statistical difference in any of the statement between two sectors regarding the workload of employees in public and private sector banks. However the mean score of private sector banks are higher than the public sector in five out of eight statements. Insignificant difference implies that e-banking has equal effect on the workload of employees in both the sectors.

**Table 3**  
**Sector-wise Employees' Perception on Personal Development and Relations**

Statements	Public	Private	t-value	p-value
HR Policies of the Bank	3.68	3.56	0.566	0.572
Environment after E-banking	3.86	3.56	1.621	0.108
Training to Employees	3.72	3.54	0.969	0.334
Knowledge up Gradation	3.54	3.60	-0.291	0.771
Relationship between Employee and customer	3.62	3.58	0.205	0.883
Relationship between Employee and Employee	3.64	3.62	0.098	0.922
Guidance to Customer	3.64	3.48	0.819	0.414
Promptness in Providing Service	3.70	3.90	-0.902	0.369

\*\* Values are significant at 5 % level

Table 3 represents knowledge enhancement and improvement in the relationship with customers after e-banking adoption. Employees of both the sectors perceive that e-banking has upgraded their knowledge, relationships and promptness in providing the service. Regarding HR policies (3.68), environment (3.86), training to employees(3.72), relationship (3.62) and guidance to customers(3.64); public sector employees are more satisfied with e-banking adoption. This implies that public sector banks are fastly adopting the modes of e-banking. Further public sector banks are also giving excellent training to its employees to achieve all the efficiencies.

**Table 4**  
**Sector-wise Employees' Perception on Processing of Transaction**

Statements	Public	Private	t-value	p-value
Time Taken in Transaction Now	3.66	3.96	-1.342	0.182
Responding Queries of the Customer	3.56	4.02	-2.161	<b>0.003**</b>
Complexity in Transactions	3.30	2.96	1.579	0.115
Time Taken in Making of Draft	3.94	3.80	0.603	0.547
Availability of Staff at Counter	3.52	3.82	-5.306	<b>0.000**</b>
Banking Hours	3.60	3.58	4.38	<b>0.000**</b>
Knowledge of Staff about Banks Products	3.74	4.35	-2.416	<b>0.017**</b>

**\*\*Values are significant at 5 % level**

Table .4 displays the data regarding the processing of transactions in both public and private sector banks. Regarding the processing of transaction, statistical difference was found in four out of seven statements. Private sector banks are more responsible and quick in responding the queries of customers(4.02) than public sector banks (3.56). As regard the knowledge of staff about bank products(4.55); private sector banks are highly satisfied with their knowledge up-gradation and perceive that e-banking has reduced the availability of staff at counter(3.82) and has reduced the banking hours to the large extent.

**Table 5**  
**Sector-wise Employees' Perception on Convenience and Security**

Statements	Public	Private	t-value	p-value
Ease of Use	3.80	4.66	-3.524	<b>0.000**</b>
Reduction in Monotony of Work	3.70	4.28	-3.185	<b>0.001**</b>
Security and Privacy	3.88	3.80	0.402	0.688
Increase in Trust	3.80	3.68	0.645	0.520
Reduction of Risk	4.12	3.58	2.878	<b>0.004**</b>
Job Losses	2.88	2.88	0.000	1.000
Reduced Interaction with People	3.63	3.50	0.463	0.644

**\*\* Values are significant at 5 % level**

Table 5 depicts that as per employee perception in three out of seven statements, statistical difference found to be significant at 5% level. Private sector employees perceive that e-banking services are easy to use (4.66) and has also reduced the monotony(4.28). However, public sector banks have high mean score with regard to reduction of risk in transaction(4.12) after e-banking adoption. Regarding the job losses and interaction with the people, trust and privacy, there seems to be no statistical difference in public and private sector banks.

**Table 6**  
**Sector-wise Employees' Perception on Core Banking Solution**

Statements	Public	Private	t-value	p-value
Facilitate Centralized Data Base	4.18	3.68	-5.069	<b>0.000**</b>
Online Real- time Data Availability	3.78	3.58	-0.909	0.365
Any Branch Banking	4.06	3.80	-1.38	0.168
Facilitative Launch of New Products	3.96	4.08	0.616	0.539
Shifting of Time Consuming Activities to Data Centre	3.74	3.80	0.239	0.811
High Load on Concentrated Branches	3.52	3.62	0.425	0.671

**\*\*Values are significant at 5 % level**

Table 6 reveals that the difference between item number 2,3,4,5,6 under core banking solution is insignificant. The difference was significant at 5% level only in one dimension namely 'facilitating the centralized data base' and public sector employees seems to have more agreed upon it (4.18) in comparison to private sector banks (3.68). In the all other dimensions, there seems to be no statistical difference.

**Table 7**  
**Sector-wise Employees' Perception on Electronic Data Interchange**

Statements	Public	Private	t-value	p-value
Reduces Inventory Holdings	3.92	3.88	0.200	0.842
Reduces Mailing Costs	3.74	3.78	-0.197	0.844
Automatic Reconciliation of Remittance	3.74	3.78	-0.214	0.831
Less Reliance on Human Interpretation	3.82	3.74	0.408	0.684
Enables Paperless Transaction	3.92	4.60	-2.999	<b>0.003**</b>

**\*\* Values are significant at 5 % level**

Table 7 carries the data showing EDI impact on both public and private sector banks. E-banking has facilitated centralized data base and ensured the interchanging of data electronically which has ensured reduction of paper transaction, mailing cost, less reliance on human interpretation etc. The difference was significant in one variable in EDI that is e-banking has 'ensured paperless transaction' and private sector banks employees are strongly agreed upon it (4.60). The employees in public sector perceived that EDI has reduced the reliability on human interpretation (3.82) as every single and small activity is done through computer based terminals.

**Table 8**  
**Sector-wise Employees' Perception on Real Time Gross Settlement System**

Statements	Public	Private	t-value	p-value
Processing and Settlement on Real Time	4.02	3.72	1.442	0.152
Payment are Settled Transaction by Transaction	3.88	3.60	1.452	0.149
Eliminated Settlement Risk	3.84	3.58	1.261	0.210
Immediate Finality of Transaction	3.88	3.68	1.010	0.315
Settlement on FIFO Basis and Priority Wise	3.30	3.52	-0.947	0.346
Immediate Credit and Transparent Pricing	3.60	4.40	-3.305	<b>0.001**</b>

**\*\* Values are significant at 5 % level**

Table 8 depicts that as per the employees' perception both the public and private sector banks are performing well as far as real time gross settlement system is concerned. It has improved the operational performance of the banks to a large extent. The statistical difference was significant only in one statement related to the immediate credit and transparent pricing. Private sector banks are having greater transparency in the pricing as well as settlement and transfer of credit in the transactions.

**Table 9**  
**Sector-wise Employees' Perception on Benefits of E-banking**

Statements	Public	Private	t-value	p-value
Increase in Employee Productivity	4.08	4.16	-0.431	0.667
Increase in Branch Productivity	3.98	4.10	-0.713	0.477
Increase in Bank Productivity	3.78	4.08	-1.623	0.107
Up-to date Information	4.00	4.08	-0.370	0.712
Innovation in Products and Services	3.72	3.80	-0.366	0.715
Rush of Customers in Bank	3.40	3.58	-0.697	0.487

**\*\* Values are significant at 5 % level**

The data pertaining to the benefits of e-banking and their impact on the overall working of both public and private sector banks has been presented in Table 7.30. Employee productivity has increased more in private sector banks (4.16) than in public sector banks (4.08). Branch productivity (4.10) is also high in private sector banks. The impact of e-banking on the overall bank productivity (4.08), up-to-date information (4.08), innovation in products and services (3.80), and rush of customers in the banks (3.58); private sector banks has been greater than that of the public sector banks. This shows that operational performance of private sector banks has improved a lot through electronic banking and public sector banks lag behind in this regard.

The above tables highlighted the perception of employees regarding the strategic and operational value of electronic banking and its impact on their working conditions and performance of the banks has been studied. It has been observed that both public and private sector banks are providing electronic banking services to their customers under the guidelines of the Reserve Bank of India and to retain their customers in the competitive financial market. The employees also believe that these services are essential for the survival and growth of banking sector. So, it is mandatory to provide such services, and employees also feel comfortable in this e-banking environment. This perception is supported by the fact that a large number of employees gave supportive and positive response regarding e-banking usage in their respective banks and its impact on banks efficiency and productivity.

### III. Findings of the Study

- The study made a comparative analysis to measure the operational performance between public and private sector banks. T-test was applied to calculate the difference between different variables and the scope of further improvement through their mean values.
- Regarding the impact of E-banking on workload of employees, there is no statistical difference in any of the statement between two sectors. However the mean score of private sector bank is higher than the public

sector in five out of eight statements. As far as the personal development of employees and knowledge enhancement is concerned, again, no significant difference was found in any dimension.

- Employees of both the sectors perceive that e-banking has upgraded their knowledge, relationships and promptness in providing the service. Regarding HR policies, environment, training to employees, relationship and guidance to customers, public sector employees are more satisfied according to their mean score.
- A difference between public and private sector banks with regards to processing of transactions has been studied. Statistical difference was found in four out of seven statements. As regard the knowledge of staff about bank products, private sector banks are highly satisfied with it and perceive that e-banking has reduced the availability of staff at counter
- The results for convenience and security dimension show a significant difference in three out of seven statements. Private sector employees perceive that e-banking services are easy to use and has also reduced the monotony. Public sector banks has high mean score with regard to reduction of risk. Regarding the job losses and interaction with the people, trust and privacy, their seems to be no difference.
- As regards the core banking solution is concerned, the difference was significant at 5% level in the dimension facilitating the centralized data base and public sector employees seems to have more agreed upon it.
- The difference was significant in one variable of electronic data interchange that is 'e-banking has ensured paperless transaction' and private sector banks employees are strongly agreed upon it. The employees in public sector also feel that it has reduced the reliability on human assets as every single and small activity is done through computer based terminals.

#### **IV. CONCLUSION**

From an operational perspective, the study indicates that banks have realized significant benefits with e-banking. Firstly, e-banking lowers the transaction per cost, thus, contributing to the cost cut and helpful in making the cost cutting policies. Secondly, e-banking offers a lot of services to customers like debit cards, credit cards, EFT, fund transfer, bill payment, etc. Revenue generated from such services is termed as value addition and profit generated for the banks. Thirdly, launching of more products like internet, ATM, mobile banking, etc. has improved the quality of service and increased the transactions in banks. It has been due to these benefits that banks are opting e-banking services at a large scale. The customers demand more and more new e-banking services, making it difficult for the banks to come up to their expectations. But with the co-operation, adoption and fast learning process of the employees, e-banking has revolutionized the system as it is easily adaptable, more responsive and has become more customer-oriented which, in turn, has improved the operational performance and productivity of the banks.

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