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ADOPTION OF INFORMATION TECHNOLOGY IN BANKING INFRASTRUCTURE FOR OPERATIONAL EFFICIENCY IN ORGANIZATIONAL PERFORMANCE.

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Abstract:
This paper investigates whether IT capability bank can create economic value and competitive advantage. The study is based on the influence of banking technology on infrastructure of a Public Sector Bank (called PSB hereafter) and a Foreign Bank (called FB hereafter). For successful organization technological prospective and business strategy must go hand in hand in order to enhance its working capabilities and also to gain a competitive advantage over others the objectives of this paper are to find out the measure deficiency in the IT infrastructure between these banks and also to evaluate its operational efficiency. An analysis by the Computer giant IBM predicts that over the next decade, the pace of technological innovation would reinforce Darwin's Law of the 'Survival of the fittest' and as a result banks are using efficient Management Information System (MIS) and strong technology adoption in working than its competitors.

This micro study will evaluate the IT skills and capabilities of employees working in these banks. As, infusion of IT in banking operations had become a strategic resource. The term 'efficiency' in real sense is concerned with-the physical aspect of the actual operational performance of a specific task." It indicates how work is being done; how effectively and efficiently the man-power, money and materials are being utilized to accomplish a task. The study covers an analytical study and anatomy of these bank's & its performance in the realm of functions, role, organizational structure and electronic banking services.

IT can provide strategic vision and long term sustainability to the organization. Hence through this research study we can conclude that IT is the lifeline that runs through the heart of the banking sector.

Keywords: *Banking Infrastructure, Information Technology competitive advantage*

Introduction

The banking industry today is truly at cross roads now , with technology aiding globalisation and integration of world's financial markets there has been a quantum jump in the expectation of customers for newer information technology(called IT hereafter) innovated products and its alternative delivery channels. Banks, in particular have been increasingly using IT in their day to day operations. An analysis by the Computer giant IBM predicts that over the next decade, the pace of technological innovation would reinforce Darwin's Law of the 'Survival of the fittest' and as a result they are using efficient Management Information System (MIS) and strong technology adoption in working than its competitors.' Banks can substantially enhance their performance by using twin strength of (i) MIS and (ii) Technology. The range of financial products and services should be offered at the lowest cost to both institutional and individual consumers, namely, borrowers, investors, depositors and risk managers. In this regard, improvement in productivity and higher returns on assets for the financial institutions will need to be realized through greater penetration of efficient and low cost delivery channels, access to scale advantages in processing, procurement and other back-office functions, and leveraging on world-class skills. This operational efficiency in these organisations can be achieved through greater investment in technology and skill enhancements.

It is expected that the Indian banking and finance system will be globally competitive. For this, the market players will have to be more financially strong and operationally efficient. Capital would be a key factor in building a successful institution. The banking and finance system will improve competitiveness through a process of consolidation, either through mergers and acquisitions through strategic alliances. Information technology would be the key to the competitiveness of banking and finance system. Indian players will keep pace with global leaders in the use of banking technology. In such a scenario, on-line accessibility will be available to the customers from any part of the globe; ‘Anywhere’ and ‘Anytime’ banking will be realised truly and fully. E-banking and Internet banking have opened new avenues in “convenience banking”. Internet banking has also led to reduction in transaction costs for banks to about a tenth of branch banking. Technology solutions would make flow of information much faster, more accurate and enable quicker analysis of data received. This would make the decision making process faster and more efficient. For the Banks, this would also enable development of appraisal and monitoring tools which would make credit management much more effective. The result would be a definite reduction in transaction costs, the benefits of which would be shared between banks and customers. While application of technology would help banks reduce their operating costs in the long run, the initial investments would be sizeable. IT spent by banking and financial services industry in USA is approximately 7% of the revenue as against around 1% by Indian Banks.

With greater use of information technology solutions, we expect IT spending of Indian banking system to go up significantly. This is one of the areas, where the entire banking system can reduce the investment costs in technology applications is by sharing of their IT facilities. We are already seeing that banks are coming together to share their ATM Networks. Similarly, in the coming years, we expect to see banks and other financial institutions coming together to share their facilities in the area of payment and settlement, back office processing, data warehousing, etc. While dealing with technology, banks will have to deal with attendant operational risks. This would be a critical area where, the bank management will have to deal with in future.

This research study is based on utility and benefits of IT infrastructure provided by these two banks working in Indian economy. Here we make an attempt to present a micro study of a PSB & a FB. This

choice is influenced by their historical importance & presence in their respective economies, as these two have always enjoyed a special status in the banking arena. These banks are leading banks in their respective area and they are now in the process of establishing a better IT infrastructure in upcoming years. Today they are moving away with a niche strategy by, the better use of technology and deft harnessing of India's managerial talent pool.

Until the mid-1990s, not a single Indian PSB was offering its customers ATM and tele- banking facilities. There were only 60 ATMs in the country, nearly all of them belonging to FBs. But now, there are 21000 ATMs in the country, mostly belonging to Public sector banks. This would help in building robust credit assessment skills, marketing savvy, strong technology-enabled processing capabilities, and a retail credit recovery system in banks. A revamp of operations and strategy has to be accompanied by radical restructuring and the implementation of performance management. High-performance of FBs and their potential to become universal banks or large-scale national bank. They have been ahead in capturing profitably & emerging opportunities of the banking sector.

Significance of the study:

Enterprise-wide IT infrastructure was part of Indian banks way back in the last decade of the 20th century. Despite severe resistance in the initial period regarding the use of IT infrastructure in the Indian banks, they were able to steadily grow with the use of IT and hence, several generations of IT infrastructure of banks can be clearly identified in the Indian banks. For instance, starting with the advanced ledger posting machines (ALPM) to the present core banking solutions, there are clearly differentiated IT infrastructures used in the banking sector. Over the years, great improvements have occurred in the quality of the IT infrastructure used. However, the impact of IT infrastructure and the impact of the changes in the IT infrastructure of banks on the organization have not been clearly understood, despite immense research in related areas. Each time an IT infrastructure is selected to be deployed, an elaborate exercise is followed to ensure that the system suits our needs. But post-deployment, no evaluation is done to ensure that the system works as we planned. No instrument exists for the measurement of operational efficiency& effectiveness of IT infrastructure of the Indian banks.

The primary aim of any organisation is to properly harness and handle these vital resources. One of the important aspects of this study is to identify the major issues between deficient IT infrastructures of this PSB and efficient IT infrastructure of this FB. For a successful organisation technology and business strategy must go hand in hand. IT has become an essential element of firm capability and a source of sustainable competitive advantage. The unavailability of publicly available data, and the accelerated pace of IT innovation. The possible interactive effects between IT and human resources, and the intangible nature of IT capability are among the obstacles that hinder an understanding of whether and how IT can create value for a firm. Another explanation for the inconclusiveness in the literature is that most studies dealing with the impact of IT on firm performance fail to explicitly distinguish (1) IT investment from IT capability and (2) value creation from firm profitability.

Review of literature:

Information technology infrastructure evaluation has been an area of active research right from the initial use of computer-based information systems in organizations. However, very few researchers have thought it necessary to undertake an in depth study of the reasons why information systems lacked effectiveness.

This research study was initiated by looking into the extant literature and practice, to understand whether IT infrastructure of these banks were effective i.e.; to understand whether IT infrastructure of banks had a positive impact on the organisations. The thrust is to find out the extent to which IT contributes to the improvement in organizational effectiveness and operational efficiency. A detailed literature review was done. It was rather surprising to note that the technological improvement has happened in a big way and many of the organisational and management issues related to IT infrastructure effectiveness seems to have been addressed. We have taken a literature review from two points of view, in order to make a comprehensive review. This has detailed as following:

Studies done from the global perspective:

Although the relationship between IT capability and a firm's performance has long been an important research topic, conclusive evidence about whether IT contributes to a firm's productivity is not available On the one hand; several studies find a positive correlation between IT spending and business profitability. Brynjolfsson and Hutt, Suggest that the value of IT should be measured by intangible dimensions such as improvements in quality, customer service and new product development. A key issue facing IT researcher and practiceners is the difficult of realizing the full potential of IT.

Bakos and Kernerer, has identify three different types of IT values. 1. Normative Value (based on expected values) 2.Reaiest value (based on observed out comes). 3. Percived value (based on subjective user evaluations). The greater the value to customers of the firm's tangible and intangible products compared to rivals, the greater the general manager's ability to avoid threats and take advantage of opportunities. In a cross-country study, La Porta, Lopez-De-Silanes, and Shleifer (2002) found that the performance of government-owned banks is inferior to that of FBs. Claessens, Demirgüc-Kunt and Huizinga (2001) investigate performance differences between domestic and FBs in eighty countries, both developed and developing, over an eight-year period from 1988 to1995.

Much of the empirical literature on banking in transition countries addresses the impact of FB entry on banking efficiency. Hasan and Marton (2003), Drakos (2003), Fries and Taci (2003) demonstrate that the entry of more efficient FBs creates an environment that forces the entire banking system to become more efficient, both directly and indirectly, in transition countries. Bunzel et al. in their research paper investigates whether the firm Information technology (IT) capability of a firm can create economic value and competitive advantage. In contrast to past research, which generally assumed that IT investment leads to IT capability that in turn leads to competitive advantage, this study examines IT capability directly.

Studies done from the Indian perspective:

As to a firm's IT capability, the definition by Bharadwaj is very useful: "its ability to mobilize and deploy IT - based resources in combination or co-present with other resources and capabilities." Firm with superior IT capability enjoy superior financial performance by bolstering their revenues increasing productivity, and/or decreasing costs. Second, operational efficiency performance measures (such as productivity, returns on equity, and Tobin's Q) differ from effectiveness performance measures (such as economic value- added, market value - added, and IT-enabled strategic options). Much of the earlier research examined the correlations between IT expenditures and measures of profitability. Dewan and

Min, reported that excess returns on IT investment are associated with other factors of production, labour, and capital.

Mitra and Chaya, found that higher IT investments are associated with lower costs. Broadly speaking, this ratio reflects the allocative efficiency of financial intermediation, a lower ratio being indicative of higher efficiency. It is quite reasonable to believe that the decline in deposit rates ushered by the deregulation process will be manifested in the lending behavior of banks with several difficulties.

Early studies conducted by Sarkar, et al. (1998) found somewhat weak evidence to suggest that ownership was an important determinant of performance. More recent studies exhibit mixed evidence; while certain studies Keova (2003) suggest ownership to have some effect on bank performance, others e.g., Bhaumik and Dimova (2004) veer around the view that competition induced public sector banks to eliminate the performance gap that existed between them and both domestic and foreign and private sector banks. Harde.s, Kekre and Mukhopadhyay (1992) found that electronic data interchange systems had a positive influence on quality improvement and inventory reduction programs. The fact that research was able to link specific investments in IT to specific performance parameters led

Aims and Objectives:

1. To evaluate the operational efficiency of the IT infrastructure of these two banks. So that, their comparative analysis of productivity of E-banking service could be analysed.
2. To elaborate the inter-relationship between the IT infrastructure of these two banks also evaluate its advantage & disadvantage.

Research Methodology:

While pursuing a new field of study, it is always desirable to confine the work to a limited area so that a detailed and intensive data may be collected by adopting the case study method. It is necessary to select the sampling methodology according to the aims and objectives of the research. The proposed research will be based on the sampling method. The samples will be selected by tile combination of Random sampling, stratified sampling.

Here we had select 8 branches, from each of these two banks representing every zone of the study area through random sampling method. We had selected 10 employees (officials & staff) from each branch of these banks in the study area. In this way, 160 samples respondents will be selected for the survey work from these two banks. The study covers an analytical study and anatomy of performance in the realm of functions, role, organizational structure and electronic banking services. For the study, both primary and secondary data had been utilized. The Primary data had been collected through structured questionnaire and direct oral investigation.

Measurement of Objectives:

Entry of more efficient FBs creates an environment that forces the entire banking system to become more efficient, both directly and indirectly, in transition countries.. They find evidence confirming the hypothesis that FBs create a more competitive market environment in transition economies, but only after they have attained sufficient aggregate market share. These studies also examine the effects of IT infrastructure on government owned public sector banks.

To evaluate the operational efficiency of the IT infrastructure of these two banks. So that, their

comparative analysis of productivity of E-banking service could be analysed.

This research study finds that both of these bank's websites have similar features like, - product/services catalogues ,customized Web page or information provided for repeat clients, facilities for collecting customer information on line, A privacy policy statement, facilities of on line payment, and provisions of online after sales support etc. This has been detailed in the Table -.1. The data of survey reveals that PSB is only lacking in areas of Provisions of online after sales support, Customized web-page or information provided for repeat clients & Order tracking available on line whereas FB has all these facilities hosted on its website. Both PSB and FB banks provide their services through different delivery channels like branches, ATMs, Internet and Mobile banking and Call centers, Since, PSB has more branches, therefore the number of customers are more than FB in the study area.

Table -1: Comparative analysis of E-banking service of PSB & FB:

S. No.	E-banking services	PSB Officials	FB Officials
1.	Product/Services catalogues available on-line	Yes	Yes
2.	Customized web-page or information provided for repeat clients	No	Yes
3.	Facilities for collecting customer information on line	No	Yes
4.	A privacy policy statement	Yes	Yes
5.	Facilities of on line payment	Yes	Yes
6.	Provisions of online after sales support	No	Yes
7.	Order tracking available on line	No	Yes

Source: Based on Primary Data of the Survey.

Comparative analysis of IT security measures available at workplace of PSB & FB:

This research study finds that both of these bank's have similar IT security measures available at their workplace This has been detailed in the Table -2

Table-.2: Comparative analysis of IT security measures available at workplace

S.no	IT security measures available at workplace	PSB	FB
1.	Virus checking software is regularly updated	Yes	Yes
2.	Anti- spyware software which is regularly updated.	Yes	Yes
3	Fire wall	Yes	Yes
4.	Spam Filter	Yes	Yes
5.	Secured communication between Client and the Server	Yes	Yes
6.	Authentication software or hard ware for internal / external users	Yes	Yes
7.	Intrusion detection system	Yes	Yes
8.	Regular backup of data critical to your business operations	Yes	Yes
9.	Offside data backup	Yes	Yes
10.	No IT security measures in the work place.	Yes	Yes

Source: Based on Primary Data of the Survey.

The findings of survey reveals that Both PSB and FB banks have Virus checking software which is regularly updated and Anti- spyware software which is also regularly updated. Besides this, both of them have fire wall, spam filter, secured communication between client and the server, authentication software or hard ware for internal / external users. These state of the art IT security measures like- intrusion detection system, regular backup of data critical to your business operations, offside data backup had really improved the performance of these banks. These, IT security measures in the work place enhanced the efficiency of these banks in the study area.

To elaborate the inter-relationship between the IT infrastructures of these two banks also evaluate its advantage & disadvantage.

Advantage of installing IT infrastructure in banks:
Here, we have conducted a comparative study between PSB and FB about the advantage of installation of IT infrastructure at the work place. From the table – 3, it may be observed that the with the installation of IT infrastructure in banks had resulted an increase in so many associated factors like- higher productivity and increased efficiency etc. These factors were also an indicator of efficiency in the IT infrastructure between PSB & FB. The data mentioned in the table-3 shows that FB had a comparative advantage in IT infrastructure over the PSB.

Higher Productivity: It is obvious from the table - 3 that only 39(49%) of PSB respondents in the study area were of the issue that IT ifrastucutre had increased their productivity whereas 60(75%) of FB official were supporting the issue. Thus it may be observed from the responses that IT penetration level is more in FB.

Greater Efficiency: From the table -3 it may be observed that IT infrastructure has provided them greater efficiency to work. Only 52(65%) of PSB respondents in the study area were of the issue that IT infrastructure had increased their productivity whereas 65(81%) of FB official were supporting the issue. Thus, it may, be observed from the response rate that FB had a comparative advantage over PSB.

Better communication: The responses about the use of IT had improved the communication in the banks. Data presented in table – 3 depicts that Only 45(56%) of PSB respondents in the study area were supporting this issue, whereas 70(87.5%) of FB official were supporting this issue.

Accuracy& Reliability: It is obvious from the table – 3 that only 50(62.5%) of PSB respondents in the study area were of the issue that IT infrastructure had increased the accuracy& reliability their services, whereas 60 (75%) of FB official were supporting this issue.

Flexibility: The responses about the use of IT had increased the flexibility in the banks. Data presented in table – 3 observed that 53(66%) of PSB respondents in the study area were supporting this issue, whereas 62(77.5%) of FB official were in favour of this issue.

Reduction in unit cost: From the table – 3 it may be observed that IT infrastructure has provided them greater efficiency to work and reduced the transaction cost. Only 44(55%) of PSB respondents in the study area were of the issue that IT infrastructure had reduced their per unit transaction cost whereas 65(81%) of FB official were supporting this issue. Thus, it may, be observed from the response rate that FB had a comparative advantage over PSB.

Table- 3. : Advantage of installing IT infrastructure in banks

S. no.	Advantage of installing of IT infrastructure in banks	PSB Officials (Yes)	PSB Officials (No)	Total	FB Officials(Yes)	FB Officials(No)	Total
1.	Higher Productivity	39(49%) #	41(51%) #	80(100%)	60(75%)	20(25%)	80(100%)
2.	Greater Efficiency	52(65%)	28(35%)	80(100%)	65(81%) #	15(19%) #	80(100%)
3.	Better communication	45(56%) #	35(44%) #	80(100%)	70(87.5%)	10(12.5%)	80(100%)
4.	Accuracy& Reliability	50(62.5%)	30(37.5%)	80(100%)	60(75%)	20(25%)	80(100%)
5.	Flexibility	53(66%) #	27(34%) #	80(100%)	62(77.5%)	18(22.5%)	80(100%)
6.	Reduction in unit cost	44(55%)	36(45%)	80(100%)	65(31%) #	15(19%) #	80(100%)
7.	Handling of large data volume	53(66%) #	27(34%) #	80(100%)	68(85%)	12(15%)	80(100%)
8.	Development of new technology	50(62.5%)	30(37.5%)	80(100%)	70(87.5%)	10(12.5%)	80(100%)
9.	Increase in associated knowledge base	56(70%)	24(30%)	80(100%)	67(84%) #	13(16%) #	80(100%)
10.	Increase in market share	64(80%)	16(20%)	80(100%)	75(94%) #	5(6%) #	80(100%)

Source: Based on Primary Data of the Survey.

* Note: (i) Figures in Parenthesis represent row percentage of the officials of PSB & FB

(ii) # Figures in parenthesis have been rounded of to the nearest digit

Handling of large data volume: The response rate about the use of IT had it possible to handle large data set in the banks. Data presented in table – 3 observed that 53(66%) of PSB respondents in the study area were supporting this issue, whereas 68(85%) of FB official were supporting the above issue.

Development of new technology: From the table – 3, it may be observed that development of IT infrastructure had created new technology at the work place. Only 50(62.5%) of PSB respondents in the study area were of the issue that IT infrastructure develops new technology, whereas 70(87.5%) of FB official were in favour of this issue.

Increase in associated knowledge base: It is obvious from the table - 3 that only working in IT infrastructure increases the associated knowledge base, 56(70%) of PSB respondents in the study area were in favour of the issue , whereas 67(84%) of FB official were supporting the issue. . Thus, it may be observed from the response rate that FB had a comparative advantage over PSB.

Increase in market share: It is observed from the table - 3 that 64 (84%) of PSB respondents in the study area were of the issue that IT infrastructure had increased their market share, whereas a significant number of FB official 75(94%) were supporting this issue. Thus, it may be concluded from the response rate that FB has a competitive advantage over PSB in the study area.

Disadvantage of installing IT infrastructure in banks:

Here, we have conducted a comparative study between PSB and FB about the concerns of installation of IT infrastructure at the work place. From the table – 4 , it may be observed that there were so disadvantage associated with installing IT infrastructure in banks like- unauthorised access, computer virus, theft of money or data etc. These factors also depicts that IT infrastructure of FB is more efficient

than the PSB. These factors were also an indicator of deficiency in the IT infrastructure between PSB & FB. The data mentioned in the table - 3.2 shows that FB had a comparative advantage in IT infrastructure over the PSB.

Unauthorised access: It is obvious from the table - 4 that only 43(54%) of PSB respondents in the study area were concerned about the increased unauthorised access of IT infrastructure in their bank, whereas 15 (19%) of FB official were concerned about the fact. Thus it may be observed from the response rate that IT infrastructure is more efficient in FB.

Computer Virus: From the table- 4, it may be observed that IT infrastructure of these banks had a threat of computer virus. Only 17 (21%) of PSB respondents in the study area were in favour of the issue, whereas 14(17%) of FB official were supporting this issue in the study area.

Theft of money or data: The responses about the use of IT had increased the theft of money or data in the banks. Data presented in table – 4 depicts that Only 10 (12.5%) of PSB respondents in the study area were supporting this issue, whereas 5(6%) of FB official were supporting this issue.

Little knowledge of operating computer: It is obvious from the table - 4 that only 10(12.5%) of PSB respondents in the study area were concerned about their little knowledge of operating IT infrastructure, as compared to a insignificant number of FB official 2 (2.5%) were concerned about the issue in the study area.

Table- 4 : Disadvantage of installing IT infrastructure in banks

S. no.	Disadvantage of installing of IT infrastructure in banks	PSB Officials (Yes)	PSB Officials (No)	Total	FB Officials(Yes)	FB Officials(No)	Total
1.	Unauthorised access	43(54%) #	37(46%) #	80(100%)	15(19%) #	65(81%) #	80(100%)
2.	Computer Virus	17(21%) #	63(79%) #	80(100%)	14(17.5%)	66(82.5%)	80(100%)
3.	Theft of money or data	10(12.5%)	70(87.5%)	80(100%)	05(6%)#	75(94%) #	80(100%)
4.	Little knowledge of operating computer	10(12.5%)	70(87.5%)	80(100%)	02(2.5%)	78(97.5%)	80(100%)
5.	Perception of risk and uncertainty	31(39%) #	49(61%) #	80(100%)	10(12.5%)	70(87.5%)	80(100%)
6.	Inadequacy of IT infrastructure maintenance	28(35%)	52(65%)	80(100%)	08(10%)	72(90%)	80(100%)

Source : Based on Primary Data of the Survey.

* Note : (i) Figures in Parenthesis represent row percentage of the officials of PSB & FB

(ii) # Figures in parenthesis have been rounded of to the nearest digit

Perception of risk and uncertainty: The fact that use of IT had increased risk and uncertainty in the banks. Data presented in table – 4 observed that a significant number of PSB respondents 31(39%) in the study area were concerned about this issue, whereas 10(12..5%) of FB official were concerned about the same, which is insignificant.

Inadequacy of IT infrastructure maintenance: From the table -4, it may be observed that inadequacy of IT infrastructure maintenance is an issue of great concern in the study area. Only 28(35%) of PSB

respondents in the study area were in favor of the issue as compared to 8(10%) of FB official. Thus, it may, be observed from the response rate that FB had a comparative advantage over PSB.

Conclusion:

Efficiency of a bank is generally conceptualized as the extent to which the bank is able to utilize its resources (inputs) to generate business transactions (output), and is measured by their ratio, where larger value of-this ratio indicates better performance. Banks are now beginning to discard their traditional view of IT infrastructure and have started thinking of IT as contributing to their growth and improvement. So, banks must treat this as an opportunity and initiate IT measures which would concurrent with the strategic vision and provide long term sustainability to the organisation. Incorporating banking technologies to enhance customer experience will increase operational efficiency and enable new business opportunity. Hence through this research study we can conclude that information technology is the lifeline that runs through the heart of the banking sector.

There were so many other factors that affect the adoption of IT infrastructure in these banks. The most important is the availability of finance or capital for adoption of technology. The other factors were government regulation, demand of customer and degree of diffusion of technology, availability of qualified human resources, timely acquisition of technology, etc.

Adoption of technology is expensive for banks, while use of currently available technology does not always correspond to gains in revenue or increases in productivity. Management information system has become an essential part of banking& financial institutions. The MIS involves all aspects of gathering, storing, tracking, retrieving and using information within a business or organization. The information system always helps bank officers to assess the quality of services and to monitor progress of operational objectives. Management Information System can improve transparency and efficiency, lower costs, improve reporting, and allow management to make more informed decisions. The right technology is invaluable in helping banks. Strong information systems are the foundation of any financial institution. Yet, many banks struggle with their traditional system resulting in inefficiencies which limit their ability to grow and eventually take advantage of other technologies for their banking operations.

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