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**A STUDY OF INFORMATION TECHNOLOGY AND ITS RELATIVE IMPACT ON INDIAN
BANKING AND PAYMENT SETTLEMENT SYSTEM**

Dr S.M.Tariq Zafar

Is M.Com, PGDMM, PhD (Social Sector Investment)
Oman College of Management and Technology, Sultanate of Oman
smtariqz2015@gmail.com, mobile (968)95364039

Qasim Al Ajmi

Pursuing PhD (Computer Science)
(Asst. Dean), Oman College of Management and Technology, Sultanate of Oman
Qasim.alajmi@omancollege.edu.om

Dr Adeel Maqbool

Is M.Com, PGDMM, M.Phil, PhD, (Trade & FDI)
Associate Professor & Head, Department of Business management, Integral University, Luckhnow,
(UP) India, headmgm@iul.ac.in

Abstract

Technological innovations have changed the world banking system to a great extent and became heart of its operational efficiency. It is prudent to accept that banking industry is a heart of economy and if it collapses so will the economy. European, East Asian banking and financial crises and other recession's historical facts are absolute evidence. The impact of growing competition and adoption of innovation in banking sector by its providers to offer their effective and efficient services makes essential the understanding of how various aspects of consumer behaviour impact the technological development and ultimate respond to customer service delivery. Apart from its traditional service obligations, Indian banks now provide wide range of innovative services to satisfy financial and non financial needs of its varied class customers. By embracing the use of information and communicational technology banks consolidated its operational efficiency and changed its accounting and management system and transformed into mass banking from class banking, they ultimately became able to serve client faster, to store, to access, to process, to disseminate information faster and they became able to establish safe and speedy payment and settlement system for within and outside the political boundary. In addition they became able to penetrate deep in untouched populace to cater its retail segment which has grown and will grow further in coming time. Thus this study is carried out by the researchers to analyze the impact of technological initiatives taken by the Nation's Central Bank "The Reserve Bank of India" in order to develop efficiency and effectiveness in banking overall operations, especially in developing speedy, safe and secure payment settlement system, and role of ICT in banking industry.

JEL Classification: G18, G20, G21, G28, G32, G 34, G38, E52, E58, H63, N 21, N 23

Key Words: Banking Industry, IT, ICT, ATM, Plastic Money, Securities, Payment Settlement, Clearing.

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I. INTRODUCTION

Innovations in processing of information's, telecommunications, and related technologies are collectively known as an "information technology" or "IT". These collective technologies hold the distinction of helping nation's strong economy growth. The extensive research on the banking industry will help in understanding about the impact of technological change. The category of Depository and Non Depository Financial Institutions play significant role in economy and are generally measured by the ratio of computer and software to value added. It is core truth that banks were among the earliest adopters of automated information processing technology as they heavily rely on gathering, processing, analyzing and providing information in order to meet the needs of customers. Thus they significantly use financial technologies that employ statistical and economical models to evaluate data, to make assessment and valuation of new securities, to estimate return distributions and use financial engineering to create new financial derivatives, financial risk and market risk models to improve portfolio management, use to create financial data to make portfolio, modern credit scoring and discriminant analysis to evaluate credit applications etc. All these technologies largely depend on the use of information Technology (IT) to collect process and disseminate the data. Adoption and Technological up-gradation in banking industry also hold importance because of key roles of banks in credit creation, depositing, lending, payment settlement services to other sectors of economy.

It is very much evident that Information Technology (IT) has brought a complete paradigm shift on the bank's performance especially in respect to customer service delivery in the banking industry. In general we assess the impact of technology on banking operations, structure, productivity and growth. It is an industry which operates with relative homogenous inputs and outputs which may mitigate complexity of combining data from heterogeneous economic entities. Banking industry for their benefit continuously carries research work on individual firm's detailed data to specify cost and profit functions and control for differing conditions while measuring productivity change, scale economies, and other relevant indicators of bank performance. Some special banking data sets also allow for observation of specific technological changes and measurement of some of other effects. Further, individual banks strategic and investigative support in evaluating the consequences of technological development on the structure of the industry, particularly the extent to which technological progress facilitated the consolidation of banking industry and analyzing detailed information on geographic spread, on the scale, and on merger and acquisition (M&A) activity of individual banks.

Banking industry in competitive environment adopted technological up-gradation but also faced many specific and general problems, like, to what extent market are competitive, the advantage derived from technological development in banking industry may be competed or it may passed through to customers or factors of production or it may not measured as a productivity increase in the industry. As banks essentially sacrificed the benefits from the ATM technology in 1980s as industry became highly competitive due to deregulation and rents from market power shifted to consumers. Complexity of government statistical omission of new products and quality improvements from technological development may lead to overstatements of inflation and understatement of productivity growth, whether new products and adopted quality modifications tools of banking industry can be identified in standard productivity measures.

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To answer all these shortcomings the banking industry has promoted technological adoption and its continuous up-gradation as a core policy. In a bid to match the pace of global demand and development, to improve the standard of provided services to customers, to reduce the transaction cost, banks heavily invested in information technology and promoted and employed technological network in order to deliver improvised wide range of value added products and services. The adoption of information technology transformed banking industry and improvises its performance in form of flexible and user friendly banking services. Banks are generally known as a heart of economy and they reflect the economic health of the nations. Their growth and decline impact the economy and if they collapse so will the economy.

Thus globally it has been found that technological innovations have enabled banking industry to open up efficient delivery channels. It has transformed banking industry to meet out the upcoming unpredictable challenges of economy. It is a fact that information technology has become heart of banking sector and its growth and decline impact the economy. Traditionally banking activities were confined to accept and lend the money but now by the adoption of innovative technology banks are offering wide range of services to satisfy the financial and nonfinancial needs of all class or customers even to non customers. Induction of information and communication technology has broadened the horizon of banking activities and its overall business. It has changed the accounting structure of banking from manual to computerised; it has changed the supervisory, regulatory system by facilitating supervisors with innovative tools to tackle expected and unexpected challenges. It has created a new infrastructure for the world economy to become truly global and also provided the users of new technology a competitive advantage over their rivals. Electronic banking has become the main technology driven revolution in conducting financial transactions.

a. Indian Banking

Globalization and rapidly increasing Indian economic competitive strength forced Indian Government to systematically adopt economic liberalization and deregulation. To meet out the demand the government of India introduces effective reforms in financial sector with core relevancy. Growing technological changes, modernisation and up-gradation in global financial market with unpredictable consequences have brought revolutionary reforms in nation policies. To establish its consolidated presence in international economic environment Indian banking sector reoriented and restructured its strategies and deregulated and digitalized its financial sector and adopted technological advancement to facilitate innovative and hybrid financial instruments and systematic, secure and safe payment settlement system with prudent diversifications in fund and non fund base activities.

To establish self-sufficient, secure, safe, transparent, efficient, effective and globally at par banking structure the "Government of India" through its regulatory arm "Reserve Bank of India" (RBI) introduced and implemented various new laws and amendments time to time. The empowered Reserve Bank of India under its jurisdiction, utilising its authority directed banking industry to adopt overall technological operations stage by stage. Thus, Indian banking industry following the instruction of apex bank and a regulatory body of the nation started working consistently towards the development and adoption of technological changes and its usage in banking operations for the improvement and overall efficiency. In order to convert traditional

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banking into modern banking the Central Bank of the nation RBI continued its systematic and prudent efforts in making the payment system more secure and efficient. The efforts were strategies to penetrate deep in the market and to minimise the cost of transaction to attract more users and to explore the untouched area for its use beyond urban base in order to achieve the goal of financial inclusion. The futuristic policies of RBI concentrate much more to reduce cash use in society and to substitute it by plastic money (card payment). RBI analyzing the significance of payment settlement for business and economic transaction promoted safe and secure technological use and encouraged innovations in payment systems to promote flexi accessibility and economical affordability to the segment which is still unbanked in the nation by employing relevant and innovative technological modernization and developments. The impacts of initiatives are found positive and paper based clearing declined to a great extent in comparison to card clearing and volumes under electronic modes during the study period increased by many fold.

b. History of Information Technology Initiatives in Indian Banking Industry

Reserve Bank of India (RBI) in order to establish Indian banking industry at par to global standards leaving no stone unturned. To achieve the objectives of developing safe, secure, transparent, competitive, efficient, effective and consumer friendly banking services the apex bank of the nation taken and taking multi layer initiative in all segment of banking. Historical initiative of RBIs in the period of 1950 to 70 was to institutionalise the banking sector. Then after in 1980s the Reserve Bank concentrated on bringing improvements in the productivity and took several initiatives and employed prevailing technology use in banks. 1990s decisions of Reserve Bank in which it emphasised the usage of technology by the new banks as a precondition of the licence and establishing exclusive research institute to facilitate banking industry, transformed Indian banking forever. Reserve Bank after reviewing microeconomic research report of various committees on all banking technologies focuses primarily on technological changes which can be observed and their effects can be measured directly – Internet banking, electronic payment technologies and information exchanges. These technologies may not be so important but they demonstrate the multiplicity of potential and can measure the impact of technological progress. These technologies represent both information and financial technologies and cover both “front office” technologies in which the bank deal directly with customers and “back office” technologies for producing services that are generally invisible to customers. In order to assess the outcome of these technologies Reserve Bank started periodical meetings with bank to share information’s and entrusted “Institute for Development and Research in Banking Technology” to facilitate RBI in developing and modernising banking policies.

To meet out the upcoming challenges and to maintain standard of Indian banking industry at par to international standards the Reserve Bank of India started setting committee and working groups and entrusted them to examine the performance of banking industry and find out the area where banking sector lacking and recommend the appropriate use of technology according to the prevailing circumstances. For better growth and development of India banking industry the RBI in the year 1980s took initiative and set committee under the supervision of Rangarajan, after this RBI constituted many committees and working group time to time for specific work and entrusted power to them to investigate the situational condition and performance of Indian banking industry in comparison to global banking, some of the committees and working groups are as, in 1990s Saraf Working Group and Vasudevan Working Group and in 2000 Barman

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Working group, Technical committee under the supervision of Shri Vijay Chug in 2012, committee under the supervision of Shri G Padmanabhan in 2013, IT Sub Committee in 2013, working group under the chairmanship Shri Deepk Mohanty in 2013, high level committee for IT Vision Document under the supervision of Dr K.C. Chakrabarty in 2013, committee on Data Standardization under the supervision of Shri P. Parthasarathi in 2015 and many other committees and sub committees and working group and sub working groups was set. These committees and working groups examined and minutely investigated strength, weakness, opportunity and threat of Indian banking industry and submitted reports with all relevant facts and finding in respect to technological adoption, up-gradation and modernisation of Indian banking industry along with recommendations. Analyzing the recommendations of these committees and working group the Reserve Bank issued directives and guidelines to Indian banking sector to adopt technology in day to day operation in order to improvise efficiency and performance. During the early period technology was used in back office operations which were mostly for the purpose of accounting transactions and collection of MIS and MICR technology was mostly used in clearing and settlement for interbank payment.

Through its multifaceted roles as a regulator, supervisor and harbinger of innovation the RBI analyzed the importance of payment and settlement system and strategically started modification and development in order to establish secure and efficient domestic payment and international settlement system. Considering it as a part of nation's duty and owing it as a social responsibility the apex bank of the nation promoted institutions such as IDRT, INFINT and RTGS systems to bring down the cost of payment transaction. Apart from these systems the Reserve Bank kept on adopting and introducing world latest technologies in Indian banking Industry. In due process to promote payment and settlement system at par to international standard the Central Bank of the nation outlined three year road map "Reserve Bank Vision Document 2009-12". The document sought progress in the following key areas "Authorisation of Payment System, Smooth Functioning of the Existing Payment Systems, Promoting Electronic Modes of Payment, Promoting Safety and Efficiency in Payment System (Paper Based Payment Systems), CTS 2010- Standardization of Cheques, Retail Payment System, Alternative Payment Systems, Card Payments, Pre paid Payment Instruments, Mobile Payments, Domestic Money Transfer, Expanding Delivery Channels, Strengthening the Payment System Infrastructure, RuPay cards, Aadhar Enabled Payment Systems (AEPS), Aadhaar Payment Bridge System, Automated Clearing House, Financial Market Infrastructure, SWIFT Oversight Group, Domestic use of Swift. During the period the Reserve Bank also took some advance initiative in the field of Information Technology and constituted IT Sub Committee of the Board and implemented Information Security (IS) Policy, introduced Business Continuity Planning, Automated Data Flow, RTGS and NG-RTGS System, Upgrading the Enterprise Knowledge Portal, Desktop Virtualisation, Payment Systems, Emerging Messaging Standards, Upgrading of the Video Conferencing System and Perimeter Security. To reach the local and global mass it also published Red Book on Payment System and report on OTC Derivatives Data Reporting and Aggregation Requirements.

In the year 2012-13 Reserve Bank drafted Vision Document 2012-15. This vision document is advance version of previous Vision Documents 2009-12. In this vision document all the initiative of 2009-12 was taken into account with additional initiatives. With holistic view the RBI tried to extend, improvise, and consolidate the technological accommodation and modification along with induction and implementation of

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new policy and technology. During the vision period 2012-15 “Paper Clearing, Electronic Payments, Authorisation under Payment System registered improvement, by the efforts of RBI number of Automated Teller Machines (ATM) and White Label Automated Teller Machines increases and consequentially facility reached to uncovered populace. During the period of Vision Document 2012-15 Transparency and Efficiency Measures in Paper Clearing, Efforts to Enhance Efficiency in (NEFT), Systematic Adoption of Uniform Routing Code and Account Number Structure, Safety and Security in Card Payment, Rationalisation of Merchant Discount Rate (MDR) in Debit Cards, Effective Rationalisation of Prepaid Instruments Issue, GIRO- Based Payment were introduced and became operational. RBI empowered the National Payment Corporation of India (NCPI) and restructured the Oversight of Payment System according to the global need. It establishes Clearing Corporation of India Limited (CCIL) and entrusted it to develop explore and implement fair and transparent standards with excellent practice in payment settlement systems including the new CPSS-IOSCO standards “Principles for Financial Market Infrastructure (FMIs), it set Committee on Payment and Settlement Systems (CPSS) to find out flows, weakness and strength and recommend solution to related complexities, it Implemented and Monitored PFMI for the betterment of banking industry. To develop strategic links and stability in sub continent banking the RBI played a parental role to SAARC nations and provided them all kind of Technical Support and expertise.

In order to consolidate the technological up gradation process in Indian Banking industry the Reserve Bank further took IT initiatives and strengthened the Automated Data Flow, Cloud Computing and Replaced RTGS by NG-RTGS. It also upgraded Information Technology within Reserve Banks and formed IT Sub Committee to the Central Board and re-established its Information Security Policy, Foreign Exchange Transaction Electronic Reporting System (FETERS). It further upgraded and extended the service of video conferencing system and restructured the Perimeter Security Solution (PSS) to provide effective security mechanism to Reserve Banks and protect it from cyber attacks. It passes the directive to set Information Security Operations Centre (ISOC) to develop extra protection to handle diversified IT security system. The Reserve Bank introduced eXtensible Business Reporting Language (XBRL) taxonomies phase II in order to modernise the Data Acquisition from banks and to facilitate various returns in the area of banking supervision and foreign exchange transaction reporting. It also took Information Management Initiative with a view to automate information inflow to generate reports and of all tables pertaining to Weekly Statistical Supplement (WSS) and current statistics of Monthly Bulletin directly from Reserve Bank data warehouse. Reserve Bank also established Department of Information Technology to focus on it technological vision and mission. The main role of this department is to develop operation efficiency in Reserve Bank with safety, security and well protected environment. To maintain its status in international competitive environment the RBI is committed to develop, adopt and implement fair and transparent standards along with excellent practice in payment settlement systems including the new CPSS-IOSCO standards “Principles for Financial Market Infrastructure (FMIs).

c. Reserve Bank Agenda 2015-16

Reserve Bank after analyzing Indian economic potential and its growing economic strength considered payment system as a key area of strategic interest, both as part of their responsibilities for financial stability

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and for the implementation of monetary policy. In prevailing economic and business environment all economic activities are transacted in different ways than past. Today, the vast majority of money is in form of claims on banks ('bank money') and most payments are made by transferring these claims. In many payment systems, obligations are settled directly in central bank money. Thus Reserve Bank is committed to make Indian Banking sector strategically strong and efficient to answer the universal expectations. For the purpose it has set its Agenda for 2015-16 and adopted change as a continuous policy along with acquiring and employing financial technologies to standardize the payment settlement system and to keep it at par with global standards it is committed to keep on modernising its technical strength and expertise.

In the set Agenda for the period of 2015-16, Reserve Bank is committed to reduce paper currency in circulation on one side and on other side it will promote non paper currency. To provide alternatives to the users and financial customers it has planned to promote Mobile Banking and issued necessary ordinance and guidelines to banks to promote usage of mobile banking in the country. It advised banks to promote satisfaction among customer base by building confidence through maintaining security and transparency in transactions. RBI in the Agenda 2015-16 committed to promote Bharat Bill Payment System (BBPS). It is expected that authorization of Bharat Bill Payment Operating Unit (BBPOU) will be completed during the Agenda period and will facilitate banks in establishing effective payment system in India. To develop competitive efficiency and to consolidate payment system it issued directive to complete the consolidation work within agenda period which was started in previous agenda. Reserve Bank has set and is committed to promote electronic payments. To achieve this it has set a target to expand the service provider base by authorising more payment system operators in addition to this Reserve Bank has set to authorised more entities in Agenda 2015-16 to operate in money transfer service schemes (MTSS) which provide cross border inward remittances and also committed to increased the number of white label ATMs (WLAs) which were 7881 in previous agenda and will also expand the usage of instant money transfer for the comfort of consumers and ultimate users.

In Agenda 2015-16, the Reserve Bank is committed to provide more alternatives financing to micro, small and medium enterprise (MSME) and has issued directives and required ordinance to establish Trade Receivable Discounting System (TReDS) to minimise the gap and to bring together MSME, financiers and corporate buyers to reduce the constraints faced by the MSME in managing liquidity. The Reserve Bank under the Payment and Settlement System (PSS) Act, 2007 has set target to authorise more number of entities to operate in TReDS in the Agenda 2015-16. Under the Agenda 2015-16 the Reserve Bank has set and initiated measures to develop and promote efficiency, effectiveness and transparency in large value payment system, it has started facilitation and modernisation of migration of NEFT platform to UNIX Platform under data centre architecture and it started equipping and up-grading CCIL which has already migrated its USD-INR settlement of interbank forex transaction to a payment versus payment (PvP) mode. The Reserve Bank under the Agenda 2015-16 promoted the strategic activation of universally at par hybrid features and further extended business hours in RTGS system and restructured the activation to accept future value dated transactions for settlement up to three business days. Reserve Bank to achieve the set target under 2015-16 has introduced effective, safe, secure and efficient Customer Convenience and Innovations system to provide and ensure convenience to the customers and service users in use of payment system and

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to support migration to electronic payment. Reserve Bank restructured and redesigned the policy guidelines which were set by previous policy makers in respect to PPIs, mobile banking, usage of ATMs and Additional Factor Authentication (AFA2). It continued the policy of previous agenda in respect to KYC limit and amended the PSS Act 2007 to coordinate the legal frame work for payment system with international standards. It directed banks to adopt Trade Repositories (TR) and Legal Entity Identifier (LEI) In order to support Over the Counter (OTC) derivative markets.

During the early Agenda period 2015-16 The Reserve Bank has hosted the 14 SEACEN Advance Course on Payment and Settlement Systems for growing sub continent economies and focused on “Resilience of Payment System to Cyber Crimes. In order to make Indian banking system comparatively at par to global establishment Reserve Bank tried its best to accomplish the set targets of Agenda 2015-16 and for the purpose established IT subsidiary of the Reserve Bank and integrated and coordinated large scale of IT processing in banking, and within due period of time, Implementation of the Electronic Document Management System (EDMS) was completed in Reserve Bank which empowered its staff with knowledge and a comprehensive business process re-engineering (BPR) which is been undertaken as a core.

To explore the potential of financial market and to develop efficiency with transparency Reserve Bank revamped the IT infrastructure at DCs. The very first initiative was migrating RTGS system to new IBM mainframe system and later making it operational. Reserve Bank implemented Information Security Operating Centre (ISOC) to manage enterprise wise IT security. To promote cash less speedy and secure transaction across India, the Reserve Bank extended E-Receipt and E-Payments to all states using e-Kuber-CBS. It also conducted conference of the State Finance Secretaries in support to E-Receipt and E- Payment. Reserve Bank to make payment system more transparent, coordinated and effective introduced Integrating Currency Management Functions with CBS. It became important for the Reserve Bank to integrate it with e-Kuber due to accounting of currency movement and it's reporting and to make it operational it issued ordinance to set modules and facilitate the integration.

II. OBJECTIVE OF THE STUDY

The major objectives of the study is to evaluate the impact of Information Technology on the performance of Indian banks payment settlement system, to examine and evaluate the growth trend of Reserve Bank initiatives to consolidate and develop transparent, speedy, safe and secure payment settlement system in comparison to global standards, and to analyze the outcome of Reserve Banks initiatives with its Vision Documents and Agendas. In addition, will suggest and recommend exploring efficiency in overall banking sector by optimally utilising the innovative technologies.

III. METHODOLOGY

The study is carried out by the researchers to evaluate and analyze the Impact of initiatives taken by Reserve

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Bank in regard to Payment Settlement System. For the purpose secondary data and reports are been used. All the data which are used for study were collected from the published reports, magazines, research articles and annual report of Reserve Bank of India. The outcome of study depends on the selected vision period of Reserve Bank by the researchers which may differ from other study and analysis.

IV. REVIEW OF LITERATURE

Every generation of business has its own technological innovations which are been used to fulfil the needs and requirements of the time period. Present generation have its own technological advancement and largely depend upon digital or information and communicational technology. It is widely accepted fact that banks are back bone of economic activities and they reflect the economic health of the nation. Thus sound banking system with social confidence, transparent functioning, safe and secure financial transactions along with effective, efficient and speedy payment and settlement system are required. For the purpose banks requires storage, processing and collection of information etc. To analyze the performance of Indian banking system it is necessary to find out the impact of digital technology on banking sector. Many extensive researches and studies have been carried out by the economists, academicians and financial experts throughout the world in this regard and they explored many hidden and untouched factorial truth by critically examining and analyzing past and present status of payment and settlement systems and tired to predict the future of it comparatively. All researches differ in time period, place, economic conditions and level of technological development. All yester year researches produced periodical facts and set standard and parameters for others to follow and find out effective solution to upcoming and unpredictable problems of growing technologies and produce relevant, accurate and cost effective solution along with developing dimensions of improvement in banking sector. The researchers of this study analyzed and examined many research works and found that most of the studies are carried out in advance economies and very few are been carried out in developing and under develop economies. They found that some studies advocated the negative impact of total adoption of technology in banking especially in developing and underdeveloped nations and on other hand some studies advocate total adoption of technologies. Thus this study is a humble initiative by the researchers to analyse the impact of technology in Indian Banking Sector especially in payment settlement system and the outcome of this study will explore new dimensions and will set new parameters for researchers, economist and academicians to examine the challenges of future upcoming times.

Zafar S.M.Tariq (2014) in his study found that modern banks operating in India have better operational efficiency than Indian traditional banks. The study further revealed that modern banks with efficient technologies are performing much better in comparison to other contemporary banks. The study suggested that growing trends and challenges have to be monitored minutely. Traditional banks have to develop quality efficiency, productivity and profitability along with cost reduction measures to compete the techno based modern banks and their challenges, *urbam, et al. (2008)* in their study found that information technology no doubt is the most essential and dynamic factors relating to all efforts but it is also true that it alone cannot improve banks earnings, *Hernando and Nieto (2007)* in their study found that internet banking is gradually replacing the traditional banking and is been seen as a complementary channel to it, *Haq (2005)* in his study

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revealed that banks existence largely depend upon their ability to achieve economies of scale in minimizing asymmetry of information between savers and borrowers. According to him that toughest challenge to banking industry is how to use information technology in banking industry optimally which has helped banks to sustain the economies of scale and transformed it from brick and mortar banking to online banking, *Sathye (2005)* after examining the credit unions in Australian banks produced the fact that electronic banking cannot be considered as a yard stick to measure the performance as there are many other factors which are also equally important and thus it cannot be considered as a performance enhancing tool, *Berger (2003)* in his study found that all banks who are using financial products and services supported by modern technologies like electronic payment, online banking, online shopping, security investments, information exchange have produced better results and delivered superior quality customer services to their customers with comparatively less efforts, *Furst et al (2002)* in his study found that all the banks using conventional business model are having higher Return on Equity (ROE). The study further revealed that all the banks which are running their operations in profit have adopted Information and Communicational Technology (ICT) after 1988, *Gowrisankaran and Stavins (2002)* in their study based on ACH usage revealed that banks were more likely to make originations, although the gap between large and small banks was narrowing over times as usage increased, *Claessens et al (2001)* in his study examined the role of ICT in banking industry and found that if information technology had been used by the banking industry then it will allow global economies to setup a financial system before establishing a fully functioning financial infrastructure. The study analysed that electronic banking is much cheaper and has reduced the processing, search and switching cost of the consumer to a great extent. Study also found that bank by using the technology can extend its services to untouched and remote areas also, *The McKinsey Global Institute (2001)* developed its own index for banking labour productivity. The outcome of their work shows that annual productivity growth rates increased dramatically, *Brynjolfsson and Hitt (2000)* in their study found that "ICT" has a significant contribution in firms output. According to them, firms which have employed Information Technology capital have registered magnificent increase in their output in comparison to the firms which do not have any contribution of Information Technology capital, *Kansas USA, Sullivan (2000)* in their carried out study found that no multi channel bank in the 10th Federal District have registered any improvement or decline by having transactional web sites, *Ali Yakhlef (2001)* in his study found that technology has taken the transaction processing load in full and banks are concentrating much more on strengthening their marketing approach and in re-designing their business model. The study found that traditional banking by the adoption of technology has been transformed into modern banking and engaging itself proactively with customers and delivering specialized advisory services and putting more efforts on retail banking, *Jappelli and Pagano (1999)* in their detailed survey of theory and practice of information exchange and found that in some case exchange collect only negative information's, such as default or arrears and in other cases also include positive information such as loan repayments and employment history, etc, *Mark R Nelson (1999)* in his study examined the trend and patterns surrounding the interface between the marketing and information services function within the financial industry. He found that most of the bank does not have coordination and integration between their marketing and information services function, *Gaston Leblanc (1990)* in his study examined the customer motivations towards use and non use of Automated Teller Machine (ATMs) customers of a selected financial institution. After analyzing the outcome based on demographic variables they found literacy is the lone factor which significantly distinct the users and non users, *Dr. Chindambaram*

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and Ms. K Alameleu (1996) in their study revealed that bank can carve a niche for itself if they invest in technology and become technology friendly. Well equipped, customer friendly premises and efficient and well trained motivated employees will improve the marketability of banks, Berger, Kashyap and Scalise (1995) in their study found that bank call report items for other noninterest expenses which includes payments to service bureaus rose to 25.4 percent in 1994 which was 14.1 percent in 1986 and 10.0 percent in 1979, Solow (1987) in his study found that present generation is computer oriented and everything is relying on it. According to him there was a huge decelerating in growth as the technologies were becoming ubiquitous he also claimed that positive impact of information and communication technology add value to business, Hannan and McDowell (1984) in their study found that to measure the performance of banks technology can be considered one deterrent but apart from technology, concentration and competition are other deterrent,

“RBI Initiatives and Trends in Payment Systems”

Reserve Bank, recognizing the need and importance of advances in payment and settlement systems took numerous initiatives and dedicatedly worked with clear mission to ensure that all payment and settlement systems operating in the country are “safe, secure, sound, efficient, accessible, authorised and authentic”. Consistent with the mission it took several measures to improve the efficiency of existing systems and promoted the use of new modes and systems along with maintaining low transaction costs and better risk management for system participants. To meet out the international standard and obligation it brought many amendments in existing financial law and issued many directives and set committees and working group to examine the present banking and financial structure and give suitable suggestions for changes and modifications according to global norms. The technological initiatives of Reserve Bank and its performance are examined and analysed by the researchers, are as below.

Table No. 1. Systemically Important Payment System (SIPS) through RTGS

Items	Volume in Million (Rs)					
	2009-10	2010 -11	2011 - 12	2012- 13	2013-14	2014-15
Systemically Important Payment System (SIPS) through RTGS	33.2	49.3	55.0	68.5	81.1	92.8

Source: Revealed by the Researcher from RBI annual Reports, 2009-10, 2010-11, 2011-2012, 2012-13, 2013-14, 2014-15

Interpretation: From the above Table No.1it is been found that “Systemically Important Payment System” (SIPS) through RTGS “which includes customer and interbank transactions only” has increased in term of volume. In the year 2009-10 its volume in term of rupees was 33.2 million which later grew to 92.8 million in the year 2014-15. In between 2009-10 to 2014-15 it has maintained its growth trend.

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Table No. 2. Total Financial Market Clearing

Items		Volume in Million (Rs)					
		2009-10	2010 -11	2011 - 12	2012- 13	2013-14	2014-15
1	CBLO	0.1	0.15	0.14	0.2	0.2	0.2
2	Government Securities Clearing	0.4	0.36	0.44	0.7	0.9	1.0
3	Forex Clearing	0.9	1.20	1.30	1.4	1.5	1.8
	Total Financial Market Clearing	1.4	1.71	1.88	2.30	2.6	3.00

Source: Revealed by the Researcher from RBI annual Reports, 2009-10, 2010-11, 2011-2012, 2012-13, 2013-14, 2014-15

Interpretation: From the above Table No. 2 it is found that total financial market clearing “which includes Collateralised Borrowing and Lending Obligation (CBLO), Government Securities Clearing and Forex Clearing” has maintained its growth trend. In the year 2009-10 its collective volume in term of rupees was 1.4 million which grew to 3.00 million volumes in the year 2014-15. Among all Forex Clearing has a major contribution in total financial market clearing, which is found 0.9, 1.20, 1.30, 1.40, 1.50, and 1.80 respectively.

Table No. 3. Others Clearings

Items		Volume in Million (Rs)					
		2009-10	2010 -11	2011 - 12	2012- 13	2013-14	2014-15
4	CTS	-----	160.4	180.0	275.0	591.4	964.9
5	MICR Clearing	1,149.7	994.6	934.9	823.3	440.1	22.4
6	Non – MICR Clearing	230.6	232.3	227.0	215.3	225.9	208.5
	Others	1380.3	1387.3	1341.9	1313.6	1257.4	1195.8

Source: Revealed by the Researcher from RBI annual Reports, 2009-10, 2010-11, 2011-2012, 2012-13, 2013-14, 2014-15

Interpretation: From the above Table No. 3 it is been found that other clearings “which includes CTS, MICR Clearing, and Non MICR Clearing” have declining trend. In the year 2009-10 it was 1380.3 million in volume and in the subsequent year 2010-11 it registered marginal increase but then it started declining drastically and in the year 2014-15 it came to 1195.8 million.

Table No. 4. Total Retail Electronic Clearing

Items		Volume in Million (Rs)					
		2009-10	2010 -11	2011 - 12	2012- 13	2013-14	2014-15
7	ECS DR	149.3	156.7	164.7	176.5	192.9	226.0
8	ECS CR	98.1	117.3	121.5	122.2	152.5	115.3
9	EFT / NEFT	66.3	132.3	226.1	394.1	661.0	927.6
10	Immediate Payment Service (IMPS)	-----	-----	-----	1.2	15.4	78.4
11	National Automated Clearing Hours (NACH)	-----	-----	-----	-----	86.5	340.2

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	Total Retail Electronic Clearing	313.7	406.30	512.3	694.00	1108.3	1687.5
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Source: Revealed by the Researcher from RBI annual Reports, 2009-10, 2010-11, 2011-2012, 2012-13, 2013-14, 2014-15

Interpretation: From above Table No. 4 it is found that total retail electronic clearing “which include ECS-DR, ECS-CR, EFT / NEFT, Immediate Payment Services (IMPS), National Automated Clearing Hours (NACH) have increasing trend. It is found that year by year it has grown with dynamic pace. In the year 2009-10 it was 313.7 million in volume but grown more than five folds; in the year 2014-15 it was 1687.5 million in volume.

Table No. 5. Total Cards Usage

Items		Volume in Million (Rs)					
		2009-10	2010 -11	2011 - 12	2012- 13	2013-14	2014-15
12	Credit Cards	234.2	265.1	320.0	396.6	509.1	615.1
13	Debit Cards	170.2	237.1	327.5	469.1	619.1	808.1
14	Prepaid Payment Instruments (PPIs)	-----	-----	-----	66.9	133.6	314.5
	Total Cards	404.4	502.2	647.5	932.6	1261.80	1737.7

Source: Revealed by the Researcher from RBI annual Reports, 2009-10, 2010-11, 2011-2012, 2012-13, 2013-14, 2014-15

Interpretation: From the above Table No. 5 it is been found that card usage has grown with drastic pace. In order to reduce the cash transaction in society “The Reserve Bank” prudently promoted card usage (Credit and Debit Cards). Its initiative backed with sophisticated, safe and secure technology produced positive result. It is found that in the year 2009-10 total card usage volume in million was 404.4 which increases year to year and in the year 2014-15 it was found 1737.7

Table No. 6. Grand Total

	Volume in Million (Rs)					
	2009-10	2010 -11	2011 - 12	2012- 13	2013-14	2014-15
Systemically Important Payment System (SIPS) through RTGS	33.2	49.3	55.0	68.5	81.1	92.8
Total Financial Market Clearing	1.4	1.71	1.88	2.30	2.6	3.00
Others	1380.3	1387.3	1341.9	1313.6	1257.4	1195.8
Total Retail Electronic Clearing	313.7	406.30	512.3	694.00	1108.3	1687.5
Total Cards	404.4	502.2	647.5	932.6	1261.80	1737.7
Grand Total	2099.8	2297.51	2503.58	2942.5	3630.1	4624.00

Source: Revealed by the Researcher from RBI annual Reports, 2009-10, 2010-11, 2011-2012, 2012-13, 2013-14, 2014-15

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Interpretation: From the above Table No 6 we found that every component of payment and settlement system has registered growth year by year. This shows the healthy sign of nation's economic growth and development. This growth and development is combination of optimum utilization of resources and prudent policies and their effective implementation. Reserve Bank technological initiatives and its overall efforts transformed dormant Indian banking structure into most efficient, effective, secure and safe structure according to global norms. The study found that systemically Important Payment System (SIPS) through RTGS, CBLO, Government Securities Clearing and Forex Clearing, ECS-DR, ECS-CR, EFT / NEFT, Immediate Payment Services (IMPS), National Automated Clearing Hours (NACH), Credit Cards and Debit Cards have grown year by year. Only CTS, MICR Clearing, and Non MICR Clearing" have declined.

V. FINDINGS

After analyzing the data of Reserve Bank initiatives the researchers found that all initiatives have positive trends and there volume has grown in millions. It is found that all initiatives are growing with stability and have good future. The researcher's findings are as follows,

The study found that all the settlement of government securities clearing and forex transaction is done by Clearing Corporation of India Ltd.

The study found that National Automated Clearing House (NACH) system was started by the National Payment Corporation of India (NPCI) in order to facilitate interbank high volume electronic transactions which are periodic and repetitive in nature.

The study found that all settlement of Collateralised Borrowing and Lending Obligation (CBLO), Government Securities and Forex Transactions is carried out through Clearing Corporation of India Limited (CCIL)

The study found that Systemically Important Payment System (SIPS) through RTGS has increased in term of volume. During the study period it was found (33.2) in 2009-10, (49.3) in 2010-11, (55.00) in 2011-12, (68.50) in 2012-13, (81.10) in 2013-14 and (92.80) in 2014-15 respectively

The study found that total Collateralised Borrowing and Lending Obligation (CBLO) has maintained its growth trend. During the study period it was found (0.1) in 2009-10, (0.15) in 2010 -11, (0.14) in 2011-12, (0.2), (0.2) in 2012-13 in 2013-14, (0.2) in 2014-15 respectively

The study found that Government Securities Clearing has maintained its growth trend. During the study period it was found (0.4) in 2009-10, (0.36) in 2010 -1, (0.44) in 2011-12, (0.7) in 2012-13, (0.9) in 2013-14, (1.0) in 2014-15 respectively

The study found that Forex Clearing has maintained its growth trend. During the study period it was found (0.9) in 2009-10, (1.20) in 2010 -1, (1.30) in 2011-12, (1.40) in 2012-13, (1.50) in 2013-14, (1.80) in 2014-

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15 respectively

The study found that CTS has maintained its growth trend. During the study period it was found (Nil) in 2009-10, (160.40) in 2010 -11, (180.0) in 2011-12, (275.0) in 2012-13, (591.4) in 2013-14, (964.9) in 2014-15 respectively.

The study found that Magnetic Ink Charter Recognition (MICR) clearing has declining trend. During the study period it was found (1149.7) in 2009-10, (994.6) in 2010 -11, (934.9) in 2011-12, (823.3) in 2012-13, (440.1) in 2013-14, (22.4) in 2014-15 respectively. The study also found that during the period of study MICR centres numbers have been increased. In the year 2013 they were available at 64 centres and in corresponding year two additional centres at New Delhi and Chennai came into existence. In new centres Reserve Bank implemented Cheque Transaction System (CTS) to facilitate the users and customers.

The study found that Non MICR Clearing also has declining trend. During the study period it was found (230.6) in 2009-10, (232.3) in 2010 -11, (227.0) in 2011-12, (215.3) in 2012-13, (225.9) in 2013-14, (208.5) in 2014-15 respectively.

The study found that there is no Magnetic Ink Charter Recognition (MICR) Cheque Processing Centre (CPC) location in the country as of now through which migration of total cheque volume to cheque truncation system (CTS) can be performed.

The study found that ECS-DR has maintained its growth trend. During the study period it was found (149.3) in 2009-10, (156.7) in 2010-11, (164.7) in 2011-12, (176.5) in 2012-13, (192.9) in 2013-14, (226.0) in 2014-15 respectively.

The study found that ECS-CR has maintained its growth trend. During the study period it was found (98.1) in 2009-10, (117.3) in 2010 -11, (121.5) in 2011-12, (122.2) in 2012-13, (152.5) in 2013-14, (115.3) in 2014-15 respectively.

The study found that EFT / NEFT have maintained its growth trend. During the study period it was found (66.3) in 2009-10, (132.3) in 2010-11, (226.1) in 2011-12, (394.1) in 2012-13, (661.0) in 2013-14, (927.6) in 2014-15 respectively. All the transaction through NEFT was carried out by nationwide 121,845 branches of 161 banks apart from business correspondent (BC) outlets. The study found that in the year 2014-15 through NEFT, agencies managed 928 million transaction valuing around 60 trillion rupees and it is also been found that in the month of March 2015, NEFT recorded largest ever monthly transaction that is of 106 million transactions.

The study found that Immediate Payment Service (IMPS) was introduced by the Reserve Bank in the year 2012-13 and since then it has maintained its growth trend. During the study period it was found (Nil) in 2009-10, (Nil) in 2010-11, (Nil) in 2011-12, (1.2) in 2012-13, (15.4) in 2013-14, (78.4) in 2014-15 respectively.

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The study found that National Automated Clearing Hours (NACH) was introduced by the Reserve Bank in the year 2013-14 and since then it has maintained its growth trend. During the study period it was found (Nil) in 2009-10, (Nil) in 2010-11, (Nil) in 2011-12, (Nil) in 2012-13, (86.5) in 2013-14, (340.2) in 2014-15 respectively.

The study found that Credit Card has maintained its growth trend. During the study period it was found (234.2) in 2009-10, (265.1) in 2010-11, (320.0) in 2011-12, (396.6) in 2012-13, (509.1) in 2013-14, (615.1) in 2014-15 respectively. The study further found that during the period of study in the year 2014-15, through Credit Card 615 million transactions valued around 1.9 trillion was done.

The study found that Debit Card has maintained its growth trend. During the study period it was found (170.2) in 2009-10, (237.1) in 2010-11, (327.5) in 2011-12, (469.1) in 2012-13, (619.1) in 2013-14, (808.1) in 2014-15 respectively. The study also found that through Debit Card in the year 2014-15 almost 808 million transactions valued around 1.2 trillion rupee was done. It is also been found that all the figure of cards is of transactions which were carried out at POS terminal only.

The study found that Prepaid Payment Instruments (PPIs) has maintained its growth trend. During the study period it was found (Nil) in 2009-10, (Nil) in 2010-11, (Nil) in 2011-12, (66.0) in 2012-13, (133.6) in 2013-14, (314.5) in 2014-15 respectively. It is been found that during the period of study in the year 2014-15, almost 315 million transactions valuing 212 billion rupees were done through PPIs.

Study found that Reserve Bank has introduced Mobile Banking Services in the year 2014-15 and through this new option in short period of time banks handled 171 million transactions total worth of 1 trillion.

The study found that during the period of study in the year 2014-15 there is 27.1 percent increase in volume of transactions and 5.4 percent decline of growth in term of value in payment settlement system in comparison to previous year.

The study found that there is substantial decline in paper based transactions in comparison to past. In the year 2014-15 paper based transactions accounted 25.4 percent of the total transaction which in the year 2013-14 was 33.9 percent of the total transactions.

The study found that transaction for value of 79 billion representing 0.01 percent of total non cash transaction were carried out by using prepaid instruments issued. And non cash transaction through Instant Money Payment Services (IMPS) of 4.3 billion representing 0.0003 percent of total non cash transaction was carried out in the year 2012-13.

In general the study found that Reserve Bank of India took bold initiatives in order to match the global economic pace and financial norms. It is found that Reserve Bank in its objective of establishing safe, secure, transparent, authentic, and effective and efficient payment settlement system has succeeded to an extent. It is

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found that Reserve Bank by adopting competitive technologies for overall banking system has proven its bankers bank status with high degree of maturity and dignity and also played the anchor role in converting Indian Banking system into global at par banking system. Its futuristic approach, prudent policies, competitive initiative with confidence motivated citizen of the nation to use electronic payment and reduce cash use. It is been found that all information and communication technology based initiatives for the betterment of banking and efficient payment settlement system has been accepted by the Indian banks and later been implemented and operationalized. It is been found that its efforts of making payment system simple, easy excess and affordable for common users / customers and to expand its horizon beyond the present status and to attain the objective of financial inclusion are working in meaningful direction with stable pace.

It is found that Reserve Banks initiative in order to rationalise the policies for prepaid payment instruments, white label ATMs, ATM transactions, minimization of formalities and additional factor to authenticate small value contact-less card present payments are giving positive and encouraging results. It has been found that Reserve Bank provided strength and consolidation to payment settlement system by introducing its innovative, futuristic technological initiatives in regards to process of infrastructure enhancement in payment of bills and bill discounting segments by drafting and enforcing policy framework to set up Bharti Bill Payment (BBPS) and Trade Receivables Discounting System (TreDS). The study found that Reserve Bank in order to control the growing challenges and to cater the present growing demand and to explore the untapped and unexplored potential took slew of in house IT initiatives. It is found that all the information and communication technology initiatives, Vision Document 2012-15, Agenda 2014-15 and 2015-16 are giving expected results. They are nicely planned and are strategically implemented and collectively all the initiatives established and consolidated the Indian Payment Settlement System according to international standards with degree of efficiency, effectiveness, trust, safety, security and speed.

VI. CONCLUSION

“India” an emerging economy gradually establishing its status as a future economic destination and safe investment zone for global investors. To establish and to justify its economic status claims it has to develop trust among global investors which is possible only when India provide and develop safe, secure, transparent, effective, efficient, authentic, authoritative and protective economic environment. To establish this environment there is need of sound Banking and Financial structure. In order to meet out domestic and international transactions there is a need of sound, safe, secure, trust worthy, robust and well developed payment and settlement system and overall protective infrastructure. All the initiatives and efforts of Reserve Bank depend upon Nation's education standards and its Literacy rate. Its initiatives success also reflects the response of educated mass and depth of educational penetration. Thus Reserve Bank has to participate in promoting education in India by cooperating and coordinating with educational policy makers. The study outcomes justified the objectives of the study and found information technology has a deep impact on the performance of Indian banks payment settlement system. The researchers minutely examined, evaluated and analyzed the growth trend, performance, vision documents and it's all initiatives and found that Reserve Banks initiatives and efforts up to extent have succeeded in consolidating and developing transparent,

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speedy, safe and secure payment settlement system in comparison to global standards. The study conclude that Reserve Bank has continued its efforts in making payment system more speedy, safe, secure and efficient with low transaction costs and better risk management for system participants. The apex bank tried its best to expand payment system beyond existing levels to accomplish its strategical, economical and financial objective of financial inclusion. In pursuance of its vision Reserve Bank encouraged electronic payments and focused to reduce the use of cash in society. It persisted in its efforts and tried to enhance the standard features along with affordability and accessibility of payment settlement system. During the years, the Reserve Bank succeeded in its endeavours to improve the Information and Communication Technology infrastructure along with facilitating Indian banking sector's by aligning it with the latest technological innovations. Simultaneously, the ambit of technology is being widened within the Reserve Bank, particularly in term of data flow and knowledge dissemination. It's all Initiatives including rationalisation of policies relating to prepaid payment instruments, ATM transactions, White label ATMs and relaxation of additional proofs to authenticate small value contact-less card payment are giving desired results with passing time and growing technological expertise. Its Bill payments, MSME bill discounting segments; Bharat Bill Payment System (BBPS) and Trade Receivables Discounting System (TreDS) are effectively and efficiently functioning.

VII. RECOMMENDATIONS

It is a paramount responsibility of The Reserve Bank, The Central Bank, The Apex Bank, The Bankers Bank of the nation to developing transparent, safe, secure, speedy, efficient, interoperable, authorised, accessible, and inclusive and complaint with international standards payment and settlement system in the country. It is its responsibility to keep on taking initiatives to establish speedy, safe and secure delivery system and it have to keep on taking efforts to develop deeper acceptance and penetration of non cash payment modes. To match the pace of growing globalisation and futuristic mode of payment and settlement and to encourage the cash less transactions Reserve Bank have to keep on standardizing its policies and have to keep on adopting safe and secure technologies. As present generation technology will become obsolete technology after some time, thus it has to keep on up-grading the techno infra in banking industry to match the global standard. To penetrate deep in society and to explore the potential of un-served and suburban base the Reserve Bank has to make attractive, protective, motivating, simple and affordable payment settlement system. To achieve the objective of financial inclusion Reserve Bank has to optimally utilise the information and communicational technologies. To make payment settlement system more effective, efficient and secure it has to make adoption of digital and innovative technologies as a core part of its policy. With nation's growing global status responsibilities of Reserve Bank is also growing and thus to maintain, to promote and to protect the nation international economical status it has to take all measures to develop transparent and sound Banking infra according to global standard. Adoption of latest technology, modernisation, growth and development of existing capacity, transparency in policies and its implementation, transaction safety, financial security, easy pan India excess and affordability with authenticity is the only answer.

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REFERENCES

1. A.K Trivadi (2002) "Economic Reform and Banking Scenario: An Analysis" Indian Economic Panorma, A Quarterly Journal of Agriculture, Industry, Trade Commerce, Special Banking Issue, pp. 6-8
2. Andrews, F (1942) The Operation of the City Clearing House, The Yale Law Journal, Vol. 51
3. Alhaji Abubakar Aliyu and Rosmaini Bin HJ Tasmin (2012) The Impact of Information and Communication Technology on Banks Performance and Customer Service Delivery in The Banking Industry, Int. J Latest Trends Fin. Eco. Sc. Vol-2 No. 1 March 2012
4. Annual Report, Reserve Bank of India, 2010-11, 2011-12, 2012-2-13, 2013-2014, 2014-15
5. Allen N. Berger and Wharton Financial Institutions Centre Philadelphia (2003) The Economic Effect of Technological Progress: Evidence from the Banking Industry, Journal of Money, Credit, and Banking, Volume 35
6. Akhavein, Jala, W. Scott Frame and Lawrence J. White "The Diffusion of Financial Innovation: An Examination of the Adoption of Small Business C Credit Scoring by Large Banking Organizations" Federal Reserve Bank of Atlanta Working paper 2001-9,
7. Akhavein, Jalal D, Allen N Berger and David B Humphery (1997) "The Effect of Bank Megamergers on Efficiency and Prices: Evidence from the profit Function" Review of Industrial Organization 12, Feb, 1997, pp 95-139
8. Alam Ila M.S (2001) " A Non Parametric Approach for Assessing Productivity Dynamics of Large Banks" Journal of Money, Credit, and Banking Pp 121-139
9. Allen, Franklin, James McAndrews and Philip Strahan (2002) " E-Finance: An Introduction, Journal of Financial Services Research, Pp 5-27
10. Ben Norman, Rachel Shaw and George Speight (2011) The History of Internet Banking Settlement Arrangement: Exploring central Banks Role in the Payment System, Working paper No 412, Bank of England
11. Bank of England (2005) Payment Systems Oversight report 2004, No. 1
12. Basu, Susanto, Jhon G. Fernald and Matthew D. Shapiro (2001) "Productivity Growth in the 1990s: Technology, Utilization, or Adjustment?" Carnegie- Rochester Conference Series on Public Policy Pp, 17-65
13. Bauer, Paul W and Patrick Higgins (2002) "Post Consolidation Estimates of ACH Scale Economics, Technical Change and Cost efficiency, Federal Reserve bank of Cleveland Working paper
14. Berger, Allen N., Rebecca S. Demsetz and Philip E. Strahan (1999) " The Consolidation of the Financial Services Industry: Causes, Consequences and Implications for the Future, Journal of banking and Finance, Pp 135-194
15. Berger, Allen N., Robert DeYoung (2001) "The Effect of Geographic Expansion on bank efficiency" , Journal of financial Services Research, Pp 163-184
16. Berger, Allen N., Diana Hancock and David B. Humphrey (1993) " Bank Efficiency Derived from the profit Function" , Journal of banking and Finance, Pp 317-347
17. Chandashekhar, C.P. (2009) How Sound is Indian Banking. The Economic & Political Weekly May, pp.8

International Journal Of Core Engineering & Management (IJCEM)
Volume 3, Issue 5, August 2016

18. Claessens, Stijn, Thomas Glaessner and Daniela Klingebiel (2002) “Electronic Finance Reshaping the Financial Landscape around the World”, Journal of Financial Services Research, Pp 29-61
19. Corvoisier, Sandrine and Reint Gropp (2001) “Contestability, Technology and Banking, European central Bank Working Paper
20. Courchane, Marsha, David Nickerson and Richard Sullivan (2002) “Financial innovation, Strategic real Options and Endogenous Competition: Theory and an Application to Internet Banking”, Colorado State university Working paper
21. Cymak, Anthony W., Timothy H. Hannan (2000) “ Non Local lending to Small Business”, Federal Reserve Board Working paper
22. Committee on payment and Settlement System (2003) The Role of Central Bank Money in payment Systems, Basel
23. Daniel, F (1996) “The evolution of the Payment System in Canada, Mimeo
24. Devaney, Michael and Warren Weber (2000) “Productivity Growth Market Structure and Technological Change: Evidence from the Rural Banking Sector, Applied Financial Economics, Pp 587-595
25. DeYoung, Robert (1997) “Bank Mergers, X – Efficiency and the Market for Corporate Control, Managerial Finance, Pp 32-47
26. DeYoung, R., Lang W.W and Nolle, D.L (2007) “How the Internet affects Output and Performance at Community Banks, Journal of banking & Finance, Vol. 31 Pp. 1033-1-60
27. Frame, W. Scott and Lawrence J. White (2002) “Empirical Studies of Financial Innovation: Lots of Talk, Little Action? Federal Reserve Bank of Atlanta Working Paper
28. Frei, Frances X., Patrik T. Harker, Larry W. Hunter (2000) “Inside the Black Box: What makes a Bank Efficient? In Performance of Financial Institutions: Efficiency, Innovation, Regulation, edited by Patrik T. Harker and Stavros A Zenios, Pp. 259 – 311, Cambridge University Press, Cambridge, UK
29. Furlong, Fred (2001) “Productivity in Banking” Federal Reserve bank of San Francisco, Economic Letter 2001-22
30. Gerdes, Geoffrey R., and Jack K. Walton II (2002) “The Use of Checks and Other Retail Noncash Payments in the United States”, Federal Reserve Bulletin, Pp 360-374
31. Gilbert, R Alton, David C. Wheelock and Paul W. Wilson (2002) “New Evidence on the Fed’s Productivity in Providing Payment Services” Federal Reserve bank of St. Louis working paper
32. Gowrisankaran, Gautam and Joanna Stavins (2002) “Network Externalities and Technology Adoption: Lessons from Electronic Payments”, Federal Reserve Bank of San Francisco Working Paper
33. Gaskin, M (1965), “The Scottish Banks, London
34. Graham, W (1886) “The One Pound Note, London
35. History of Reserve Bank of India, RBI Bulletin, May 2005
36. Hancock, Diana. “Comment” In Output Measurement in The Service Sector, edited by Zvi Griliches, Pp 296-300, National Bureau of Economic research Studies in Income and Wealth, University of Chicago Press

International Journal Of Core Engineering & Management (IJCEM)
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37. Hausman, Jerry A. (1998) "New Product and price Indices" NBER Report, Pp, 10-12
http://www.nber.org/reporter/fall98/hausman_fall98.html
38. Haynes, Michelle and Steve Thompson (1999) "The Productivity Effects of bank Mergers: Evidence From The UK Building Societies", Journal of Banking and Finance, Pp 325-846
39. Ip, Greg (2002) "Green spam Expresses Optimism for Growth of U.S Economy" Wall Street Journal
40. IBA Bulletin, January 2004
41. Jha Dilip Kumar, Sarangi, Dr Durga Shankar (2011) Performance of New Generation Banks In India: A comparative study, IJRCM, Vol. No. 2, Issue No. 1, ISSN – 0976-2183
42. Kajal Chaudhary and Monika Sharma (2011) Performance of India Public Sector Banks and Private Sector Banks: A comparative Study; International Journal of Innovation, management and Technology, Vol. 2, No. 3
43. Kahn, C M and Roberds, W (2009) "Why Pay? An introduction to Payment Economics", Journal of Financial Intermediation, Vol. 18, No. 1
44. Kozak S (2005) "The Role of Information Technology in the Profit and Cost Efficiency Improvements of the Banking Sector" Journal of Academy of Business and Economics
45. Kallberg, Jarl G and Gregory F Udell (2002) "The value of Private Sector Credit Information Sharing: The U S Case" Journal of Banking and Finance
46. Klapper, Leora F and Elike Kraus (2002) "The Information of South Africa" World Bank Mimeo
47. Mckinsey Global Institute (2001) "U.S Productivity Growth, 1995-2000 (Washington: McKinsey)
48. Mittal, Manish and Aruna Dhade (2007) "Profitability and Productivity in Indian Banks: A Comparative Study", AIMS International, Vol. 1 No. 2, Pp 137-152
49. Milne, A (2006) "What is in it for us? Network Effects and Bank Payment Innovation" Journal of banking & Finance, Pp 1613-1630
50. Nag. A K Shivaswamy K (1990) "Foreign Banks in India- Recent Performance" Reserve Bank of India Occasional Papers, Vol. 11, No.4 December, Pp 297-328
51. Peristiani, Stavros (1997) "Do Mergers Improve the X- Efficiency of U.S Banks? Evidence from the 1980s" Journal of Money, Credit, and banking, Pp 326-337
52. Petersen, Mitchell A., and Raghuram G. Rajan (2002) "The Information Revolution and Small Business Lending: Does Distance Still Matter? Journal of Finance
53. Passah, P.M (2001) "Banking and Financial Sector Reforms in India-Rationale, Progress, Efficiency and Future Agenda" Political Economy Journal of India, Pp 18-38
54. Quinn, S and Roberds, W (2005) "The Big Problem of Large Bills: The Bank of Amsterdam and the Origins of Central Banking", Federal Reserve Bank of Atlanta Working paper No. 2005-16
55. Solow, Robert M (1957) "Technical Change and the Aggregate Production Function" Review of Economics and Statistics, Pp 313-330
56. S.M.Tariq Zafar (2014) "A Pre Rescission Comparative Analysis of Cost, Productivity and Employees Efficiency in Indian baking Industry" Al – Barkat Journal of Finance and management", Published by Indian Publication House, Print ISSN: 0974-7281 Online ISSN: 2229-4503
57. S.M.Tariq Zafar, (2013) Nonperforming Assets and Its Impact on Indian Public Sector Banks" published in international Journal of Marketing Financial Services and Management (ISSN ONLINE: 2277-3622), on 15th FEB, 2013.

International Journal Of Core Engineering & Management (IJCEM)
Volume 3, Issue 5, August 2016

58. S.M.Tariq Zafar, (2012) "A Study on Universal Banking and its Impact on Indian Financial Market" published in Research Journal of Business Management & Social Sciences Research (ISSN: 2319-5614), "Blue Ocean Research Journals".
59. S.M.Tariq Zafar, (2012) "A Study of Financial Performance of Selected Indian Scheduled Commercial Banks using CAMELS Methodology for 2006 - 2010" published in IMS Manthan, Greater Noida, and Volume 7 Issue 1. The Journal of Innovations, an International Refereed Journal, Reg. No. UPENG/2007/23486, ISSN 0974-7141 (Print, ISSN 0976-1713 (Online), July 2012. <http://www.imsmanthan.com>,
60. S.M.Tariq Zafar, (2012) "A Study on Dividend Policy and its Impact on the Shareholders Wealth in Selected Banking Companies in India" published in international refereed journal "International Journal of Financial Management", Publishing India, ISSN, NO.2229-5682, and September Issue-2012.
61. Sensaram, R (2006) "Are Foreign Banks Always the Best? Comparison of State Owned, Private and Foreign banks in India" Economic Modelling
62. Sarkar, P C das A (1997) "Development of Composite Index of banking Efficiency: The Indian Case" Reserve bank of India Occasional Paper, 18, Pp 1-10
63. Stiroh, Kevin J (2001) "Information Technology and the Productivity Revival: What do the Industry data Say?" Federal Reserve Bank of New York Working Paper
64. Sullivan, Richard (2001) "Performance and Operation of Commercial Bank Web Sites" Federal Reserve Bank of Kansas City, Financial Industry Perspectives, Pp 23-33
65. Shoebridge, M (2005) "Banking on Six Sigma to Improve Service Quality a Case Study: Major Australian Financial Institution, Australian Banking & Finance,14, Pp 9-10
66. V. Leeldhar, (2007) "Customer Centricity and the Reserve Bank, RBI Monthly Bulletin
67. Winttner, M and Wolff, S (1911) "Method of payment by Means of Bank Account transfer and the Use of Checks in Germany", in Koch, R (ed), Publications of national Monetary Commission Vol. XI-Articles on German banking and German Banking Laws, Washington
68. Zafar S.M.Tariq, (2011) "A Study on Impact of Leverage on the Profitability of Indian Banking Industry" published by Publishing Indian Group in International Journal of Financial Management, ISSN, NO.2229-5682 (P), an International Referred Quarterly Journal, April- 2011, pp.85-99.
69. Zafar S.M.Tariq, (2010) "A Fundamental Analysis of Public Sector Banks in India" published in I M S Manthan, Greater Noida, The Journal of Innovations, an International Refereed Journal and Volume 5 Issue 2 Reg. No. UPENG/2007/23486, ISSN 0974-7141 (Print0, ISSN 0976-1713 (Online) December, 2010, pp. 107-114.
70. Zafar S.M.Tariq, (2010) "A Comparative Study of the Performance of Hybrid Banks in India" published in Journal, 'Al-Barkaat Journal of Finance and Management' "Indian Publication house" Print ISSN: 0974-7281. Online ISSN: 2229-4503, Volume-4, Issue-2 (July).
71. Zafar S.M.Tariq, (2011) "Non - Performing Assets and Indian Banking" published in biannual-referred research journal of OIMT Business Review, ISSN: 0976-3236, Volume 1, Issue 1, and Feb-2011.