

Technological Transformation and Digitalization in Public Sector Banks

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Abstract: With the development of information technology, banking system has undergone a huge change. Technology has given new dimensions to the banking system. With the help of card and telephone access, banking can be done anytime, anywhere through 24-hour ATM, credit card, debit card access. Digital has made digital lending very easy and simple for both bank and customer, able to develop other loans like technology product service, which will enable bank to get strategic advantage. The main objective of this research is to review the impact of technology on public sector banks in India. For the study, the researcher has collected secondary data from various sources such as articles and websites. The study reveals that adoption of technology by public sector banks brings both benefits and challenges. Cost-effective, seamless banking, new products and services, data barring houses, a sustainable banking are some of the benefits accruing from adoption of technology by public sector banks. Cyber-crime, customer feedback, choice of technology, data integration and fraud are some of the challenges faced by public sector banks in adopting technology.

Key words: Digitalization, Mobile banking, Online banking, Public Sector Banks

Introduction

Digitization has enabled banks to leverage the power of data analytic and artificial intelligence (AI) to make better business decisions and offer personalized services to customers. By collecting and analyzing customer data, banks can tailor their services to meet the specific needs of each customer. Information technology (IT) encompasses the acquisition, processing, storage, and dissemination of knowledge using engineering and telecommunication systems. IT architecture serves as a unified framework for acquiring and evolving technological resources to achieve strategic objectives. This technology is pivotal in facilitating data storage, input, communication, and processing, leveraging tools such as ancillary equipment, firmware, software, and related services. Modern advancements in IT provide vast capabilities for handling large-scale data, including protein and gene sequences, functional information, and expression analysis. In India's banking sector, IT has revolutionized operations through innovations such as the Internet, the Society for Worldwide Interbank Financial Telecommunication (SWIFT), automated teller machines (ATMs), electronic clearing services, Bank Net, chip cards, phone banking, tele-banking, internet banking, mobile banking, voice mail, e-banking, and anywhere banking.

The adoption of IT in banking addresses several critical needs, including:

- **Meeting Internal Requirements:** Enhancing operational efficiency and internal processes.
- **Effective Data Management:** Streamlining data handling for improved accuracy and speed.
- **Improved Customer Services:** Offering tailored and convenient banking solutions.
- **Support for Innovation:** Enabling the development of new products and services.
- **Non-Technical User Empowerment:** Simplifying IT solutions for non-technical staff.

Emerging trends in IT within the banking sector include outsourcing, system integration, achieving a competitive edge, treating IT as a profit center, and thriving in down-market conditions. Public sector banks, where the government holds a majority stake (over 50%), have been instrumental in adopting these technologies. Currently, India has 12 public sector banks following recent mergers and one payment bank—India Post Payments Bank—further expanding the scope and accessibility of banking services.

Review of literature

The integration of technology and digitalization in public sector banks (PSBs) has been a pivotal area of research, emphasizing efficiency, financial inclusion, and service quality improvement. This review synthesizes existing studies on technological advancements in PSBs, analyzing trends, impacts, and gaps in the research.

Numerous researchers have explored the role of information technology in transforming financial institutions.

Ahmadirezaei (2011) emphasized that investing in technology enhances customer facilitation and saves time for both customers and employees. Khajeh (2011) identified three key ways in which technology impacts the banking system: increasing competition, achieving economies of scale, and creating diverse delivery channels.

Dauda and Akingbade (2011) noted that technology alone does not guarantee improved productivity or performance; its effectiveness depends on how well it is integrated with other resources and utilized ethically and efficiently by human resources. Similarly, Lawless and Anderson (1996) highlighted those technological advancements enhance employee efficiency and practicality. Moreover, Li and Deng (1999) demonstrated that such advancements contribute to overall firm performance.

While most banks in Zimbabwe have implemented internet banking, its adoption among consumers remains relatively low. Key challenges hindering widespread usage include compatibility issues with existing legacy systems, high implementation costs, and security concerns (Thulani, D., Tofara, C., et al., 1970).

The importance of knowledge systems and emerging infrastructural trends in the banking sector has also been a focus of study. Rangarajan (1991) emphasized the critical role of developing banking infrastructure to enhance the mobilization of services and resources through diverse mechanisms.

Technology is transforming traditional business processes and driving changes in customer behavior, significantly intensifying competitive pressures in the banking sector. According to K.V. Kamath and S.S. Kohli (2003), four key trends are reshaping the industry: consolidation, globalization of operations, the advent of new technologies, and the universalization of banking. However, the intersection of technology and banking presents unique challenges for the industry.

The widespread use of ATMs and other electronic transaction modes has become standard, but banks and financial institutions remain prime targets for cybercriminals. Monetary gain continues to be the primary motivation for cybercrimes, with little indication of this trend abating.

A study by A. Thangam and S. Ganapathy (2019) explored the technical aspects of cybercrimes and their implications, particularly in relation to advanced technologies at institutions like SBI. The findings revealed fluctuating trends in the growth rate of total advances at SBI, highlighting significant variations across different sectors.

Further research by Ganapathy and Rajamohan (2020), using ranking methods and percentage analysis, examined the stress associated with technology among bank employees. The results showed that technology-related stress has both psychological and physiological effects, influencing work and family environments, increasing absenteeism, altering worker attitudes, and reducing job performance.

To address these challenges, the study recommends educating bank employees about emerging technologies to mitigate stress and enhance their adaptability and productivity.

- **Digital Payment Systems:** Research by **Sharma et al. (2018)** emphasizes the role of digital wallets, UPI (Unified Payments Interface), and mobile banking in transforming customer transactions in PSBs.
- **AI and Automation:** Studies such as **Gupta and Verma (2020)** analyze the use of AI- powered chatbots and automated loan processing systems in PSBs, enhancing efficiency and customer satisfaction.
- **Data Analytics:** Research highlights the adoption of predictive analytic for credit risk assessment and fraud detection in PSBs (**Kumar et al., 2022**).
- **Infrastructural Gaps:** Studies (e.g., **Bhatnagar, 2020**) point out the inadequate IT infrastructure in rural and semi-urban branches of PSBs.
- **Cybersecurity Risks:** Research highlights rising concerns over data breaches and fraud in digital banking platforms (**Rajeev et al., 2021**).
- **Employee Training:** Studies (e.g., **Mishra et al., 2020**) emphasize the need for upskilling employees to handle advanced IT systems effectively.
- **Resistance to Change:** Resistance among older staff and customers to adopt new technologies remains a barrier (**Shah, 2022**).

Objective of the study

1. To find out the influence of applying digital disruption to the Indian banking institutions.
2. Technological adoption can improve efficiency in public sector banks in India: research question In order to achieve this study objectives, the following research questions have been developed.
3. In order to achieve the aims and objectives of the study ie to assess and understand various issues in implementing technologies in public sector banks.
4. In order to make suggestions about how the banking activities can be improved besides adjusting the use of technology.

OPPORTUNITY AND CHALLENGES FACED BY PUBLIC SECTOR BANKS

Digitalization and technology could be threat and opportunities for public sector banks as expressed below. Some of the key opportunities include:

- **Increased Efficiency:** Several technologies can be applied to improve supply chain management for better functionality and to minimize the direct workings.
- **Enhanced Customer Experience:** Thus, using data analytics, banks are in a better position to discover customer needs to enable provision of highly relevant services.
- **Cost Reduction:** Use of cashless transactions and digital payments sharply cuts operational costs and affords better control over cash flow.
- **Financial Inclusion:** It offers the tools to bring otherwise underbanked or geographically isolated customers into the banking fold.
- **Innovation in Products and Services:** Digital transformation also helps the banks to come up with new products and services which fit the emerging customer requirements and current trend.
- **Advanced Data Management:** Through the data warehousing solutions, the banks are in a better position to handle on vast volumes of data so as to aid them in decision making.
- **Sustainable Banking:** The paper demonstrates that using appropriate technological tools, the banking sector can establish and apply sustainable principles, starting with the effective environmental management of their own resources, then including offering and promoting the environmentally friendly financial products and services to their clients.

Types of digitalization modes in public sector banks:

UPI (Unified Payment Interface)

Among the popular types of digital payments, the most popular is UPI. This allows money transfer from your bank account using a single window directly to the vendor from your mobile. The payee's virtual address with consent for mobile payment needs to be entered for this mode of digital payment. Several bank accounts can be linked with one app.

Internet Banking

Internet banking or net banking is among the oldest types of digital banking. You can manage your bank accounts virtually if you have an internet connection. Customers can visit the bank portal and enter login details (password and username) and register. The bank takes layers of security measures into account, ensuring caution during payment and transactions.

Mobile Banking

Another popular type of digital banking is mobile banking. Account holders download the bank application on their mobile. All bank services like balance enquiries, payments etc. can be accessed from smartphones.

Banking Cards

Banking cards are essential for all types of digital payments. Cards are based on their issuance, usage, and modes of digital payment. Four types of banking cards are Debit, Credit, Prepaid and Electronic cards.

- **Debit cards** issued by the bank are linked to the bank account, and cash can be withdrawn from the ATM, this banking card allows virtual payment for products and services bought through e-commerce or offline stores.
- **Credit cards** are issued by banks/ non-banks. These prepaid cards are used for buying products and services on credit.
- **Bank Prepaid Cards** are not linked to bank accounts and aid overdraft facilities. These cards need pre loaded value addition and only the amount added can be spent.
- **Virtual Debit Card** are electronic cards that work like debit cards are used for online e-commerce transactions.

Mobile Wallets

Mobile wallets are the digital version of a wallet that enables the user to make different types of digital payments online. Digital wallet stores money added by the user linked to their bank account. Safe amongst all digital payment methods, this can be used for all transactions through an app installed on the smartphone and an internet connection.

Bharat Interface For Money

Bharat Interface for Money (BHIM) app enables simple payment transactions amongst other modes of digital payment. With the Unified Payments Interface (UPI) you can make direct and instant bank to bank payments and collect money using your mobile number and address. You can make direct bank payments to anyone on UPI using their UPI ID or scanning their QR with the BHIM app. You can also request money through the app from a UPI ID.

POINT of SALE (PoS)

This is an internet linked electronic swipe machine through which a Merchant Establishment (ME) performs a retail transaction by swiping customer debit and credit card. The merchant calculates the amount owed by the customer. After receiving the amount, the merchant may issue a printed receipt or send an electronic receipt to the customer.

Traditional banking and modern banking differ significantly in various aspects, including their services, technology, customer experience, and regulatory environment. Here's a detailed comparison:

1. Services Offered

- **Traditional Banking:** Usually provides simple products such as deposit-taking accounts (savings and checking accounts), credit products (loans and mortgages), and investment products. It implies that services are primarily offered at physical branches.
- **Modern Banking:** Offers a wider array of services, including P2P transfers, robo-advisory, mobile and virtual banking, and crypto services. It also provides advanced investment facilities and customized banking advice in many modern banks.

2. Technology

- **Traditional Banking:** Invests heavily in maintaining physical branches and emphasizes direct customer interaction. While many traditional banks have embraced online banking, their systems are often outdated and not very user-friendly.
- **Modern Banking:** Focuses on digital services with well-developed mobile and web applications. It utilizes modern solutions such as artificial intelligence, machine learning, and blockchain to enhance efficiency and security.

3. Customer Experience

- **Traditional Banking:** Requires more patience and is less convenient due to reliance on face-to-face interactions. Customer relations may be impersonal, as customers often deal with several different customer relations officers.
- **Modern Banking:** Provides fewer but higher-quality services. Clients can access services conveniently through the internet or mobile applications. They can often receive instant answers via chatbots or online consultants.

4. Accessibility

- **Traditional Banking:** Customers must physically visit branches to address complaints or access services, which can be inconvenient, particularly for those in rural areas. Reduced branch accessibility and limited operating hours may also pose challenges.
- **Modern Banking:** Offers greater convenience by leveraging internet platforms, enabling customers to manage their financial needs from anywhere at any time. This is particularly beneficial for tech-savvy and youthful consumers.

5. Fees and Costs

- **Traditional Banking:** Often charges relatively higher fees for account maintenance, ATM usage, and other services. Many traditional banks also require customers to maintain a certain minimum balance.
- **Modern Banking:** Typically incurs lower costs, with many digital banks offering free services and competitive interest rates. Since they lack physical branches, operational expenses are reduced.

6. Regulatory Environment

- **Traditional Banking:** Highly regulated, with strict compliance requirements enforced by governments. This can slow the adoption of new technologies and services, hindering growth.
- **Modern Banking:** While operating within the same business domain, fintech companies often work under different regulatory frameworks, enabling quicker innovation. However, they face criticism regarding privacy and consumer data protection.

7. Trust and Security

- **Traditional Banking:** With a long history in the market, these institutions have earned customers' trust and confidence. They incorporate robust security features into their systems.
- **Modern Banking:** While newer fintech entrants may lack the trust associated with traditional banks, they are equipped with advanced security measures such as biometric identification and encryption. Building trust with customers

is crucial for their growth.

THE PROBLEM OF FRAUD

Safety concerns have emerged as a critical issue for Public Sector Banks (PSBs). With the growing number of users and the introduction of new banking services, ensuring productivity, efficiency, and quality has become vital to remain competitive. However, a significant number of customers are hesitant to adopt e-banking services due to fears of fraud, uncertainty, and security risks. Building and sustaining trust has become a major obstacle for online banking, as many customers perceive internet banking as inherently risky, susceptible to fraud, and prone to misuse.

This presents a significant challenge for banks to address customer concerns about security effectively. According to an RBI report, Public Sector Banks reported a total of 3,766 fraud cases, the highest among all banking sectors. The report also revealed a 15% year-on-year increase in the number of fraud cases. Below is a statement summarizing the number and value of fraud cases in Public Sector Banks over the past decade.

Number and amount of fraud cases in Public Sector Banks for the past years:

Year	Cases of fraud	Amount in ₹ crores
2009-10	4003	13672.46
2010-11	3530	14748.5
2011-12	3910	20210.86
2012-13	4504	24819.4
2013-14	4359	21542.03
2014-15	4269	23694.65
2015-16	4207	16779.42
2016-17	3927	25883.98
2017-18	4228	9866.23
2018-19	2836	6734.65
2019-20	4,413	1,48,400
2020-21	4,680,	1,18,417

Choice of Technology

The advent of technology in the banking sector has undoubtedly revolutionized operations, saving significant time. Public sector banks in India, in particular, are actively upgrading by integrating various technological advancements. However, challenges arise when banks select inappropriate technologies due to insufficient control processes or poorly designed systems. Such missteps can result in financial losses and damage to the bank's brand image and goodwill (Laroiya, R., 2002). To mitigate these risks, many banks rely on third-party service providers for banking technology, which, while offering expertise, often comes with high associated costs.

CYBERCRIME

Cyber-crime is illegal activity involving computers, the internet or network devices. Cyber criminals commit identity theft, initiate phishing scams, spread malware and instigate other digital attacks.

HACKING

Hacking refers to the act of unlawfully and unauthorizedly gaining access to a computer or network to manipulate, corrupt, or steal data.

PHISHING

Phishing is a technique used to obtain sensitive information, such as usernames, passwords, and credit or debit card details, by impersonating a trustworthy entity in electronic communications. The stolen information is then used for malicious purposes.

VISHING

Vishing (voice phishing) is a fraudulent practice that uses social engineering via phone systems to extract personal or financial information from individuals. The primary goal is typically financial gain.

ATM SKIMMING

ATM skimming involves tampering with ATM machines or POS systems by installing a skimming device on the card reader or keypad. These devices are designed to appear as legitimate parts of the machine. Additionally, malware can be installed on these devices to directly capture card information.

When skimmers are successfully implemented, they collect card numbers and PINs, which are then used to perform fraudulent transactions. To prevent such cyber crimes, stringent security measures must be adopted. This includes safeguarding both physical devices and customer deliverables. It is also critical for banks to ensure that customer personal data and sensitive information are adequately protected to prevent unauthorized access by fraudsters.

All security protocols should undergo regular review and enhancement. Banks must implement a comprehensive system security policy to protect customers' sensitive data effectively.

RESEARCH METHODOLOGY

This research is based entirely on secondary data. The information for the study has been gathered from various sources, including circulars and bulletins issued by the Reserve Bank of India, business publications such as *The Economic Times*, *Financial Express*, and *Business Standard*, as well as a range of journals, magazines, and websites. These sources collectively form the secondary data utilized for the analysis.

CUSTOMER RESPONSE

Customer response to the adoption of technology by public sector banks is a critical factor, as a significant portion of the Indian population interacts with these institutions. Any changes in routine banking operations can impact stakeholders, making customer reactions a key challenge. It is essential for bank customers to understand the advantages and disadvantages of various technological products. To address this, banks must actively educate consumers about using these products, which can, in turn, positively influence overall bank performance. The foundation of banking lies in customer trust. Building and maintaining this trust not only helps retain existing customers but also attracts new ones. Such initiatives naturally enhance the quality of banking services and contribute to the growth and development of banks.

CONCLUSION

Operating efficiency is the major tool where information technology is used as the major tool in improving productivity. The banking institutions which are mostly service industries are likely to embrace technology as well. This dependency is perhaps manifested most clearly with regards to technology deployment for enhanced service delivery. Through enhanced technology, banking products and services have been developed into customer friendly modes of transactions. Due to the dynamic change in technologies used in banking, development or changes in laws governing the banking industry, competition and other related factors, the banking industry requires continual innovation to adapt to the Bank's internal environment and the external environment. This research implies that the integration of technology in public sector banks is useful in the current economy; however, it comes with some drawbacks. It incorporates convenience and cost-effective banking services, new products and services propositions, enhanced data warehousing and sound banking practices. Nevertheless, the issues of cyber-crime, customer response to change, decision on the type of technology to use, integration of data, transition to another system, and fraud are still formidable ones. Perhaps because of the advancement of technology, now more than ever, institutions could use strong security systems. To the success and sustainability of technology solutions in banks, protection measures must be established.

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