International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 20, Issue 1, 2025
https://cgscopus.com/index.php/journals

Operational Efficiency of Payment and Settlement Systems in Selected Indian Banks: and Challenges

Amit Kumar Srivastava
Research scholar, Department of Commerce, Dr. APJ Abdul Kalam university,
Indore, M.P.
Dr. Manish Chaudhary
Associate Professor, Department of Commerce
Dr. APJ Abdul Kalam university, Indore, M.P.

Abstract

This study examines the operational efficiency of payment and settlement systems in selected Indian banks under the regulatory framework of the Reserve Bank of India. It evaluates key dimensions such as transaction speed, reliability, cost efficiency, accessibility, and risk management across systems like RTGS, NEFT, and UPI. Using both primary and secondary data, the research identifies improvements driven by digitalization and regulatory support. However, challenges such as cybersecurity threats, technical failures, infrastructure gaps, and customer awareness issues persist. The study suggests technological upgrades and policy measures to enhance efficiency and ensure a secure, resilient, and inclusive payment ecosystem.

keywords - R.B.I., RTGS, NEFT, UPI, Digital Payments, Banking Efficiency, Cybersecurity

Introduction

The efficiency of payment and settlement systems is fundamental to the stability and development of any modern financial system. In India, rapid digitalization and policy reforms have transformed the banking landscape, making electronic payment systems an integral part of economic activity. Under the regulatory supervision of the Reserve Bank of India, payment mechanisms such as Real Time Gross Settlement (RTGS), National Electronic Funds Transfer (NEFT), and Unified Payments Interface (UPI) have significantly enhanced the speed, reliability, and accessibility of financial transactions.

Operational efficiency in payment and settlement systems refers to the ability of banks to process transactions quickly, accurately, and at minimal cost while ensuring system security and reliability. Efficient systems reduce transaction delays, lower operational risks, and improve customer satisfaction, thereby contributing to overall economic efficiency. In recent years, India has witnessed exponential growth in digital payments, driven by technological advancements, government initiatives like Digital India, and increasing adoption of mobile banking platforms.

Despite these advancements, several challenges continue to affect the efficient functioning of payment and settlement systems in Indian banks. Issues such as system downtime, cybersecurity threats, technical glitches, infrastructure limitations in rural areas, and lack of customer awareness hinder optimal performance. Additionally, the growing volume of transactions places significant pressure on banking infrastructure, requiring continuous upgrades and robust risk management frameworks.

This study focuses on analyzing the operational efficiency of payment and settlement systems in selected Indian banks and identifying the key challenges that impact their performance. By evaluating parameters such as transaction speed, cost efficiency, accessibility, and system reliability, the study aims to provide insights into the effectiveness of existing systems. Furthermore, it seeks to suggest measures to enhance efficiency and address the issues faced by banks in ensuring smooth and secure payment operations.

Selected Indian banks for study-

In this study samples drawn 18 banks from 27 different public sector banks, and two private sector banks out of a total of 25, respectively.

Public sector banks were classified into three distinct groups in descending order of their overall business size. The first group, referred to as Large Banks, included five banks: the (SBI), (PNB), (Canara), (BOI), and (BOB).

The second group, classified as Mid-Size Banks, consisted of seven financial institutions: the Union Bank of India (Union), the Central Bank of India (Central), the UCO Bank (UCO), the Syndicate Bank (Syndicate), the Indian Overseas Bank (IOB), the Oriental Bank of Commerce (OBC), and the Allahabad Bank (Allahabad).

The third group, referred to as Small Banks, included the Indian Bank (Indian), Corporation Bank (Corporation), Andhra Bank (Andhra), Vijaya Bank (Vijaya), Bank of Maharashtra (BOM), and Dena Bank (Dena).

From the private sector category, one private sector bank from the new generation and one from the old generation were randomly selected. As a result, the two private sector banks chosen for the study were Axis Bank (Axis) and Lakshmi Vilas Bank Ltd (Laxmi).

International Journal of Interdisciplinary Cultural Studies
ISSN: 2327-008X (Print), ISSN: 2327-2554 (Online)
Volume 20, Issue 1, 2025
https://cgscopus.com/index.php/journals

Objective

1. To discuss the role and significance of operational efficiency in payment and settlement systems of selected Indian banks
2. To analyze the various issues relating to the efficient functioning of the payment and settlement systems of selected Indian banks

Hypothesis

1 Higher operational efficiency in payment and settlement systems leads to reduced transaction processing time in Indian banks.
2 Security risks and cyber threats are major barriers to the efficient functioning of payment and settlement systems in Indian banks

Methodology

Primary and secondary data , and Anova testing

Hypothesis testing

H1-Higher operational efficiency in payment and settlement systems leads to reduced transaction processing time in Indian banks.

ANOVA Result Comparing Operational Efficiency and Transaction Processing Time in Indian Banks

Source	Sum of Squares	Mean Squares	Cal. F	Crit. F	p-value
Between-group	5656.67	1414.17	26.5156	3.478	0.000053
Within-group	533.33	53.33		-	-
Total	6190	-	-	-	-

The hypothesis (H_2) states that higher operational efficiency in payment and settlement systems leads to reduced transaction processing time in Indian banks. The ANOVA results in Table 4 provide strong statistical evidence supporting this claim.

The between-group sum of squares (5656.67) and the mean square value (1414.17) indicate a significant variance in transaction processing times across different levels of operational efficiency. The calculated F-value (26.51) is much higher than the critical F-value (3.478), suggesting that the observed differences in transaction processing times are statistically significant. The p-value (0.000053) is extremely low, far below the standard significance threshold of 0.05, confirming that the results are not due to random variation but rather to actual differences in operational efficiency.

The within-group sum of squares (533.33) and the mean square value (53.33) indicate that while minor variations exist within individual banking processes, the primary factor influencing transaction speed is the level of operational efficiency. The significant difference between groups implies that banks with more efficient payment and settlement systems process transactions faster than those with lower efficiency levels.

H2-Security risks and cyber threats are major barriers to the efficient functioning of payment and settlement systems in Indian banks.

ANOVA Result Comparing Security Risks and Cyber Threats as Barriers in Payment and Settlement Systems

Source	Sum of Squares	Mean Squares	Cal. F	Crit. F	p-value
Between-group	5440	1360	9.714	3.478	0.0036
Within-group	1400	140	-	-	-
Total	6840	-	-	-	-

The hypothesis (H_3) states that security risks and cyber threats are major barriers to the efficient functioning of payment and settlement systems in Indian banks. The ANOVA results in Table 5 provide strong statistical evidence supporting this claim.

The between-group sum of squares (5440) and the mean square value (1360) indicate substantial variance in system efficiency based on security risks and cyber threats. The calculated F-value (9.714) is significantly higher than the critical F-value (3.478), confirming that security risks and cyber threats have a statistically significant impact on the efficiency of payment and settlement systems. The p-value (0.0036) is extremely low, far below the conventional significance level of 0.05, indicating that the observed differences are not due to chance but are indeed influenced by cybersecurity concerns.

The within-group sum of squares (1400) and the mean square value (140) suggest that while some variations exist within individual banking operations, the major determinant of inefficiencies in payment systems is the presence of security

COMMON GROUND

risks and cyber threats. The significant variance between groups highlights the urgent need for enhanced cybersecurity measures to ensure the smooth and secure operation of banking transactions.

Conclusion

The efficiency and effectiveness of payment and settlement mechanisms in Indian banks play a crucial role in maintaining financial stability and fostering economic growth. Through this study, we have examined the existing payment and settlement frameworks, assessed operational efficiency, analyzed key challenges, evaluated customer satisfaction, and proposed strategies for improvement. This conclusion synthesizes the key findings and highlights essential measures for enhancing operational efficiency in payment and settlement systems.

The Indian banking system has evolved significantly over the years, transitioning from traditional paper-based transactions to modern digital payment and settlement mechanisms. The introduction of the Real-Time Gross Settlement (RTGS) system, National Electronic Funds Transfer (NEFT), Immediate Payment Service (IMPS), and the Unified Payments Interface (UPI) has revolutionized transactions, ensuring speed, security, and convenience. The (RBI) has played a pivotal role in strengthening the payment infrastructure, setting regulatory frameworks, and promoting digitization. Despite these advancements, certain gaps remain, including the need for greater technological integration, enhanced cybersecurity, and inclusivity in rural banking services.

Suggestions of the Study

Findings from the research give light on how Indian banks handle payments and settlements at the moment, highlighting key areas for improvement. To enhance operational efficiency, security, and customer satisfaction, the following suggestions are proposed:

1. Strengthening Digital Infrastructure

Indian banks must invest in upgrading their digital infrastructure to support fast, seamless, and secure transactions. Outdated core banking systems are still used by many banks, which may cause delays in processing transactions. Upgrading to advanced cloud-based solutions can enhance scalability and ensure uninterrupted services. Increasing the use of digital banking also requires better internet access in semi-urban and rural regions. Government programs and partnerships with telecom companies may work together to narrow the digital gap.

2. Enhancing Cybersecurity Measures

With the increasing volume of digital transactions, cybersecurity threats have also escalated. Banks need to implement AI-powered fraud detection systems to proactively identify suspicious activities. Regular security audits, penetration testing, and cybersecurity training for bank staff should be prioritized. Moreover, multi-factor authentication and end-to-end encryption must be mandated for all online transactions to minimize the risk of cyber fraud and data breaches.

Recommendations

Recommendations of the Study

Based on the analysis of the payment and settlement mechanisms in Indian banks, several recommendations have been formulated to improve operational efficiency, enhance security, and increase customer satisfaction. The following recommendations aim to create a more robust and effective banking ecosystem:

1. Investment in Advanced Banking Technology

Indian banks should prioritize upgrading their digital banking infrastructure by adopting cloud computing, AI-driven automation, and blockchain technology. These advancements will help streamline payment processing, reduce transaction failures, and enhance security. A focus on real-time data analytics will enable banks to proactively identify system inefficiencies and optimize payment processing.

2. Strengthening Cybersecurity and Fraud Prevention

To combat rising cyber threats, banks should adopt multi-layered security protocols, including end-to-end encryption, biometric authentication, and AI-powered fraud detection systems. Regular cybersecurity audits, penetration testing, and employee training programs should be mandated to prevent security breaches. Additionally, collaboration with regulatory bodies like the RBI should ensure compliance with the latest security standards.

Future Scope of the Study

The study on payment and settlement mechanisms in Indian banks provides a foundation for further research and improvements in the banking sector. With rapid technological advancements, evolving regulatory frameworks, and increasing customer expectations, several future research opportunities and developments can be explored.

1. Integration of Emerging Technologies

The future of payment and settlement systems in Indian banks will be shaped by the adoption of emerging technologies such as blockchain, artificial intelligence (AI), machine learning (ML), and quantum computing. Future studies can explore how blockchain can enhance transaction transparency, reduce fraud, and improve the efficiency of cross-border

payments. Similarly, AI and ML can be leveraged for real-time fraud detection, automated dispute resolution, and predictive analytics for transaction failures.

2. Expansion of Central Bank Digital Currency (CBDC)

The Reserve Bank of India (RBI) has initiated pilot programs for a Central Bank Digital Currency (CBDC). Future research can focus on the impact of CBDC on the efficiency, security, and accessibility of payment and settlement systems. The study can also analyze how digital currency can complement existing payment systems, reduce reliance on cash transactions, and facilitate cross-border trade.

References

Journals and Articles

1. Syed, S. Grima, and K. Sood, "Assessing the role of the fintech era on the banking stability of an emerging economy: interaction analysis of the Indian banking industry," Folia Oeconomica Stetinensia, vol. 24, Issue 1, Page no. 182–202, Jun. 2024.
2. S. Jain, "A study on digital payment system and its future feasibility in India," International Journal of International Institute of Management Studies, vol. 2, Issue 1, Page no. 125–139, 2023.
3. A. Kumar, R. K. Choudhary, S. K. Mishra, S. K. Kar, and R. Bansal, "The growth trajectory of UPI-based mobile payments in India: enablers and inhibitors," Indian Journal of Finance and Banking, vol. 11, Issue 1, Page no. 45–59, 2022.
4. Mahesh and G. Bhat, "A systematic review and research agenda of digital payment system with reference to Unified Payment Interface," International Journal of Management, Technology and Social Sciences (IJMTS), vol. 7, Issue 2, Page no. 679–709, 2022.
5. R. F. Sultana and J. Bousrih, "Digital banking penetration: impact on students' usage frequency and awareness," R. Econ. And Finan., vol. 20, Issue 2, Page no. 562–571, 2022.

Books

1. Khan, M. Y. Indian Financial System. McGraw Hill Education, 2021.
2. Mishra, Rajesh. Digital Payments in India: Issues, Challenges, and Solutions. Notion Press, 2020.
3. Sundaram, K. P. M., and Datt, Ruddar. Indian Economy. S. Chand Publishing, 2018.
4. Sharma, G. L., and Bal, Amrinder. Indian Banking Industry: Challenges and Opportunities. Regal Publications, 2016.