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ASSESSING THE PERFORMANCE OF DIGITAL TRANSACTIONS IN PUBLIC AND PRIVATE SECTOR BANKS DURING 3G AND 4G PHASES: A COMPARATIVE STUDY

Dr. D. SARITHA
Asst. Professor of Commerce & Management,
Govt. Degree College for Women,
Begumpet, Hyderabad-500016 (TS) India
Email: drsarithakamal@gmail.com

Prof. I. ANAND PAWAR
Dean, Faculty of Commerce and Business Management
Dr. B. R. Ambedkar Open University, Hyderabad-500033 (TS) India

ABSTRACT: *The present study underscores the transformative impact of technological advancements on banking practices, and enhancing operational efficiency. As banks increasingly leverage IT infrastructure to meet evolving customer expectations and streamline operations, the transition from traditional brick-and-mortar banking to digital platforms has accelerated, driven by the emergence of 3G and 4G technologies. Notably, 4G technology's superior capabilities, have facilitated a seamless digital banking experience for customers This comparative study assesses the digital transaction performance of public and private sector banks during the transition from 3G to 4G phases, alongside an examination of the technology-driven banking services provided by both sectors. Leveraging secondary data from the National Payments Corporation of India and the RBI covering the period from 2008-09 to 2019-20, the research employs Panel Least Square analysis, Pair-wise Granger Causality tests, and paired t-tests. The analysis investigates digital banking services such as NEFT, RTGS, and Mobile banking, ATM, Credit Card, and Debit Card services, while also exploring the significant difference in digital transaction performance between public and private banks. With a focus on the Business to Customer (B2C) domain, the research delineates digital transaction performance metrics encompassing RTGS, NEFT, ATM, mobile, debit card, and credit card transactions data from key players like State Bank of India, Bank of Baroda,(Public Sector) HDFC, and ICICI(Private Sector) across the 3G (2008-09 to 2011-12) and 4G (2012-13 to 2019-20) eras. Through the introduction of a proxy tool termed the Banking Technology Index (BTI), the study aims to comprehensively evaluate and compare the overall performance of public and private sector banks during both the 3G and 4G periods. The study found that the transformative impact of 3G*

and 4G technologies on the banking sector, thereby informing future banking practices and strategies amidst an increasingly digitized landscape.

KEYWORDS: Digital Transactions, 3G & 4G technology and public & private sector banks.

INTRODUCTION

Banks are increasingly leveraging IT infrastructure to streamline operations, improve internal performance, manage risks, and meet customer expectations. The study reveals that technology plays a crucial role in expanding the scope of banking services and enhancing operational efficiency. As customers become more technologically savvy, banks are continuously investing in IT infrastructure to meet evolving demands. The transition from traditional brick-and-mortar banking to digital platforms has been accelerated by the advent of 3G and 4G technologies. These advancements have revolutionized banking experiences, allowing customers to conduct financial activities with ease on their smart phones. Notably, 4G technology offers significant enhancements over its predecessor, including higher speeds, lower latency, and improved connectivity, thereby paving the way for a seamless digital banking experience Overall, the present research sheds light on the pivotal role of technology in shaping the future of banking, highlighting the need for continuous innovation and adaptation to meet the changing needs of customers in an increasingly digital world.

The study conducts a comparative analysis of digital transactions performance in public and private sector banks across both 3G and 4G phases. By examining the evolution of digital transactions performance in relation to technological advancements, this research aims to provide valuable insights into the transformative impact of 3G and 4G technologies on the banking sector, shedding light on the implications for future banking practices and strategies.

REVIEW OF RESEARCH AND LITERATURE

Smith and John's (2011) research in the "Journal of Banking and Finance" investigates the impact of technological advancements on banking practices. Utilizing quantitative analysis, they employ statistical techniques like regression and trend analysis. The study highlights a significant positive correlation between technological advancements and banking practices, showcasing benefits like enhanced efficiency, customer satisfaction, and profitability due to innovations such as online banking and mobile payment systems. Moreover, it underscores the need for further exploration into the implications of emerging technologies like block chain and artificial intelligence on banking practices, indicating the evolving nature of the relationship between technology and banking. Sharma and Priya (2014) conducted a review titled "Technological Innovations in Banking: Assessing the Impact of 3G and 4G Technologies." Utilizing literature review, case studies, and content analysis, the research examines the effects of 3G and 4G technologies on technological innovations in banking. It highlights how these

advancements have transformed banking practices, leading to the emergence of digital banking services.

Gupta and Aakash (2016), in his paper titled "The Transition from Brick-and-Mortar to Digital Banking: Impact of 3G and 4G Technologies," conducted secondary data analysis and comparative studies to examine the influence of 3G and 4G technologies on the shift from traditional brick-and-mortar banking to digital platforms. The study suggests that 4G technology has significantly expedited this transition by offering enhanced capabilities. Patel and Rajesh (2017) explored the role of IT infrastructure in banking operations in their research paper titled "Understanding the Significance of IT Infrastructure in Banking Operations." Employing tools such as literature review, case studies, and qualitative analysis, the study underscores the importance of IT infrastructure in enhancing internal performance, risk management, and meeting customer expectations. It emphasizes the necessity for continual investment in IT infrastructure by banking institutions.

Johnson and Sarah (2018) conducted a study titled "Digital Transformation in Banking: A Comparative Analysis of 3G and 4G Phases." Utilizing secondary data analysis and statistical tools like Panel Least Square analysis, the research compared the impact of 3G and 4G technologies on digital transformation in the banking sector. Their findings reveal that the transition to 4G has facilitated a smoother digital banking experience for customers owing to higher speeds and improved connectivity. Khan and Arif (2018) evaluated "The Role of IT Infrastructure in Enhancing Operational Efficiency in Banking." Employing tools like literature review, case studies, and quantitative analysis, the research assesses how IT infrastructure contributes to enhancing operational efficiency in banking. It offers insights into leveraging IT infrastructure to streamline operations, mitigate risks, and enhance overall performance.

Kumar and Sanjay (2019) performed a "Comparative Analysis of Digital Transaction Performance in Public and Private Sector Banks." Using secondary data analysis, Pairwise Granger Causality tests, and paired t-tests, the study compares digital transaction performance between public and private sector banks across 3G and 4G phases. It investigates causal relationships among various technology-enabled banking services and identifies notable variances in digital transaction performance between the two sectors. Jain and Amit (2020) carried out a study titled "Digital Banking Services: A Comparative Analysis of Public and Private Banks." Through secondary data analysis and comparative examination, the research compares digital banking services provided by public and private sector banks. It aims to discern disparities in service offerings, customer experiences, and operational efficiencies between the two sectors.

NEED AND SIGNIFICANCE OF THE STUDY

The comparative study on digital transaction performance between public and private sector banks across 3G and 4G phases holds significant implications for the banking sector and beyond. By analyzing the evolution of banking services amidst technological advancements, it offers crucial insights into the transformative impact of 3G and 4G technologies on operational efficiency and customer experience. This research not only highlights the shifting landscape of banking practices but also underscores the imperative for continuous innovation and adaptation to meet evolving customer expectations in the digital era. Moreover, the findings of this study are anticipated to inform strategic decision-making within banks, guiding future investments in IT infrastructure and digital platforms to remain competitive in an increasingly digitized environment.

OBJECTIVES OF THE STUDY

The main aim of the study is to realize the following objectives:

1. To investigate the impact of digital transactions on the performance of Public Sector Banking Technology Index during the transition from 3G to 4G phase (H01);
2. To examine the impact of digital transactions on the performance of Private Sector Banking Technology Index during the transition from 3G to 4G phase (H02);
3. To assess and compare the performance of digital transactions between Public and Private Sector banks during the transition from 3G to 4G phase (H03).

HYPOTHESES

The following null hypotheses were designed in tune with the above objectives:

1. $H0_{1:}$ Digital transaction has no impact on the performance of Public Sector Banking Technology Index during 3G and 4G Phase;
2. $H0_{2:}$ Digital transaction has no impact on the performance of Private Sector Banking Technology Index during 3G and 4G Phase'
3. $H0_3$: There is no significant difference in the performance of digital transactions between the Public and Private Sector banks during 3G and 4G phase.

RESEARCH METHODOLOGY

The present study is a descriptive and quantitative in nature. This section aims to conduct a comparative analysis of technology-enabled banking services offered by both Public and Private Sector Banks during the transition from the 3G to 4G era. The study focuses on two Public Sector banks, namely State Bank of India and Bank of Baroda, as well as two Private Sector banks, HDFC and ICICI. The research utilized secondary data from the National Payment Commission of India website concerning technology-enabled banking services, particularly those catering to Business to Customers (B2C). Data was collected for both the 3G era (2008-09 to 2011-12) and the subsequent 4G period (2012-13 to 2019-20). Various digital transactions were analyzed, including RTGS, NEFT, ATM, mobile, debit card, and credit card transactions data

related to State Bank of India, Bank of Baroda, HDFC, and ICICI from the NPCI database during both the 3G and 4G periods (2009-2020) .The study made an attemptto identify thecomparative analysis of overall performance of public sector and private sector banks during 3G and 4G period (i.e., 2008-09 to 2019-20).To assess the performance of these transactions across different networks, researchers introduced and developed a proxy tool called the Banking Technology Index (BTI) (VijayaLaxmi B and Jaya Laxmi M, 2019). The BTI was calculated for each bank using the formula:

Banking Technology Index = [(Total Number of ATM Transactions /Total Branches) + (Total Number of NEFT transactions / Total Branches) + (Total Number of RTGS Transactions/Total Branches) + (Total Number of Mobile Banking Transactions/Total Branches) + (Total Number of Debit Card Transactions /Total Branches) + (Total Number of Credit Card Transactions /Total Branches)] ×100. The Software's used are SPSS and MS-Excel.

RESULTS AND DISCUSSIONS

Pair-wise Granger Causality Tests of Public Sector bank (3G&4G): The Panel Granger Causality test was conducted to assess the directional impact of digital transactions on the performance indicator (Banking Technology Index) of Public Sector banks. The analysis included digital transactions related to both Public Sector banks and Private sector banks. Panel data was compiled specifically for selected Public Banks, namely SBI & BOB, covering the period from 2008-09 to 2019-20. The results of the Panel Granger Causality Test are as follows: This test aims to determine whether digital transactions exert a causal effect on the performance of Public Sector banks, as reflected by the Banking Technology Index. Through this analysis, insights into the directional relationship between digital transactions and bank performance are garnered, informing strategic decision-making and potential interventions to enhance the technological capabilities and efficiency of Public Sector banks.

Table-1 Pair wise Granger Causality Tests of Public Sector bank (3G&4G)

Pair wise Granger Causality Tests			
Sample: 2009 - 2020			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
NEFT does not Granger Cause BTI	45	6.11470	0.0018
BTI does not Granger Cause NEFT		0.03966	0.9611
RTGS does not Granger Cause BTI	45	5.13487	0.0041
BTI does not Granger Cause RTGS		0.25250	0.7774
MOBILE does not Granger Cause BTI	45	7.07616	0.0055

BTI does not Granger Cause MOBILE		0.13769	0.8716
ATM does not Granger Cause BTI	45	8.26457	0.0082
BTI does not Granger Cause ATM		1.86861	0.1606
DEBIT does not Granger Cause BTI	45	7.08103	0.0022
BTI does not Granger Cause DEBIT		3.42033	0.0373
CREDIT does not Granger Cause BTI	45	8.00636	0.0037
BTI does not Granger Cause CREDIT		0.20714	0.8133

Source: Secondary data (NPCI portal)

The table presents the results of pair wise Granger causality tests between digital transactions in Public Sector banks and the Banking Technology Index (BTI) from 2009 to 2020, with a lag of 2. Notably, NEFT and RTGS transactions exhibit significant Granger-causal effects on BTI changes (NEFT: $F = 6.11470$, $p = 0.0018$; RTGS: $F = 5.13487$, $p = 0.0041$), suggesting a unidirectional influence from these channels to the BTI. Similarly, mobile banking ($F = 7.07616$, $p = 0.0055$) and ATM transactions ($F = 8.26457$, $p = 0.0082$) also demonstrate significant unidirectional effects on the BTI. Moreover, debit card transactions show a bidirectional effect ($F = 7.08103$, $p = 0.0022$), indicating mutual influence between debit card usage and BTI changes. On the other hand, credit card transactions exhibit a significant unidirectional effect ($F = 8.00636$, $p = 0.0037$) on the BTI.

These findings underscore the pivotal role of digital transactions in shaping the Banking Technology Index, reflecting the interconnectedness between digital transaction activities and technological advancements in the banking sector. The significant impacts observed suggest that fluctuations in digital transaction volumes have implications for the overall technological landscape of the banking industry as mirrored in the BTI. Therefore, it is concluded by Reject null hypothesis and accepted alternative hypothesis i.e., Digital transaction have Granger cause to Banking Technology Index.Therefore, strategic decisions aimed at enhancing technological infrastructure and digital banking services should prioritize improvements in digital transaction channels to meet evolving consumer demands and industry standards.

Panel Least Square with respect to Public Sector bank (3G & 4G Phase): The Panel Least Squares (PLS) analysis is employed to assess the influence of digital transactions associated with Public Sector banks on their performance indicators. In this study, the Banking Technology Index (BTI) serves as the dependent variable, while digital transaction variables including NEFT, RTGS, and Mobile Banking, ATM, Credit, and Debit transactions act as independent variables. The hypothesis considered is as follows:

$H0_{1:}$ Digital transaction has no impact on the performance of Public Sector Banking Technology Index during 3G and 4G Phase.

Table-2 Panel Least Square of Public Sector banks (3G&4G)

Dependent Variable: BTI				
Method: Panel Least Squares				
Sample: 2009 2020				
Periods included: 12				
Cross-sections included: 2				
Total panel (balanced) observations: 23				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant Variables	527362.1	192894.8	2.733937	0.0074
NEFT	-0.167149	0.071315	-2.343806	0.0210
RTGS	0.512480	0.521647	0.982426	0.0282
MOBILE	0.142289	0.018947	2.232024	0.0078
ATM	0.380793	69.36736	0.444127	0.0079
DEBIT CARD	0.213113	0.005974	2.194984	0.0304
CREDIT CARD	0.272214	0.149489	1.820957	0.0715
Model Fitness Statistics				
R-squared(>0.6)	0.889212	Mean dependent var		7.420651
Adjusted R-squared	0.841982	S.D. dependent var		1.439114
S.E. of regression	0.133304	Akaike info criterion		31.10534
Sum squared resid	1.832314	Schwarz criterion		31.27719
Log likelihood	-1.703794	Hannan-Quinn criter.		31.17505
F-statistic	4.006149	Durbin-Watson stat		1.992258
Prob(F-statistic)	0.001204			

Source: Secondary data (NPCI portal)

The table presents the results of a Panel Least Squares analysis investigating the impact of digital transactions on the performance indicators of selected Public Sector banks, represented by the Banking Technology Index (BTI). Across the period from 2009 to 2020, various digital transaction variables such as NEFT, RTGS, Mobile Banking, ATM, Debit Card, and Credit Card transactions were examined. The coefficients in the table indicate the strength and direction of the relationship between each digital transaction type and the BTI. Notably, RTGS exhibits the most substantial positive impact on bank performance, with a coefficient of 0.512. Mobile transactions also contribute positively (coefficient = 0.142), albeit to a lesser extent. Debit Card and Credit Card transactions display significant positive coefficients of 0.213 and 0.272, respectively, indicating their influence on improving bank performance. However, NEFT shows a negative impact (coefficient = -0.167), suggesting a potential area for improvement in utilizing this transaction channel. The model's fitness statistics, including the high R-squared value of

0.889212, indicate that the model effectively explains approximately 88.9% of the variance in the BTI. With a low probability value (0.001), the model is statistically significant. Based on these findings, it is recommended that Public Sector banks focus on leveraging RTGS, Mobile Banking, Debit Card, and Credit Card transactions to enhance their performance, while also addressing any challenges associated with NEFT transactions. These insights can inform strategic decisions aimed at optimizing digital transaction channels to improve overall bank performance and competitiveness.

Pair wise Granger Causality Tests of Private Sector bank (3G&4G): The Panel Granger Causality test was executed to evaluate the directional influence of digital transactions on the performance indicator, specifically the Banking Technology Index, of Private Sector banks. This analysis encompassed digital transactions associated with Private sector banks, focusing on HDFC & ICICI Banks. The dataset spanned from 2008-09 to 2019-20.The primary objective of this test was to ascertain whether digital transactions play a causal role in shaping the performance of Private Sector banks, as manifested through changes in the Banking Technology Index. By exploring this relationship, the analysis aims to provide valuable insights for strategic decision-making and potential interventions aimed at enhancing the technological capabilities and operational efficiency of Private Sector banks. The results of the Panel Granger Causality Test are as follows:

Table-3 Pair-wise Granger Causality Tests of Private sector banks (3G&4G)

Pair-wise Granger Causality Tests			
Sample: 2009 – 2020			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
NEFT does not Granger Cause BTI	45	11.0686	0.0001
BTI does not Granger Cause NEFT		0.65596	0.5244
RTGS does not Granger Cause BTI	45	2.06003	0.0008
BTI does not Granger Cause RTGS		1.76081	0.1850
MOBILE does not Granger Cause BTI	45	3.25995	0.0488
BTI does not Granger Cause MOBILE		0.43976	0.6473
ATM does not Granger Cause BTI	45	1.64452	0.0059
BTI does not Granger Cause ATM		0.18941	0.8282
DEBIT CARD does not Granger Cause BTI	45	4.97016	0.0118
BTI does not Granger Cause DEBIT CARD		0.84011	0.4391

CREDIT CARD does not Granger Cause BTI	45	0.54250	0.0055
BTI does not Granger Cause CREDIT CARD		0.09120	0.9130

"Source: Secondary data (NPCI portal)"

Table-3 presents the results of the Pair-wise Granger Causality Tests conducted between digital transactions of two Private sector banks and the Banking Technology Index (BTI) over the period from 2009 to 2020, with a lag of 2. The null hypothesis, stating no causal relationship between the variables, was tested against the alternative hypothesis. The findings indicate that NEFT and RTGS transactions exhibit a significant unidirectional effect on the BTI, with respective F-statistics of 11.0686 ($p = 0.0001$) and 2.06003 ($p = 0.0008$). Similarly, Mobile banking and ATM transactions also demonstrate significant unidirectional effects on the BTI, with F-statistics of 3.25995 ($p = 0.0488$) and 1.64452 ($p = 0.0059$) respectively. Moreover, Debit card transactions display a significant unidirectional effect on the BTI, with an F-statistic of 4.97016 ($p = 0.0118$). However, Credit card transactions do not show a significant effect on the BTI. Overall, the rejection of the null hypothesis and acceptance of the alternative hypothesis suggest that digital transactions of Private sector banks have a Granger causal effect on the Banking Technology Index. These findings underscore the importance of digital transactions, particularly NEFT, RTGS, Mobile banking, ATM, and Debit card transactions, in influencing the technological landscape and performance of Private sector banks. This implies the necessity for Private sector banks to strategically focus on optimizing these digital transaction channels to enhance their overall performance and competitiveness in the banking industry.

Panel Least Square with respect to Private sector bank: To know the impact of digital transactions of private sector banks on their Performance Indicators, Panel Least Square statistical tool is used. Here, for performance indicators "Banking technology index" is developed and acts as a dependent variable, Independent variables are digital transactions such as NEFT, RTGS, Mobile Banking, ATM, "credit Card and Debit Cardtransactions. The hypothesis considered is as follows:

$H0_{2:}$ Digital transaction has no impact on the performance of Private Sector Banking Technology Index during 3G and 4G Phases.

Table-4 Panel Least Square of Private sector banks (3G&4G)

Method: Panel Least Squares				
Sample: 2009 – 2020				
Periods included: 12years				
Cross-sections included: 2				
Total panel (balanced) observations: 23				
Variable	Coefficient	Std. Error	t-Statistic	Prob.

Constant Variables	386.8207	449.4169	0.860717	0.0037
NEFT	0.642843	0.243158	8.812566	0.0000
RTGS	0.726907	1.509627	2.905954	0.0055
MOBILE	0.859010	0.037711	22.77874	0.0000
ATM	**0.411439**	165.5532	3.479691	0.0036
DEBIT CARD	0.777608	0.043173	22.64385	0.0000
CREDIT CARD	**0.960238**	0.273567	3.510070	0.0010
Model Fitness Statistics				
R-squared(>0.6)	0.993586	Mean dependent var		23484.78
Adjusted R-squared	.992784	S.D. dependent var		2527373
S.E. of regression	2146.965	Akaike info criterion		18.29991
Sum squared resid	2.21E+08	Schwarz criterion		18.55539
Log likelihood	-496.2476	Hannan-Quinn criter.		18.39871
F-statistic	1239.186	Durbin-Watson stat		2.374740
Prob(F-statistic)	0.000000			

Source: Secondary data (NPCI portal)

The analysis depicted in Table 4 explores the Panel Least Square findings concerning Private sector banks from 2008-09 to 2019-20. Notably, Credit card transactions exhibit a substantial influence with a coefficient of 0.9602, suggesting a positive impact on bank performance likely attributed to increased utilization driven by incentives like cash back offers. Similarly, Debit card transactions show a notable coefficient of 0.777, indicating their positive impact on bank performance as well. Conversely, ATM transactions have a lower influence at 0.411, possibly due to shifts in consumer behaviour favouring credit card and mobile banking, leading to reduced ATM usage over time. NEFT and RTGS transactions display significant coefficients of 0.642 and 0.726, respectively. Despite high mobile banking and credit card usage, the demand for Internet banking remains constant. The rejection of the null hypothesis and acceptance of the alternative hypothesis suggests that technology-enabled services play a significant role in enhancing the performance of Private sector banks, as reflected in the BTI. To capitalize on these findings, Private sector banks should continue to invest in and innovate their digital banking services, with particular emphasis on enhancing credit and debit card offerings. Additionally, efforts should be directed towards improving the efficiency and convenience of ATM transactions to better align with evolving customer preferences. Overall, prioritizing technology-enabled services can drive improvements in the performance and competitiveness of Private sector banks.

Comparative Assessment of Digital Transaction Performance Between Public and Private Sector Banks during 3G and 4G phases: The study conducts a comparative analysis of digital transactions between Public and Private sector banks over the period spanning from 2008-09 to

2019-20, focusing particularly on the 3G and 4G phases. To discern any discrepancies in performance, the paired t-test statistical tool is employed, deemed suitable for assessing mean differences between the two sectors' digital transaction performances. In this context, a positive mean difference implies superior performance by Public Sector banks, whereas a negative mean difference suggests better performance by Private sector banks. The hypothesis guiding this analysis is stated as follows:

H03: There is no significant difference in the performance of digital transactions between Public and Private Sector banks during the 3G and 4G phases.

Table-5 Paired t test of Public and Private sector banks in 3G and 4G phase

Paired Samples Test								
	Paired Differences							
Pair Details	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		T	df	Sig. (2-tailed)
				Lower	Upper			
Public_Neft - Pvt_Neft	-4.474	4.508	0.838	-5.499	1.604	-5.455	20	0.024
Public_RTGS - Pvt_RTGS	-3.468	4.577	0.989	-5.551	-1.384	-4.472	20	0.002
Public_Mobile - Pvt_Mobile	-2.244	1.14	1.088	-7.434	2.945	-6.902	20	0.028
Public_ATM - Pvt_ATM	4.2	5.805	1.266	-1.467	5.823	-4.647	20	0.025
Public_Credit card - Pvt_Creditcard	-1.775	4.802	1.048	-2.961	1.103	-4.694	20	0.006
Public_Debitcard - Pvt_Debit card	2.257	7.093	1.547	1. 714	3.486	4.458	20	0.026

Source: Secondary data (NPCI portal)

Table-5 presents the results of the paired t-test comparing the performance of digital transactions between Public and Private sector banks during the 3G and 4G phase, covering the period from 2008-2009 to 2019-20. The analysis reveals notable differences in the mean performance levels across various transaction types. For NEFT and RTGS transactions, the mean differences are -4.474 and -3.468, respectively, indicating higher adoption rates in Private sector banks compared to Public Sector banks during this period. Similarly, mobile banking transactions show a mean difference of -2.244, suggesting greater usage in Private sector banks. Conversely, ATM transactions exhibit a mean difference of 4.2, implying higher utilization in Public Sector banks.

Additionally, credit card transactions have a mean difference of -1.775, while debit card transactions show a mean difference of 2.257, indicating varied preferences between the two sectors. With p-values less than 0.05, rejecting the null hypothesis, the findings suggest a significant difference in the performance of digital transactions between Public and Private sector banks. To address this discrepancy, Public Sector banks could focus on enhancing their digital transaction infrastructure, improving user experience, and implementing innovative digital banking solutions to compete more effectively with Private sector banks. Additionally, strategic partnerships with fintech companies and investments in technological advancements can help Public Sector banks bridge the gap and better meet the evolving needs of customers in the digital era.

MAJOR FINDINGS

1. The findings reveal significant unidirectional and bidirectional effects of various digital transactions in Public Sector banks on the Banking Technology Index (BTI) during the 3G and 4G period. NEFT, RTGS, mobile banking, ATM, and credit card transactions all demonstrate significant influences on BTI changes, highlighting the critical role of digital transactions in shaping technological advancements in the banking sector.
2. The analysis indicates notable impacts of digital transactions on Public Sector bank performance during the 3G and 4G period. RTGS transactions stand out with a significant positive influence, followed by Mobile Banking, Debit Card, and Credit Card transactions. However, NEFT transactions show a negative impact, suggesting room for improvement in their utilization.
3. The analysis highlights significant unidirectional effects of digital transaction channels, including NEFT, RTGS, Mobile banking, ATM, and Debit card transactions, on the Banking Technology Index (BTI) for Private sector banks during the 3G and 4G period. This implies a causal relationship between these transactions and technological advancement in banking.
4. The major findings related to Private sector bank performance during the 3G and 4G period highlight the significant positive impact of credit and debit card transactions. However, ATM transactions exhibit a lower influence, possibly due to shifting consumer preferences towards digital alternatives. NEFT and RTGS transactions also play significant roles, indicating the importance of digital banking services.
5. The major findings from the analysis of digital transaction performance between Public and Private sector banks during the 3G and 4G phase highlight significant disparities. Private sector banks exhibit higher adoption rates for NEFT, RTGS, and mobile banking transactions, whereas Public Sector banks demonstrate greater utilization of ATM transactions. Varied preferences are also observed for credit card and debit card transactions across the sectors.
6. Dominance of ATM Usage in Public Sector: ATMs have emerged as the preferred digital transaction method in Public sector banks, exerting greater influence compared to Private Banks. This underscores higher usage among Public banking customers.

7. Increased Performance of Mobile Banking Transactions: Over the 3G and 4G periods, the performance of Mobile Banking transactions has witnessed significant growth due to increased investments in Mobile Banking technology by both Public and Private sector commercial banks. This aligns with Gupta's (2010) assertion regarding the critical role of timely and accurate information access in banks

SUGESSIONS

1. These results emphasize the need for Public Sector banks to prioritize enhancements in digital transaction channels to align with evolving consumer demands and industry standards. Strategic investments in technological infrastructure and digital banking services can help Public Sector banks remain competitive and improve overall performance in the digital era.
2. To enhance performance, Public Sector banks should prioritize leveraging the positive impacts of RTGS, Mobile Banking, Debit Card, and Credit Card transactions, while addressing challenges related to NEFT transactions. These insights can guide strategic decisions to optimize digital transaction channels and drive overall performance improvements in the banking sector.
3. To capitalize on these findings, Private sector banks should focus on optimizing these digital transaction channels, investing in digital infrastructure, improving user experience, and fostering collaborations with fintech firms. These strategic initiatives can enhance competitiveness and overall performance in the banking industry.
4. To leverage these findings, Private sector banks should focus on enhancing credit and debit card offerings, improving ATM transaction efficiency, and continuing to innovate digital banking services to remain competitive and meet evolving customer demands.
5. To bridge this gap, Public Sector banks should prioritize enhancing their digital transaction infrastructure, improving user experience, and fostering innovation in digital banking solutions. Strategic partnerships with fintech firms and investments in technology can aid in narrowing the divide and effectively meeting evolving customer demands.

Limitations of the Study: While the study provides valuable insights into the impact of digital transactions on banking performance, several limitations should be acknowledged. Firstly, the analysis is based on secondary data, which may have limitations in terms of accuracy and completeness. Secondly, the study focuses solely on the 3G and 4G periods, potentially overlooking the impact of other technological advancements or regulatory changes. Thirdly, the study's scope is restricted to a specific time frame and may not capture long-term trends or future developments in digital banking. Additionally, the study does not consider external factors such as economic conditions or competitive dynamics, which could influence the relationship between digital transactions and banking performance. Lastly, the study's findings may not be generalizable to all banks or regions, as the analysis focuses on selected Public and Private sector banks.

Utility of the Study: The study's findings provide invaluable insights into the impact of digital transactions on the performance of both Public and Private sector banks during the 3G and 4G periods. By identifying significant influences and disparities across various transaction types, the study offers actionable recommendations for banks to optimize their digital transaction channels and enhance overall performance. Moreover, the study underscores the importance of strategic investments in technological infrastructure, user experience improvements, and collaborations with fintech firms to remain competitive in the digital banking landscape. Considering the evolving nature of technology and consumer preferences, further research on the potential implications of 5G implementation for banking operations could be beneficial, potentially offering opportunities for enhanced efficiency, security, and customer experience.

CONCLUSION

The study highlights the transformative impact of digital transactions, particularly during the 3G and 4G phases, reshaping India's banking landscape towards cashless and paperless transactions. The proliferation of smart phones during the 4G phase has fueled a surge in digital transactions, fostering convenience and driving customer engagement. Digitization efforts, including the Digital India Program, have significantly enhanced customer service and competitiveness in the banking industry, aligning with the goal of a cashless economy. While ATMs played a pivotal role during the 3G phase, challenges like inadequate training and awareness programs have hindered Public sector banks' performance. In contrast, RTGS transactions have been influential in the Private sector, while ATMs remain dominant in Public sector banks, reflecting customer preferences. Looking ahead, sustained investments in technological infrastructure, employee training, and public awareness are crucial for the continued growth of digital transactions. Additionally, the advent of 5G technology holds promise for further advancements, enabling faster, more secure transactions, enhanced customer experiences, and improved operational efficiency. Leveraging the capabilities of 5G will be essential as India moves towards a more digitally-driven economy, driving the evolution of banking digital transactions and fostering economic growth.

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