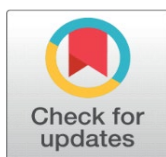
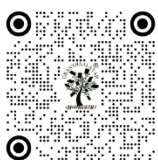


# TECHNOLOGICAL INNOVATIONS AS A GROWTH STRATEGY: AN ANALYTICAL OF THE PRIVATE BANKING SECTOR

J. S. Mohana Krishna <sup>1</sup>✉, Dr. R. Uma Maheswari <sup>2</sup>

<sup>1</sup> Ph.D. (Part-Time) Research Scholar, Department of Management Studies, Sree Saraswathi Thyagaraja College (Autonomous), Affiliated to Bharathiar University, Coimbatore, Tamil Nadu, India

<sup>2</sup> Associate Professor, Department of Management Studies, Sree Saraswathi Thyagaraja College (Autonomous), Affiliated to Bharathiar University, Coimbatore, Tamil Nadu, India



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## Corresponding Author

J. S. Mohana Krishna,  
[Mohana.Krishna@Outlook.com](mailto:Mohana.Krishna@Outlook.com)

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## ABSTRACT

Advanced technologies are increasingly taking over roles traditionally held by bank employees. The fast-evolving landscape of the banking industry, along with the ongoing challenges it presents, necessitates a continuous enhancement of knowledge and skills within organizations. Embracing new technology is crucial for achieving economies of scale and improving efficiency and effectiveness compared to existing systems. Innovations driven by technology will play a vital role in providing diverse and tailored banking services to a wide range of customers at lower costs. Key technological advancements include Internet banking, mobile banking, automated teller machines, and investments in software solutions. The banking sector is pivotal in accelerating socio-economic development, particularly in developing nations, where banks significantly contribute to economic growth through investments across various sectors. To maximize the benefits of these innovations, it is essential to create a system that promotes efficient investment in technology while minimizing the gap between revenue and costs associated with technological upgrades. A total of 280 participants from different private sector banks were surveyed using a stratified random sampling method, with a structured questionnaire designed to assess the impact and aspects of technological innovations in these banks.

**Keywords:** Technology, Innovations, Bank, Adoption, Customer Service

## 1. INTRODUCTION

The banking sector in India boasts a rich historical backdrop, encompassing traditional banking practices from the British colonial era to the periods of reform, nationalization, and privatization, along with the rising presence of foreign banks. This journey reflects the extensive evolution of banking in India. Since gaining independence, the Indian banking landscape has experienced significant changes, particularly during the 1990s and 2000s, when numerous innovations reshaped public perception of banking, driven by both autonomous and external demands. During the 1990s, there was a notable shift towards technology and innovation within the banking sector, enabling banks to enhance service quality

and speed. The advent of information technology has allowed customers to conduct banking activities from previously underserved locations. As highlighted by Malik (2014), the Indian banking system impacts millions and continues to expand rapidly. However, the industry faces various challenges, including evolving customer needs and perceptions, periodic regulatory changes, and rapid technological advancements. These pressures have necessitated a transformation in traditional business practices among banks.

Buzzacchi and colleagues (1995) created a conceptual model to examine how Information Technologies influence innovations in the banking industry. This theoretical framework highlights the significant impact of demand-pull factors in driving innovation within the context of smart automation. Conversely, it downplays the significance of cumulative and learning-by-doing effects associated with back-office automation, particularly for banks that possess adequate absorptive capacity. The proposed hypotheses are evaluated using an econometric analysis of the factors influencing innovative practices in electronic payment systems among a group of Italian commercial banks.

## 2. EVOLUTION OF THE INDIAN BANKING INDUSTRY

The General Bank of India, recognized as the first bank in India, was founded in 1786. Following this, the East India Company established several banks: the Bank of Bengal/Calcutta in 1809, the Bank of Bombay in 1840, and the Bank of Madras in 1843. The Bank of Hindustan was later founded in 1870. The three banks - Bank of Calcutta, Bank of Bombay, and Bank of Madras - were collectively known as the Presidency Banks. In 1865, Allahabad Bank became the first bank to be entirely managed by Indians. Punjab National Bank Ltd. was established in 1894, with its headquarters in Lahore. Between 1906 and 1913, several banks were founded, including the Bank of India, Central Bank of India, Bank of Baroda, Canara Bank, Indian Bank, and Bank of Mysore. In 1921, the Presidency Banks merged to form the Imperial Bank of India, which was operated by European shareholders. Subsequently, the Reserve Bank of India was established in April 1935. During this initial phase, the banking sector experienced slow growth, and between 1913 and 1948, around 1,100 small banks existed in India.

To enhance the operations and activities of commercial banks, the Government of India introduced the Banking Companies Act in 1949, which was subsequently amended to become the Banking Regulation Act of 1949 through the amending Act of 1965 (Act No. 23 of 1965). The Reserve Bank of India was granted significant authority to oversee banking operations in the country as the Central Banking Authority. Following independence, the government implemented crucial reforms in the Indian banking sector. In 1955, the Imperial Bank of India was nationalized and renamed the "State Bank of India," serving as the primary agent of the RBI and managing banking transactions nationwide. This transformation was formalized under the State Bank of India Act of 1955. Additionally, in 1960, seven banks that were subsidiaries of the State Bank of India were also nationalized.

On 19<sup>th</sup> July 1969, a major process of nationalization was carried out. At the same time, 14 major Indian commercial banks of the country were nationalized. In 1980, another six banks were nationalized, thus raising the number of nationalized banks to 20. Seven more banks were nationalized with deposits of over 200 crores. Till the year 1980, approximately 80% of the banking segment in India was under the government's ownership. On the suggestion of the Narasimhan Committee, the Banking Regulation Act was amended in 1993 and thus the gates for the new private-sector banks were opened. The following are the major steps taken by the Government of India to Regulate Banking institutions in the country:- 1949: Enactment of Banking Regulation Act. 1955: Nationalisation of State Bank of India. 1959: Nationalization of SBI subsidiaries. 1961: Insurance cover extended to deposits. 1969: Nationalisation of 14 major Banks. 1971: Creation of credit guarantee corporation. 1975: Creation of regional rural banks. 1980: Nationalisation of seven banks with deposits over 200 Crores.

## 3. INNOVATIONS IN BANKING SECTOR

On July 19, 1969, a significant nationalization initiative was implemented, resulting in the nationalization of 14 prominent commercial banks in India. In 1980, an additional six banks were nationalized, bringing the total to 20. Furthermore, seven more banks with deposits exceeding 200 crores were also nationalized. By 1980, around 80% of India's banking sector was under government control. Following the recommendations of the Narasimhan Committee, the Banking Regulation Act was revised in 1993, paving the way for the establishment of new private-sector banks. The key milestones in the regulation of banking institutions in India include: 1949 - Introduction of the Banking Regulation Act; 1955 - Nationalization of the State Bank of India; 1959 - Nationalization of its subsidiaries; 1961 - Extension of

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insurance coverage to deposits; 1969 - Nationalization of 14 major banks; 1971 - Establishment of the credit guarantee corporation; 1975 - Formation of regional rural banks; 1980 - Nationalization of seven banks with deposits over 200 crores.

#### **4. CHALLENGES AHEAD FOR BANKING SECTOR**

Technological advancements in the Indian banking sector create distinct opportunities and challenges for the industry. It is crucial to either develop or acquire suitable technology, implement it effectively, and maximize its potential to uphold high standards of service and efficiency while remaining cost-effective and providing sustainable returns to shareholders. Consequently, managing technology poses a significant challenge for Indian banks. In developing nations like India, a large segment of the population lacks access to banking services due to dispersed and fragmented locations. However, for those who do utilize banking services, expectations are on the rise, driven by improved service levels resulting from advancements in Information Technology and intense competition among various banks' offerings. With the presence of foreign banks in the Indian market, the range of services has expanded, prompting banks to focus on meeting customer demands.

India, with its vast population, is on the brink of becoming the most populous nation shortly. The rapid demographic growth presents an opportunity for technological innovations to foster a seamless connection between urban and rural communities. A significant hurdle lies in providing consistent service to all customers, regardless of their location. Customer retention will emerge as a critical challenge, prompting banks to focus on maintaining their clientele and expanding their market presence. Despite the convenience of ATMs and Internet Banking, many individuals still cherish the personal interaction offered by their local branch. Technology has enabled the delivery of services across the entire branch network, allowing for immediate updates to checking accounts and swift money transfers. However, this reliance on technology has placed additional demands on the IT department, which must manage, maintain, and enhance the performance of retail banking networks. Modern retail banks must ensure that all products and services are accessible at all times throughout the organization to drive revenue and stay competitive. Furthermore, managing these intricate, distributed networks and applications is vital to achieving business objectives, particularly in ensuring that transaction applications operate smoothly between branch offices and data centers.

#### **5. REVIEW OF LITERATURE**

Shujat and Bhutto (2011) argue that it is beneficial for the banking sector to improve its policies, benefits programs, and pay structures to attract, recruit, and retain more capable candidates. Banks should pay attention to such factors since the benefits extend beyond employees and can help banks in the long run, particularly in terms of workforce turnover. Ravi et al. (2011) observed that both public and private banks exhibit comparable trends in outsourcing. Nevertheless, public banks face greater regulatory constraints, which limit their ability to outsource specific processes to mitigate potential risks to customer data privacy. From a financial strategy perspective, this regulatory environment may negatively impact the long-term profit margins of public banks.

Jain et al. (2012) emphasize that effective human resource management and high levels of job satisfaction in banks are crucial not only for the banks' performance but also for the overall growth and performance of the economy. Majumder (2012) notes that significant advancements in Information and Communication Technology, shifts in workforce demographics and values, the rise of the knowledge economy, and heightened global competition have posed substantial challenges for organizations. Anjum (2012) highlights the rapid growth of the Indian banking sector, driven by technological advancements such as ATMs, online banking, telephone banking, and mobile banking. The proliferation of plastic cards, which serve the retail segment, has seen exponential growth in recent years, largely supported by technological developments. Malik (2014) identifies various innovations in the banking and financial sector, including ECS, RTGS, EFT, NEFT, ATMs, retail banking, debit and credit cards, free advisory services, and online and mobile banking, along with other value-added products and services. This paper also discusses the advantages and challenges associated with evolving banking trends. Kaushik and Rahman (2015) assert that the practical implications of their findings can assist managers and designers of technological interfaces, ultimately benefiting users through the effective implementation of self-service technologies (SSTs). Mehta (2016) discusses the application of efficient and effective human resource practices aimed at maximizing value and minimizing costs within organizations. Haabazoka (2018)

investigates the impact of innovations on the performance of commercial banks, finding that technological advancements positively influence the financial performance of banks in Zambia.

Singh and Malik (2018) explored the efficiency and competitive landscape of Indian banks. Additionally, there is potential for further investigation into how various dimensions of service quality influence the technical efficiency of these banks. El-Chaarani and El-Abiad (2018) analyzed how factors related to technological innovation affect performance. Prokopenko et al. (2019) discussed the innovation strategies of banks, highlighting the crucial role of various state institutions in executing scientific and technical policies. The characteristics identified in the banks' strategies can inform the development of innovation systems and structures. Nichkasova and Shmarlouskaya (2020) examined both evolutionary and revolutionary changes, where the former involves transforming traditional business models into technology-driven companies, while the latter entails complete integration with alternative distributed services based on blockchain technologies and consumer empowerment. Islam et al. (2020) investigated customer perceptions of private banking services through an expanded set of service quality dimensions, aiming to establish a connection between customer satisfaction and loyalty. Their findings are expected to provide insights into enhancing customer satisfaction and loyalty in private banking services, not only in Bangladesh but also in other nations.

Hossain (2020) states that innovation is crucial for the survival and growth of PCBS. According to Saha (2021), for blockchain technology to be widely adopted, it must address issues such as expanding networks, limited collaboration, low comprehensiveness, lack of a solid regulatory framework, and insufficient skilled personnel. If the banking sector can tackle these obstacles, blockchain technology could become the future of banking services. Hymavathi & Koneru (2022) conclude that factors like working hours, technology, discipline, participation, motivation, learning and development, and performance-based bonuses play a significant role in change management and can influence employee performance.

Hymavathi & Koneru (2022) In today's competitive landscape, banks can secure an edge by addressing unmet needs or catering to niche markets. Employees are required to handle a diverse range of tasks, many of which are distinct, while some functions may not be directly related to banking and could be outsourced. This research aims to examine the degree of strategic change implementation and adoption within banks in India, as well as the extent to which these institutions engage in such practices. Additionally, the study investigates how well employees are trained in technology-driven strategies and operational alerts, enabling them to thrive in a rapidly evolving environment. Effective change management is crucial in the current dynamic business climate. Navigating change is inherently difficult, and it becomes even more complex within large corporate settings. Therefore, this study seeks to understand the impact of change management on employee performance and to provide insights on effectively managing change, particularly in the banking sector.

Dahri, Memnon, and Qureshi (2022) indicate that all variables, except data security, influence the growth of the FinTech sector. Ismat et al. (2023) highlight that E-banking serves specific segments of the population, which may result in dissatisfaction among those who are excluded. Banks need to address this disparity to enhance overall customer satisfaction. Private banks in Punjab are urged to persist in their innovation and adaptation to meet changing customer expectations, thereby maximizing the advantages of E-banking and ensuring high consumer satisfaction levels. Onunka et al. (2023) emphasize that as the banking sector evolves, its interdependent relationship with entrepreneurship is likely to drive economic growth, provided that challenges are effectively managed and opportunities are seized. Gohain and Sanyal (2024) point out that the challenges faced by human resources have been met with the emergence of various analytical tools, which are increasingly being utilized by large corporations. The study's findings highlight the crucial influence of HR analytics on workplace behavior and the overall work environment.

Sinha (2024) highlights that the financial ecosystem has significantly enhanced the efficiency and accessibility of banking services. The advent of digitalization has greatly influenced both public and private banking sectors in India, leading to improved operational efficiencies, greater financial inclusion, and a transformation in customer experiences. Ahinful et al. (2024) discuss various areas of innovation and strategic decision-making within banking institutions aimed at strengthening INP by implementing innovativestrategic tools such as TQM, INB, GOV, MKD, CMP, and TUR.

## 6. OBJECTIVES OF THE STUDY

- 1) To identify the socioeconomic of respondents and the challenges faced by Private banks.
- 2) To classify and analyze the dimensions of technological innovation in the banking sector.

3) To study the impact of technological innovation and Salient Features of the Private Banking sector.

## 7. METHODOLOGY

For descriptive design, a structured questionnaire survey of 150 bankers was used as the research method. The stratified sampling technique was used in the study. The structured closed-ended questionnaire. A 5-point Likert Scale was used to collect their responses. Primary data were collected through questionnaires with 5-point Likert scales where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. While secondary data was collected from books, magazines, research journals, websites, etc. The data was analyzed using the SPSS 19 version.

## 8. RESULTS AND FINDINGS

Table 1

Table 1 Reliability Statistics		
Variables	Reliability Statistics	
	Cronbach's Alpha	N of Items
Dimensions of service quality banking sector	0.671	7
Technological Innovation in the Private Banking Sector	0.772	17
Impact of Technological Innovations Private banking	0.888	16
Salient Features of the Banking Sector	0.784	12
Challenges Faced by The Banking Sector	0.934	7

Table - 1 presents the Reliability Statistics. A Cronbach's alpha value exceeding 0.6 indicates that an instrument possesses good internal consistency. In the banking sector, the dimensions of service quality have a value of 0.671, while Technological Innovation in the Private Banking Sector stands at 0.772. The Impact of Technological Innovations in Private Banking is rated at 0.888, the Salient Features of the Banking Sector is at 0.784, and the Challenges Faced by the Banking Sector have a high value of 0.934.

## 9. PROFILE OF RESPONDENTS

The demographics of the respondents are detailed in Table - 2. The results reveal that 70% of the participants are male, while 30% are female. In terms of age distribution, 37.3% fall within the 16-35 age range, 19.3% are aged 36-45, 25.3% are between 46-55, and 18% are over 56 years old. Regarding their roles, 12% are branch managers, 34.7% are loan officers, 27.3% are credit analysts, 7.3% are auditors, and 18.7% are financial advisors. The types of transactions reported include ECS Credit at 8%, ECS Debit at 28%, credit cards at 17.3%, debit cards at 8%, NEFT at 22.7%, and RTGS at 16%. When it comes to technological innovation in the banking sector, mobile banking accounts for 24%, investment in computer software is at 48%, and Internet banking makes up 28%.

Table 2

Table 2 Profile of Respondents					
Category	Classification	Number of Respondents N = 150	Percent	Mean	Std. Deviation
Gender	Male	105	70.0		
	Female	45	30.0	1.3	0.46
Age	26-35 years	56	37.3		
	36-45 years	29	19.3	2.24	1.139
	46-55 years	38	25.3		
	Above 56 years	27	18.0		
Role	Branch managers	18	12.0		
	Loan officers	52	34.7	2.86	1.28

	Credit analysts	41	27.3		
	Auditors	11	7.3		
	Financial advisors	28	18.7		
Types of transactions	ECS Credit	12	8		
	ECS Debit	42	28.0		
	Credit cards	26	17.3	3.59	1.64
	Debit cards	12	8.0		
	NEFT	34	22.7		
Dimensions of technological innovation in the banking sector	RTGS	24	16.0		
	Mobile banking	36	24.0		
	Investment in computer software	72	48.0		
	Internet banking	42	28.0	2.04	0.722

### 10. MIXED MODEL ANALYSIS

Table 3

Table 3 Model Dimension				
Model Dimension <sup>a</sup>				
		Number of Levels	Number of Parameters	
Fixed Effects	Intercept	1	1	
Residual			1	
Total		1	2	

a. Dependent Variable: Dimensions of technological innovation in the banking sector.

The dimensions of technological innovation in the banking sector have one level and one parameter.

Table 4

Table 4 Information Criteria	
Information Criteria <sup>a</sup>	
-2 Restricted Log Likelihood	330.957
Akaike's Information Criterion (AIC)	332.957
Hurvich and Tsai's Criterion (AICC)	332.984
Bozdogan's Criterion (CAIC)	336.961
Schwarz's Bayesian Criterion (BIC)	335.961
The information criteria are displayed in smaller-is-better form.	

a. Dependent Variable: Dimensions of technological innovation in the banking sector.

The information criteria for the model are as follows: the Restricted Log Likelihood is 330.957, the Akaike Information Criterion (AIC) is 332.957, Hurvich and Tsai's Criterion (AICC) is 332.984, Bozdogan's Criterion (CAIC) stands at 336.961, and Schwarz's Bayesian Criterion (BIC) is 335.961.

Table 5

Table 5 Type III Tests of Fixed Effects				
Type III Tests of Fixed Effects <sup>a</sup>				
Source	Numerator DF	Denominator DF	F	Sig.
Intercept	1	149	1196.139	0

a. Dependent Variable: Dimensions of technological innovation in the banking sector.

Table - 5 shows that for type III Tests of Fixed Effects, the numerator degrees of freedom (df) is 1, the denominator df is 149, the F value is 1196.139, and the significance value is 0.000.

**Table 6**

Table 6 Estimates of Covariance Parameters		
Estimates of Covariance Parameters		
Parameter	Estimate	Std. Error
Residual	0.521879	0.060463

a. Dependent Variable: Dimensions of technological innovation in the banking sector.

Calculations for Covariance In the banking industry, parameters are aspects of technological innovation. The residual parameter's standard estimate is 0.521879. The error is 0.060463.

## 11. SALIENT FEATURES OF THE BANKING SECTOR

- S1 - Telebanking
- S2 - Electronic Fund Transfer
- S3 - NEFT (National Electronic Fund Transfer)
- S4 - RTGS (Real-time Gross Settlement)
- S5 - IMPS (Immediate Payment Service)
- S6 - Instant Money Transfer (Cash transfer, cardless withdrawal)
- S7 - Instant Money Transfer (IMT)
- S8 - ECS – (Electronic Clearing Service)
- S9 - Total Branch Automation (TBA)
- S10 - Automated Teller Machine (ATM)
- S11 - Internet Banking
- S12 - Mobile banking

**Table 7**

Table 7 Salient Features of the Banking Sector								
	Sum	Mean	Std. Deviation	Variance	Skewness	Kurtosis		
	Statistics	Statistics	Statistics	Statistics	Statistics	Std. Error	Statistics	Std. Error
S1	488	3.25	1.332	1.774	-0.718	0.198	-0.895	0.394
S2	488	3.25	1.332	1.774	-0.718	0.198	-0.895	0.394
S3	488	3.25	1.332	1.774	-0.718	0.198	-0.895	0.394
S4	504	3.36	1.307	1.708	-0.804	0.198	-0.654	0.394
S5	504	3.36	1.307	1.708	-0.804	0.198	-0.654	0.394
S6	568	3.79	1.185	1.404	-1.074	0.198	0.322	0.394
S7	618	4.12	0.866	0.751	-1.742	0.198	4.283	0.394
S8	702	4.68	0.583	0.34	-2.282	0.198	6.873	0.394
S9	701	4.67	0.585	0.342	-2.235	0.198	6.643	0.394
S10	700	4.67	0.587	0.345	-2.19	0.198	6.423	0.394
S11	653	4.35	0.592	0.351	-1.278	0.198	6.514	0.394
S12	647	4.31	0.604	0.364	-1.195	0.198	5.786	0.394

The mean and standard deviation values are displayed alongside the Mean M, which is calculated as (S1 to S5 = 3.25).

The mean values for S6, S7, S8, S9, S10, S11, and S12 are 3.79, 4.12, 4.68, 4.67, 4.35, and 4.31, respectively.

The standard deviations are as follows: S1 to S3 = 1.332, S4 and S5 = 1.307, S6 = 1.185, S7 = 0.866, S8 = 0.583, S9 = 0.585, S10 = 0.587, S11 = 0.592, and S12 = 0.604.

In terms of variance statistics for the banking sector, the values are: S1, S2, and S3 = 1.774; S4 and S5 = 1.708; S6 = 1.404; S7 = 0.751; S8 and S9 = 0.34; S10 = 0.345; S11 = 0.351; and S12 = 0.364.

The skewness values are as follows: S1, S2, S3 = -0.718; S4 and S5 = -0.804; S6 = -1.074; S7 = -1.742; S8 = -2.282; S9 = -2.235; S10 = -2.19; S11 = -1.278; and S12 = -1.195.

Lastly, the kurtosis values are: S1 = -0.895, S2 = -0.895, S3 = -0.895, S4 = -0.654, S5 = -0.654, S6 = 0.322, S7 = 4.283, S8 = 6.873, S9 = 6.643, S10 = 6.423, S11 = 6.514, and S12 = 5.786.

**Table 8**

Table 8 Dimensions of Service Quality Banking Sector				
Dimensions of Service Quality Banking Sector	Mean	SD	F	Sig.
Service system quality	4.17	0.923	3.321	0.022
Behavioral service quality	3.92	0.71	8.354	0
Service transactional accuracy	4.22	0.776	0.603	0.614
Machine service quality	4.01	0.7	5.61	0.001
Human skills	3.84	1.153	12.918	0
Tangibles	3.87	0.914	25.413	0
Empathy	4.01	0.803	7.549	0

The average values indicate that the elements influencing the dimensions of service quality in the banking sector are crucial for service system quality (M = 4.17, F = 3.321), with service transactional accuracy being of high importance (M = 4.22, F = 0.603). Additionally, behavioral service quality (M = 3.92, F = 8.354), machine service quality (M = 4.01, F = 5.610), human skills (M = 3.84, F = 12.918), tangibles (M = 3.87, F = 25.413), and empathy (M = 4.01, F = 7.549) also play significant roles. All significance values are below the p-value threshold of 0.05, except for the factor of service transactional accuracy, which has a p-value exceeding this limit. Furthermore, there is no notable difference in the dimensions of service quality across different professional age groups among the respondents.

## 12. CHALLENGES FACED BY THE BANKING SECTOR

- C1 - Regulatory Changes
- C2 - Cybersecurity Risks
- C3 - Customer Expectations
- C4 - Increasing Competition
- C5 - Economic Uncertainty
- C6 - Fintech Disruption
- C7 - Talent Management

**Table 9**

Table 9 Challenges Faced by the Banking Sector								
		Correlations						
		C1	C2	C3	C4	C5	C6	C7
C1	Pearson Correlation	1						
		Sig. (2-tailed)						
		N	150					
C2	Pearson Correlation	.337**	1					

	Sig. (2-tailed)	0					
	N	150	150				
C3	Pearson Correlation	.194*	.946**	1			
	Sig. (2-tailed)	0.017					
	N	150	150	150			
C4	Pearson Correlation	0.156	.924**	.930**	1		
	Sig. (2-tailed)	0.057					
	N	150	150	150	150		
C5	Pearson Correlation	0.004	.809**	.833**	.800**	1	
	Sig. (2-tailed)	0.961					
	N	150	150	150	150	150	
C6	Pearson Correlation	0.052	.812**	.817**	.809**	.778**	1
	Sig. (2-tailed)	0.525					
	N	150	150	150	150	150	150
C7	Pearson Correlation	0.021	.732**	.762**	.734**	.748**	.855**
	Sig. (2-tailed)	0.802					
	N	150	150	150	150	150	150

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

The correlation coefficient for the Challenges Faced by the Banking Sector between C2 and C1 indicates a Pearson Correlation (PC) value of 0.337\*\* with a significance (sig) value of 0.000, demonstrating a positive and significant relationship.

For C3 about C2 and C1, the Pearson Correlation values are 0.194\* and 0.946\*\*, with significance values of 0.017 and 0.000, respectively, indicating a positive and significant connection.

When examining C4 with C3, C2, and C1, the Pearson Correlation values are 0.156, 0.924\*\*, and 0.930\*\*, with significance values of 0.057, 0.000, and 0.000, respectively, which also shows a positive and significant relationship.

C5's correlation with C4, C3, C2, and C1 yields Pearson Correlation values of 0.004, 0.809\*\*, 0.833\*\*, and 0.800\*\*, with significance values of 0.961 and the remaining three at 0.000, indicating a positive and significant association. Notably, C5 correlates with C1 but does not show a significant p-value.

Lastly, C6's correlation with C5, C4, C3, C2, and C1 presents Pearson Correlation values of 0.052, 0.812\*\*, 0.817\*\*, 0.809\*\*, and 0.778\*\*, with a significance value of 0.525 for the first and 0.000 for the others, confirming a positive and significant relationship. C6 is correlated with C1 but does not show a relationship with the p-value.

C7 is associated with C6, C5, C4, C3, C2, and C1, indicating Pearson Correlation values of 0.021, 0.732\*\*, 0.762\*\*, 0.734\*\*, 0.748\*\*, and 0.855\*\*, with a significance value of .802, while the remaining four values are 0.000. This suggests a positive and significant relationship among these variables. Additionally, C7 correlates with C1 without a connection to the p-value, further demonstrating a positive and significant relationship, indicating a moderate degree of correlation between them.

### 13. TECHNOLOGICAL INNOVATION IN THE PRIVATE BANKING SECTOR

Table 10

Table 10 Technological Innovation in the Private Banking Sector			
Variables Entered <sup>a</sup>			
Model	Variables Entered	Variables Removed	Method
1	Technology_PB <sup>b</sup>	.	Enter

a. Dependent Variable: Type of Transaction

b. All requested variables entered.

The technological innovation in the private banking sector encompasses various factors. The dependent variables include the type of transaction and the methods used. Key aspects of technological innovation in this sector involve enhancing customer experience, providing personalized financial advice, and facilitating mobile and digital banking. Additionally, it focuses on streamlining onboarding and service delivery, improving efficiency, and reducing costs, as well as incorporating automation, data analytics, and cloud computing. Other important elements include risk management and security, utilizing AI for fraud detection, implementing blockchain technology, developing new products and services, offering robo-advisors, enabling embedded payments, and introducing virtual credit cards, all of which contribute to gaining a competitive advantage.

**Table 11**

Table 11 Model Summary				
Model Summary <sup>b</sup>				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.122 <sup>a</sup>	0.015	0.008	1.641

a. Predictors: (Constant), Technology\_PB

b. Dependent Variable: Type of Transaction

Transaction types encompass ECS Credit, ECS Debit, credit cards, debit cards, NEFT, and RTGS. Model 1 is characterized by an R-value of 0.122a, an R Square value of 0.015, an Adjusted R Square value of 0.008, and a standard error of the estimate of 1.641.

**Table 12**

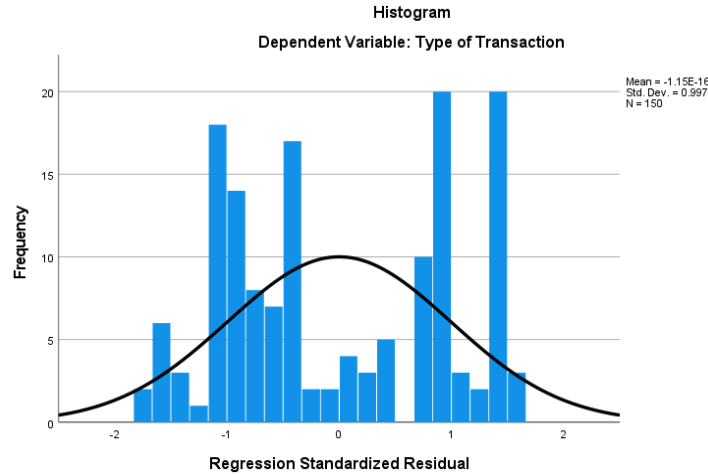
Table 12 ANOVA and Coefficient Correlations <sup>a</sup>							
	Sum of Squares	MS	F	Standardized Coefficients	Coefficient Correlations		Sig.
				Beta	Covariances	C	
Regression	6.057	6.057	2.249	0.122	0	1	.136 <sup>b</sup>
Residual	398.636	2.693					
Total	404.693						

a. Dependent Variable: Type of Transaction

b. Predictors: (Constant), Technology\_PB

ANOVA is a fixed test that utilizes the F distribution (right-tailed) to analyze the Type of Transaction factor among respondents. The null hypothesis (H0) states that the means of all groups are equal. Given that the p-value is greater than  $\alpha$ , we cannot reject H0. This indicates that the differences in the averages across all groups are not substantial enough to be considered statistically significant. C represents Correlations.

**Figure 1**



**Figure 1** Regression Standardized Residual

**Table 13**

Table 13 Communalities - Impacting Technological Innovations Private Banking		
Variables	Reliability Statistics	Communalities
	Cronbach's Alpha	Initial
Impact of Technological Innovations Private banking	0.888	1

**Table 14**

Table 14 Eigen Values				
Components	Variables	Rotation Values	Initial Eigen Values % of Variance	Variable Factor Names
I <sup>st</sup> Component	Robo-Advisors	0.965	51.923	Artificial Intelligence and Machine Learning
	Predictive Analytics	0.965		
	Enhanced Customer Experience	0.948		
	Fraud Detection	0.921		
	Sentiment Analysis	0.887		
	Open Banking	0.88		
	Secure Transactions	0.829		
	Biometric Authentication	0.784		
	Mobile Banking Apps	0.601		
II <sup>nd</sup> Component	Scalability and Flexibility	0.915	14.777	Notable Innovations
	Data Management	0.911		
	Cost Savings	0.877		
III <sup>rd</sup> Component	Streamlined Processes	0.483	10.601	Technology
	Digital Onboarding	0.87		
	Digital Asset Trading	0.689		
	Robotic Process Automation (RPA)	0.667		

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 4 iterations.

## 14. RECOMMENDATIONS AND CONCLUSION

Indian banks are recognized as reliable brands within the Indian market, making it essential for them to leverage their brand equity, which serves as a significant asset. They encounter a range of challenges and opportunities, including the need for transparency, growth in the banking sector, and the management of technology. To stay competitive, banks must exert considerable effort in navigating the rivalry posed by global institutions and technological advancements. This competitive landscape has prompted banks to reassess their policies and strategies, ultimately requiring the banking sector to adopt a new business model focused on effective management and exceptional customer service. Currently, the Indian banking industry is still in the early stages of technological advancement. Key growth drivers include mobility and customer convenience, leading banks to actively seek out innovative technologies, with terms like mobile solutions and cloud computing becoming increasingly prevalent. Nevertheless, the Indian banking sector faces several challenges, such as heightened competition, pressure on profit margins, and the need for systemic changes to meet international standards, all of which demand a thorough re-evaluation of strategies and processes to maintain competitiveness in this ever-evolving landscape.

The creation of advanced products utilizing cost-effective technology is essential. This necessitates a thorough examination of customer requirements, market dynamics, and competitor activities. Such analysis is crucial for formulating innovative strategies, products, and services. In addition to conventional banking offerings, Indian banks need to embrace product innovation to remain competitive in a crowded marketplace. Adapting to technological advancements is a vital part of overcoming challenges. Consumer awareness has significantly increased compared to previous years, with a growing demand for internet banking, mobile banking, and ATM services. In the service-driven banking sector, employees are among the most valuable assets, and effective management of staff throughout the employment lifecycle is critical for success in this competitive landscape. It can be concluded that public sector banks invest in training and development for their employees to enhance productivity. These training initiatives are designed to equip staff with the knowledge and skills necessary to better serve customers. The growth of the banking sector in India can be attributed to its skilled workforce, developed through various training and development programs.

Financial institutions must recognize the evolving demands, ambitions, and expectations of their clients to deliver real value. To maintain a diverse customer base, banks need to meet these service expectations effectively. Current research indicates that customers are eager to adopt new technologies or approaches that present minimal risk. Therefore, banks should prioritize the safety and security of their modern banking services for financial transactions, especially in comparison to traditional banking methods. Ultimately, the comprehensive service offered by banks not only meets customer satisfaction but also plays a crucial role in customer retention.

## CONFLICT OF INTERESTS

None.

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