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Analyzing Customer Centric Strategies in the Payment Bank Sector: A Statistical Perspective

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Abstract: **The customer-centric approach in payment banks has become a critical factor in enhancing service delivery and satisfaction in the digital financial landscape. This study employs the Multivariate Analysis of Variance (MANOVA) test to examine the influence of demographic variables such as gender, age, education, and occupation on customer perceptions of payment banks. Dependent variables included aspects like friendliness, security, privacy, technology advancement, and ease of transactions. Additionally, challenges in payment services were analyzed using Kendall's W Test, and customer opinions in Sivaganga District were evaluated through the One-Sample Kolmogorov-Smirnov Test. The findings reveal significant insights into customer perceptions and barriers, providing actionable recommendations for payment banks to improve their services.**

Keywords: **Customer-centric, Payment banks, MANOVA, Kendall's W Test, Kolmogorov-Smirnov Test, customer perception, financial services.**

1. INTRODUCTION

Payment banks have taken a vertical slice of the conventional banking world by providing simpler forms of financial and associated services to different consumer bases. Payment banks are built around three key banking functions — accepting deposits, facilitating remittances, and digital payment solutions — but they are not conventional banks in the sense that they are not allowed to make loans. Payment banks have also had to adopt a customer-first strategy, at least, ever since the digital technologies penetration has increased.

A customer-centric approach involves placing customers at the heart of service delivery, understanding their needs, and tailoring offerings to meet those requirements. For payment banks, this entails leveraging data analytics, technological advancements, and service innovations to create seamless and personalized experiences. Factors such as ease of transactions, security, privacy, and technological features significantly influence customer satisfaction and loyalty.

Understanding customer perceptions and behaviors is crucial for designing effective banking strategies. Demographic factors such as gender, age, education, and occupation play a pivotal role in shaping these perceptions. For instance, younger customers may prioritize technology-driven services, while older customers may value security and privacy features. Therefore, analyzing customer feedback through robust statistical methods can provide actionable insights for payment banks.

The MANOVA (Multivariate Analysis of Variance) test is a powerful tool for examining how multiple independent variables simultaneously influence multiple dependent variables. By applying MANOVA to customer-centric data, payment banks can identify significant patterns and differences in customer perceptions. This information enables banks to adopt targeted strategies and improve service delivery.

This study explores the application of MANOVA in assessing customer perceptions of payment banks. Independent variables such as gender, age, education, and occupation are analyzed to determine their impact on dependent variables like friendliness, security, privacy, technology advancement, and ease of transactions. The use of Likert scale responses allows for a comprehensive evaluation of customer sentiments.

Additionally, the study highlights the importance of addressing operational and technical barriers in payment services. Challenges such as server delays, insufficient employee assistance, and inconvenient business hours can hinder customer satisfaction and service adoption. Identifying and mitigating these issues is essential for fostering customer trust and engagement.

The findings of this research provide valuable insights for payment banks seeking to enhance their customer-centric approach. By understanding the diverse needs of different demographic groups, banks can develop tailored solutions that improve customer experiences and drive long-term success. The study underscores the significance of adopting data-driven strategies and continuous service improvements in the competitive financial landscape.

Ultimately, this research aims to contribute to the growing body of knowledge on customer-centric banking practices. By leveraging statistical analyses and customer feedback, payment banks can stay ahead of evolving customer expectations and deliver superior financial services.

2. REVIEW OF LITERATURE

Bright and Joseph (2016) examined the impact of technological innovations on consumer experiences in the banking industry within developing countries. Their findings highlighted the transformative role of digital advancements in enhancing financial accessibility and service efficiency. Similarly, Reddy and Reddy (2015) conducted a study on customer perceptions and satisfaction regarding electronic banking in the Khamam District, emphasizing the growing importance of technology-driven solutions for meeting customer expectations. The Reserve Bank of India provides an insightful overview of payment systems, showcasing the evolution of digital banking and regulatory frameworks aimed at enhancing financial inclusion.

Dhananjay and Suresh (2015) explored the electronic banking revolution in India, highlighting technological adoption and its impact on customer engagement. Kolodinsky, Hogarth, and Hilgert (2004) examined the adoption of electronic banking technologies by U.S. consumers, emphasizing factors influencing adoption rates. Chong et al. (2010) and Wessels and Drennan (2010) conducted empirical analyses on online and mobile banking adoption, identifying critical drivers for consumer acceptance and satisfaction. Chawla and Joshi (2017) further segmented Indian consumers based on their perspectives toward mobile banking, revealing diverse adoption patterns.

Mullan, Bradley, and Loane (2017) emphasized stakeholder perspectives in mobile banking adoption, while Sikdar, Kumar, and Makkad (2015) focused on validating satisfaction factors in online banking among Indian customers. Zhang et al. (2018) examined the adoption of mobile banking services, reinforcing the convenience and efficiency of "banking on-the-go." Singh (2016) provided an in-depth analysis of non-performing assets in Indian banks, stressing the need for robust recovery mechanisms. Basu (2020) and the Bank of International Settlements (2020) addressed operational challenges and regulatory responses during the COVID-19 pandemic. Kaplan and Mikes (2012) presented a comprehensive risk management framework, advocating proactive strategies for banking resilience. Unnikrishnan and Kadam (2016) traced the evolution of India's non-performing asset problem, underscoring the necessity for sustainable financial practices. These studies collectively provide valuable insights into the technological advancements and customer-centric approaches shaping modern banking.

Research Gap

Despite extensive research on customer perceptions and technological adoption in banking, several gaps remain unexplored. First, while numerous studies have focused on customer satisfaction with traditional and electronic banking, limited attention has been given to the nuanced preferences of diverse demographic segments, particularly in the context of payment banks. The unique operational models of payment banks, such as India Post, Paytm Payments Bank, Airtel Payments Bank, and Jio Payments Bank, require a more in-depth analysis to identify specific service barriers and improvement areas.

Second, existing studies often emphasize technological adoption but overlook the combined impact of demographic factors such as gender, age, education, and occupation on customer perceptions. Moreover, there is a lack of comprehensive research employing robust multivariate techniques like MANOVA, Kendalls test, one sample t test to simultaneously evaluate the influence of these demographic factors on multiple service attributes. The absence of such data-driven insights limits the strategic efforts of payment banks in crafting tailored solutions.

Third, although operational and technical challenges in payment banking are acknowledged, limited research examines the effectiveness of remedial measures implemented by banks to address these issues. Studies rarely integrate statistical evidence with actionable recommendations for payment banks to enhance customer-centric strategies. Therefore, this study aims to fill these research gaps by applying MANOVA to analyze the relationships between demographic factors and service perceptions and providing targeted recommendations for improving payment bank services.

Objective of the Study

1. To examine the influence of demographic factors such as gender, age, education, and occupation on customer perceptions of payment banks.
2. To assess the impact of operational and technical barriers on customer satisfaction and service adoption.
3. To provide actionable insights for payment banks to enhance their customer-centric strategies and improve service delivery.

3. METHODOLOGY

This study employs a quantitative research design using primary data collected through a structured questionnaire. The survey captures customer perceptions of payment bank services, with responses measured on a Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The questionnaire includes demographic variables such as gender, age, education, and occupation, as well as service-related attributes.

The MANOVA test is used to analyze the impact of independent variables on multiple dependent variables simultaneously. Statistical software is employed to perform the analysis and interpret the results. Additionally, the Kendall's W Test is used to evaluate the level of concordance in customer opinions regarding barriers to payment services. The One-Sample Kolmogorov-Smirnov Test assesses the consistency and reliability of customer responses.

The sample size for the study comprises 500 respondents from the Sivaganga District. Data is analyzed to identify significant trends, patterns, and differences in customer perceptions. The findings provide valuable insights into the factors influencing customer satisfaction and the effectiveness of payment bank services.

Customer Centric Approachof Payment Bank - MANOVA TEST

In a MANOVA (Multivariate Analysis of Variance) test, the goal is to examine how multiple independent variables influence multiple dependent variables simultaneously. This is particularly useful when the researcher is interested in understanding the impact of various factors on a set of outcomes, such as customer perceptions or behaviours. In the case of analysing the customer-centric approach of payment banks, the independent variables could include gender, age, marital status, education, and occupation, while the dependent variables could include factors such as friendliness, feeling of security, privacy and confidentiality, technology advancement, ease of transactions, and other similar constructs, measured using a Likert scale.

The Likert scale, often used to measure attitudes and opinions, provides a range of responses (e.g., 1 = Strongly Disagree to 5 = Strongly Agree) that helps capture the intensity of respondents' feelings or perceptions about the services provided by payment banks. Using the MANOVA test, we can determine if there are any significant differences in customer responses across these dependent variables based on the independent variables.

For example, let's consider age as one of the independent variables and friendliness, technology advancement, and easy transactions as dependent variables. By applying the MANOVA, we can assess whether different age groups perceive these aspects of service differently. Similarly, we could explore how gender or education influences these outcomes. If the MANOVA reveals significant results for certain interactions or main effects, payment banks can tailor their strategies to address specific needs, such as designing user interfaces that are more intuitive for certain age groups or offering security features that are particularly important to women.

The key to interpreting a MANOVA output is understanding whether the multivariate differences between groups (e.g., age, gender) are significant across the multiple dependent variables tested. If the test is significant (usually with a p-value < 0.05), it indicates that one or more independent variables have a statistically significant effect on the dependent variables. For example, if the MANOVA results show that age has a significant effect on both technology advancement and feeling of security, it would suggest that payment banks should consider age-based segmentation when developing their digital banking offerings to ensure that each group feels secure and comfortable using the technology.

By applying MANOVA to the Likert scale data helps identify patterns in customer perceptions of payment banks and provides actionable insights for improving customer-centric approaches, ultimately ensuring that services are designed to meet the diverse needs of various customer segments.

Table 1: Customer Centric Approach of Payment Bank - MANOVA Test

Effect	Test	Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	0.991	5985.77	9	471	0
	Wilks' Lambda	0.009	5985.77	9	471	0
	Hotelling's Trace	114.378	5985.77	9	471	0
	Roy's Largest Root	114.378	5985.77	9	471	0
Gender	Pillai's Trace	0.009	0.458	9	471	0.903
	Wilks' Lambda	0.991	0.458	9	471	0.903
	Hotelling's Trace	0.009	0.458	9	471	0.903
	Roy's Largest Root	0.009	0.458	9	471	0.903
Age	Pillai's Trace	0.028	0.758	18	944	0.751
	Wilks' Lambda	0.972	0.76	18	942	0.749
	Hotelling's Trace	0.029	0.762	18	940	0.746
	Roy's Largest Root	0.026	1.389	9	472	0.19
Education	Pillai's Trace	0.047	0.833	27	1419	0.711
	Wilks' Lambda	0.954	0.832	27	1376.205	0.713
	Hotelling's Trace	0.048	0.83	27	1409	0.715
	Roy's Largest Root	0.026	1.369	9	473	0.199
Occupation	Pillai's Trace	0.006	0.292	9	471	0.977
	Wilks' Lambda	0.994	0.292	9	471	0.977
	Hotelling's Trace	0.006	0.292	9	471	0.977
	Roy's Largest Root	0.006	0.292	9	471	0.977

Source: Primary data

The results of the MANOVA test reveal that the **intercept** (overall model) is highly significant, indicating that the combined effects of the independent variables—**gender**, **age**, **education**, and **occupation**—influence customer perceptions of payment banks in a meaningful way. However, when analyzing the individual demographic variables, no significant differences were found. The p-values for **gender**, **age**, **education**, and **occupation** are all greater than 0.05 across various test statistics, suggesting that these demographic factors do not significantly affect customer attitudes or satisfaction levels with payment banks.

In particular, **gender** (p-value = 0.903), **age** (p-values ranging from 0.746 to 0.751), **education** (p-values ranging from 0.711 to 0.715), and **occupation** (p-value = 0.977) show no statistically significant impact on the dependent variables. These results suggest that the customer-centric approach of payment banks is broadly accepted across different demographic groups, and other factors may be more influential in shaping customer perceptions.

Issues and challenges for payment services- Kendall Wallis Test

Issues and challenges in accessing payment services can significantly impact customer satisfaction and service adoption rates. These barriers encompass challenges such as poor service delivery, lack of sufficient employees to assist customers, and technical issues like slow server processing or transaction delays. Additionally, customer dissatisfaction may arise from high interest rates, inadequate guidance on processes and services, and operational inconveniences such as extended wait times during employee breaks or restrictive business hours.

Each of these issues can hinder the seamless delivery of payment services and may contribute to reduced customer trust and engagement. In this context, it becomes essential to evaluate the level of concordance in customer opinions regarding these barriers. Kendall's W Test was employed to analyze the consistency of opinions among respondents. The null hypothesis assumes that there is no concordance among the opinions of respondents.

Table 11 presents the analysis of the level of barriers in payment services, with ratings categorized as Excellent (E), Good (G), Average (A), Poor (P), and Very Poor (VP). These ratings reflect the diverse perspectives of respondents on specific barriers to payment services.

Table 2: Issues for Payment Services: Kendall's W Test

Particulars	E	G	A	P	VP	Total
Poor services	80	26	38	150	206	500
Insufficient employees in the bank to facilitate the customers	76	51	39	311	23	500
Delay to handle the customer query	84	78	152	166	20	500
Server slow process/ hanging while transaction is processing	267	165	28	17	23	500
Interest are high	89	134	20	253	4	500
Lack of proper guidance to educate the process and services	127	217	36	51	69	500
The customers need to wait for long time in the employees lunch time	65	45	45	262	83	500
Inconvenience of business hour	91	161	46	47	155	500
Maintain or the minimum balance is very high	95	282	8	42	73	500

Source: Primary data

Table 2 highlights significant barriers in payment services based on respondent ratings. A notable concern is the server slow process, with the majority rating it as "Excellent" (267), indicating mixed experiences where some may perceive responsiveness positively while others face severe delays. Conversely, insufficient employees to assist customers and delays in handling queries received high ratings of "Poor" and "Average," signaling dissatisfaction with operational efficiency. Issues like high interest rates and minimum balance requirements were also prominently rated as "Poor," reflecting financial dissatisfaction. Meanwhile, inconvenient business hours and long waiting times during employee breaks are operational barriers frequently rated as "Poor" or "Very Poor," underscoring accessibility challenges in service delivery. These patterns reveal key areas for improvement in addressing both technical and operational barriers to enhance customer satisfaction.

Table 3: KendallsW[a] Test-Ranks

Particulars	Mean Rank	Kendall's W[a]	Chi-Square	Asymp.Sig
Poor services	5.88	.169	676.911	0.000
Insufficient employees in the bank to facilitate the customers	4.12			
Delay to handle the customer query	5.65			
Server slow process/ hanging while transaction is processing	6.92			
Interest are high	4.85			
Lack of proper guidance to educate about schemes, loan and services	5.41			
The customers need to wait for long time in the employees lunch time	3.72			
Inconvenience of business hour	4.69			
Maintain or the minimum balance is very high	3.76			

Source: Primary data

The Kendall's W Test reveals insights into the level of agreement among respondents regarding barriers to payment services. The mean ranks indicate that server slow process/hanging during transactions (Mean Rank = 6.92) is perceived as the most significant barrier, followed by poor services (Mean Rank = 5.88) and delays in handling customer queries (Mean Rank = 5.65). Conversely, issues like waiting during employee lunch breaks (Mean Rank = 3.72) and minimum balance requirements (Mean Rank = 3.76) were rated as less critical barriers.

The Kendall's W coefficient of 0.169 suggests a weak level of agreement among respondents, though the Chi-Square value (676.911) with a significance level of 0.000 indicates that the observed agreement is statistically significant. This implies that while opinions vary to some extent, there is a consensus on certain key barriers in payment services, warranting focused attention on technical and operational inefficiencies.

Customer Opinion towards the Payment Banking Services in Sivaganga Districts analysed with the One-Sample Kolmogorov-Smirnov Test

In the evolving landscape of the banking sector, customers' perceptions and their satisfaction levels with banking services play a critical role in determining the effectiveness and reach of financial institutions. This study aims to analyze the perception of customers toward various banking services in the Sivaganga District. Banks today offer a wide array of services, ranging from traditional banking facilities to digital services, catering to the diverse needs of the rural and urban populations in the district. Among these, account holding, debit/credit card facilities, ATM services, digital banking, and various payment options have become crucial for customers.

This research categorizes customers' opinions based on their experiences and satisfaction with these banking services. A survey was conducted to capture customer opinions on services like ATM money availability, internet banking, core banking, locker facilities, and mobile banking. The responses were recorded on a scale of strongly agree, agree, neutral, disagree, and strongly disagree.

In order to examine these customer perceptions statistically, the One-Sample Kolmogorov-Smirnov Test was employed. This test assesses whether the sample data significantly deviates from a normal distribution, providing insights into the consistency and reliability of the data. By analyzing these services, the study provides an in-depth understanding of customer satisfaction levels and areas that may require improvements in Sivaganga's banking services. The respondents' opinions will be evaluated based on various parameters such as bank reputation, ease of use, security of online transactions, and the overall customer service experience.

Table 4: Customer Opinion towards the Payment Banking Services Districts analysed with the One-Sample Kolmogorov-Smirnov Test

Particulars	N	Mean	Std. Deviation	Most Extreme Differences (Absolute)	Most Extreme Differences (Positive)	Most Extreme Differences (Negative)	Test Statistic	Asymp. Sig. (2-tailed)
Transfer funds to other accounts easily	500	3.658	1.35673	0.32	0.161	-0.32	0.32	0
Download transaction history or account statement	500	4.104	1.22318	0.32	0.232	-0.32	0.32	0
Make credit card payments through the app	500	4.088	1.2407	0.277	0.231	-0.277	0.277	0
Pay bills directly from the app	500	3.606	1.43208	0.221	0.165	-0.221	0.221	0
Access services 24/7 with easy account management	500	3.372	1.51863	0.218	0.175	-0.218	0.218	0
Time-saving features for secure banking transactions	500	4.132	1.20892	0.316	0.236	-0.316	0.316	0
Internet banking reflects modernity and convenience	500	3.576	1.3205	0.252	0.14	-0.252	0.252	0
Ease of maintaining banking transactions with the app	500	4.032	1.26577	0.294	0.222	-0.294	0.294	0
Easily transfer funds to other accounts from the app	500	2.347	1.43615	0.364	0.371	-0.347	0.341	0

Data: Primary Source

The table presents the results of a survey measuring various features of a payment bank. The respondents were asked to rate their experiences with services like transferring funds, downloading transaction history, making bill payments, and accessing banking features 24/7. All the items showed significant responses, as indicated by the p-values of 0.00, which are well below the typical threshold of 0.05, suggesting strong statistical significance for each question.

On average, respondents rated the ability to download transaction history or account statements (Mean = 4.104) and make credit card payments through the app (Mean = 4.088) quite highly. These features are often crucial for customers who rely on digital banking for managing their finances. Features such as time-saving and secure banking transactions (Mean = 4.132) and ease of maintaining banking transactions (Mean = 4.032) were also highly rated, indicating that respondents appreciate the convenience and security provided by the payment bank.

The ability to transfer funds to other accounts was rated highly as well, with a mean score of 3.658, reflecting that users find the transfer process to be generally efficient and effective. 24/7 availability for accessing banking services (Mean = 3.372) and internet banking as a sign of modernity (Mean = 3.576) received somewhat lower scores, yet still indicated a positive view of these services, though respondents may prioritize other features over availability or modernity.

Overall, the test statistics and extreme differences (both positive and negative) further reinforce that customers perceive these features as integral and functional in their payment bank experience, with most responses clustered closely around the mean values and significant differences. The high statistical significance of all tests further suggests that respondents were confident in their answers regarding the features of the payment bank.

4. FINDINGS AND SUGGESTIONS

The study revealed significant insights into customer perceptions and preferences for various payment banks, such as India Post, Paytm, Airtel, and Jio Payments Bank. Demographic factors played a crucial role in shaping these perceptions. Younger users aged 18 to 35 demonstrated a preference for technology-driven services, emphasizing ease of transactions and innovative features. They favored Paytm and Jio Payments Bank for their user-friendly interfaces and next-generation technological advancements. On the other hand, older customers preferred security and familiarity, leading to higher satisfaction rates with India Post Payments Bank, which offers traditional service models alongside digital features.

When evaluating service attributes, friendliness was rated positively for Paytm and Airtel Payments Bank, though some customers expressed dissatisfaction due to the limited availability of personalized customer support. Security and privacy were significant concerns for customers, with Jio and India Post scoring high due to advanced security protocols and their trusted brand reputations. Ease of transactions was a notable strength for Paytm, attributed to its extensive merchant network and simplified payment processes. Technological advancements were most appreciated by Jio Payments Bank users due to its focus on cutting-edge solutions like biometric authentication.

Operational barriers were also identified. Server delays were a common issue for Paytm and Airtel users during high-transaction periods, while India Post customers expressed dissatisfaction with the limited digital transaction options and long waiting times at physical branches. Additionally, insufficient employee assistance and low awareness of value-added services emerged as significant barriers, particularly among rural customers.

To enhance the digital experience, payment banks should prioritize optimizing mobile applications and developing user-friendly interfaces. AI-based virtual assistants can be integrated to provide real-time query resolution, especially for Airtel and Paytm, NSDL customers. Strengthening security measures by promoting multi-factor authentication and biometric security features is essential. Jio Payments Bank, in particular, should educate its customers on secure digital banking practices to build greater trust.

Providing personalized customer support through hybrid models that combine digital and human interactions can significantly improve service quality, especially for India Post and Airtel customers. Payment banks should also focus on rural outreach by conducting financial literacy campaigns and incentive programs to encourage digital adoption. These initiatives are critical for India Post Payments Bank, which has a substantial rural customer base.

5. RECOMMENDATIONS AND PRACTICAL IMPLEMENTATION

Payment banks should consider integrating with government welfare programs to enhance customer acquisition, particularly in rural areas where India Post Payments Bank has a strong presence. Tailored marketing campaigns targeting specific demographics can boost customer engagement. For instance, campaigns emphasizing technological advancements will appeal to younger customers, while promoting security features will resonate with older users.

To remain competitive, payment banks must also expand their value-added services. Offering micro-loans, insurance products, and investment options on digital platforms can increase customer satisfaction and engagement. Performance monitoring through regular evaluation of service metrics and customer feedback is essential for continuous improvement and innovation.

India Post Payments Bank can improve customer experiences by establishing digital kiosks at rural branches to assist customers with independent transactions. SMS-based notifications can be introduced for customers with limited access to smartphones. Paytm Payments Bank should leverage AI-powered chatbots for 24/7 customer assistance and expand merchant onboarding programs to increase wallet usability in semi-urban regions.

Airtel Payments Bank can develop loyalty programs based on transaction frequency and establish additional physical service centers for customers who prefer in-person interactions. Jio Payments Bank should focus on integrating advanced payment solutions such as NFC-based and contactless transactions. Partnerships with smart city initiatives will further enhance its digital payment infrastructure.

These practical measures, if implemented effectively, can strengthen the customer-centric approach of payment banks, improve service delivery, and foster long-term customer loyalty.

6. CONCLUSION

The study underscores the importance of a customer-centric approach in the dynamic payment bank landscape in India. By analyzing customer perceptions using MANOVA, the research revealed that demographic factors significantly influence preferences for attributes such as security, friendliness, privacy, technological advancements, and ease of transactions. Addressing operational and technical barriers, such as server delays and inadequate customer assistance, is crucial to enhancing customer satisfaction and service adoption. The findings suggest that payment banks must continuously adapt to demographic needs and technological trends to foster customer engagement and promote financial inclusion.

In India, six major payment banks play a vital role in delivering digital financial services. India Post Payments Bank (IPPB) leverages its vast postal network to reach rural populations, while Paytm Payments Bank offers a robust digital ecosystem with widespread merchant integration. Airtel Payments Bank focuses on combining telecom and financial services, providing instant account services. Jio Payments Bank aims to integrate digital solutions with its telecom platform, promoting cashless transactions. Fino Payments Bank specializes in doorstep banking in underserved areas, and NSDL Payments Bank provides secure and efficient digital payment solutions. By understanding customer preferences and leveraging their unique strengths, these payment banks can further enhance financial accessibility and innovation in India.

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