Impact of Digital Evolution on Customer Relationship Strategies in the Banking Sector

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Abstracts

Digital evolution in the banking sector refers to the integration and development of digital innovations, such as internet banking, mobile applications, AI, and data analytics in banking operations and customer service measures. The research examines the influence of digital development on customer interaction strategies in the banking sector. As banks increasingly adopt digital tools to meet customer expectations for convenience and personalized services, the dynamics of customer relationships are changing. The study purpose is to understand how digital transformation influences customer engagement, satisfaction, loyalty and challenges banks face in maintaining personalized interactions in a digital environment. The study looks into a number of factors, including digital engagement, customer satisfaction, service personalization, customer loyalty, service accessibility, trust and security. The study involves 600 banking customers filling out a questionnaire after being informed about the purpose of the survey. SPSS was employed to conduct various statistics tests such as, pearson correlation, chi square, and t-test the obtain data and variables. The result indicates a positive correlation between the adoption of digital banking solutions and increased customer engagement. Research results underscore the importance of continued investment in a digital technologies to maintain a competitive edge in the banking industry. Banks that effectively integrate digital tools into their customer relationship management practices are better positioned to evolving requirement of customers, leading to improved satisfaction and loyalty.

Keywords: Digital Transformation, Customer Engagement, Mobile Banking, Personalization, Customer Loyalty.

Introduction

The banking sectors experience a significant transformation due to the development of digital technology, which has an impact of the business, including customer relationship management (CRM). The financial institutions manage their interactions with customers that has changed significantly as a consequence of their quick adaptation to technology (Gallego-Gomez et al., 2021). The term digital transformation in banking describes how digital technology is integrated in the facets of a bank's operations, radically changing method provides services and engages with customer (Hanif et al., 2020). The growth of digital channels, improvements in data analytics, the popularity of online and mobile banking, and increasing demands of tech-knowledge consumers are primary factors behind the shift and banks manage customer interactions has been radically altered as a result of the transition from traditional banking techniques to digital possibilities (Kaondera et al., 2023). Customer expectations have evolved as a consequence of the banking industry's digital revolution. Customers require financial options that are highly tailored to their individual requirements and preferences. The growing availability of individualized services in other industries, including retail and entertainment, which contributes to the desire (Kumar et al., 2022). Customer approach is essential for organizational success, service delivery, personalized experiences, transparency, security, businesses operating procedures, digital platforms, and enhancing customer interactions (Zouari and Abdelhedi 2021). Digital transformation, is crucial to continuing competitiveness, infrastructures embracing technologies like micro services, APIs, and DevOps could shorten cycles and also support continuous innovation (Hamidi and Safareeyeh 2019). The businesses to operating models provide a hybrid experience, digital speed. It could be achieved through three models: integrating digital into core business, establishing new digital business lines, and creating a digital-native directly on customer demand (Dastane 2020). By aligning strategies with customer expectations, companies drive growth and an interconnected world. Fig 1 illustrate the banking sector in the digital transformation framework.

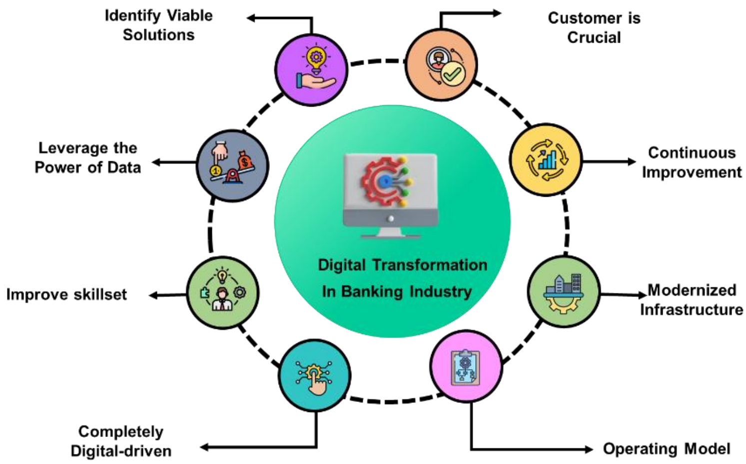

Fig 1 Banking sector in digital transformation framework

Strategic updates to enhance customer relations

Banks require changes to their strategies to make use of innovative technology to manage customer interactions in the digital age (Mogaji et al., 2020). To provide more relevant and individualized services, banks are utilizing data analytics to gain an improved understanding of the habits and preferences of their customers, proactively interacting with customers by using digital technologies to predict and address their requirement, which could significantly boost customer happiness and loyalty (Trivedi 2019). The study goal is to explore how digital evolution influences customer relationship strategies in the banking sector, focusing on how technological developments in customer engagement, service delivery and relationship management enhance overall customer experience and stratification.

Organization of this study

The work is organized as follows: section 2 briefly describes related work, section 3 demonstrates the hypothesis developments, Section 4 describes the methods, Section 5, explains result; section 6 explains discussion and Section 7 concludes the study.

Related work

Komulainen and Saraniemi (2019) enhanced the understanding of customer value in mobile banking by examining user experiences through a phenomenological. It identified key value aspects, highlighted the role of temporality, and offered insights for banks to improve customer-centric strategies. Sleimi and Musleh (2020) explained the service quality model was to measure customer satisfaction in Islamic banking by including aspects of digitization and compliance. It revealed a satisfactory association between service quality characteristics and happiness, underscoring the significance of digital services alongside compliance, based on a survey of 145

Islamic bank clients in Tunisia. Deng et al., (2024) described Artificial Intelligence Generated Content (AIGC) as customized in financial services, investment, marketing, and risk management. Bueno et al., (2024) explained digital operational efficiency (DOE) conceptual developments of the product and service portfolio supplied by digital banks. The relationship among operational and digitization effectiveness to explore the digital professional models, and industry 4.0 technologies. Ahmed et al., (2024) emphasized how crucial information security is to Pakistani digital banking and essential elements for customer retention happiness included data procedure and user safety. Financial institutions strengthen their competitive and protected reputations in the digital economy by taking into consideration. Alanudin (2024) investigated how Digital Transformation (DT), innovation behavior, and competitive advantage addressed their roles as originators DT to analysis qualitative data.

Hypothesis Development

To assess how digital tools influence customer engagement, satisfaction, and loyalty, helping banks optimize their customer relationship strategies. The hypothesis developed evaluates the effects of disciplinary measures. The impact of customer relationships is demonstrated by the six hypothesis. 5-point Likert scale is used to assess the factors that could be exploited to gain an edge in competition. Fig 2 shows the developed hypothesis.

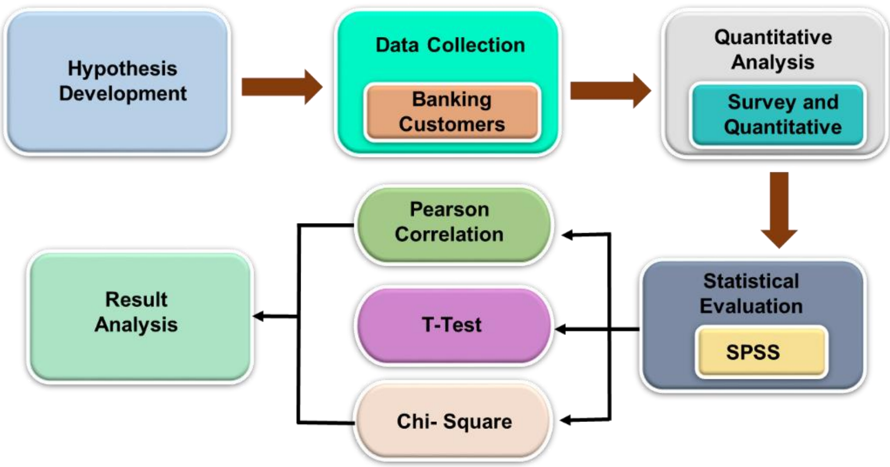

Fig 2 Developed hypothesis

➢ Digital Engagement (DE)

Digital engagement, describes how people connect with the digital platforms using different channels, such as social media, websites, and applications. It includes actions like sharing, enjoying, and commenting on material with the goal of creating deep relationships, increasing user engagement, and strengthening brand loyalty online. Increased use of digital channels like mobile apps and online banking improves customer engagement in the banking sector by offering convenient accessible services. Through higher retention and expansion opportunities, better engagement eventually has a satisfactory influence on organizational performance by improving customer satisfaction and loyalty. Based on this idea, the study developed the following hypothesis:

H1: Increased use of digital channels (e.g., mobile apps, online banking) enhances customer engagement in the banking sector and this technology innovation has a positive influence on organizational performance.

- Customer Satisfaction (CS)

The crucial metric represents overall performance and influences customer loyalty and recurring business. Effective service delivery, high-quality goods, and robust customer assistance are frequently the causes of high customer satisfaction levels. Businesses could improve their products and services and keep a competitive edge with computer science. Digital banking services improve customer happiness by offering 24/7 easy access to financial services. A fulfilling banking experience is made possible by this accessibility, which enables users to carry out transactions, manage accounts, and address problems fast. An important factor in raising overall consumer happiness is the convenience and usability provided by digital platforms.

H2: The availability of digital banking services positively influences overall customer satisfaction.

- Customer Loyalty (CL)

In digital marketing, customer loyalty is dependent on constant value delivery and individualized involvement. Through the utilization of data-driven insights, companies modify their messaging and offerings to suit individual interests, thereby improving customer happiness and nurturing enduring connections. Recurring business and brand advocacy are fostered by tactics including focused advertising, loyalty plans, and first-rate customer support. Customers are more likely to stick around and refer the service to others when banks provide safe transactions, individualized help, and user-friendly interfaces. Improved customer satisfaction increases trust and fosters enduring connections, which strengthens customer loyalty and retention.

H3: Higher satisfaction with digital banking services is associated with increased customer loyalty.

- Service Personalization (SP)

Customizing interactions and services to meet the unique requirements and preferences of each customer is known as service customization. Businesses improve the customer happiness and loyalty by tailoring experiences, feedback, and assistance through the use of data and sophisticated analytics. This strategy increases long-term retention and conversion rates while simultaneously enhancing user engagement. Digital technologies are effective, but if they are not handled carefully, they can occasionally result in impersonalized services. Customers become less satisfied and loyal as a result of this lack of customisation, which might harm the quality of customer relationships. As a result, overall performance and customer retention could suffer for firms.

H4: The limitations of digital tools may lead to impersonalized services, decreasing the quality of customer relationships negatively associated with organization performance.

- Service Accessibility (SA)

Developing platforms that are easy to use and providing support for numerous channels, and assuring device compatibility by taking into the various requirements preferences of users improving accessibility encourages inclusion, grows market reach, and improves customer happiness. The internet connectivity digital banking solutions could be inaccessible to less tech-savvy clients. The other access points and user-friendly interfaces must be provided. It presented the following hypothesis based on this idea:

H5: Digital banking solutions create accessibility barriers for less tech-savvy customers, potentially leading to their exclusion:

- Trust and Security (TS)

Customer trust can be damaged by concerns about the security of digital banking, which can result in lower usage and discontent. Users decrease confidence in the service or data breaches, which affects how well the company performs. Retaining confidence and improving user engagement need strong security protocols and open communication. From this concept, this study developed the following hypothesis.

H6: Concerns over the security of digital banking platforms decrease customer trust and willingness to use these services, negatively associated with organization performance.

Methods and Materials

This study evaluates how digital transformation influences customer engagement, satisfaction, loyalty and challenges banks face in maintaining personalized interactions in a digital environment. Fig 3 represents the structure of the framework. The first phase in the framework is hypotheses development. The influence of digital development on customer interaction strategies in the banking industry comprehensive analysis with the information acquired from 600 banking customers, the quantitative data are collected by survey questions. SPSS was employed to conduct various statistical tests on the obtained data and variables.

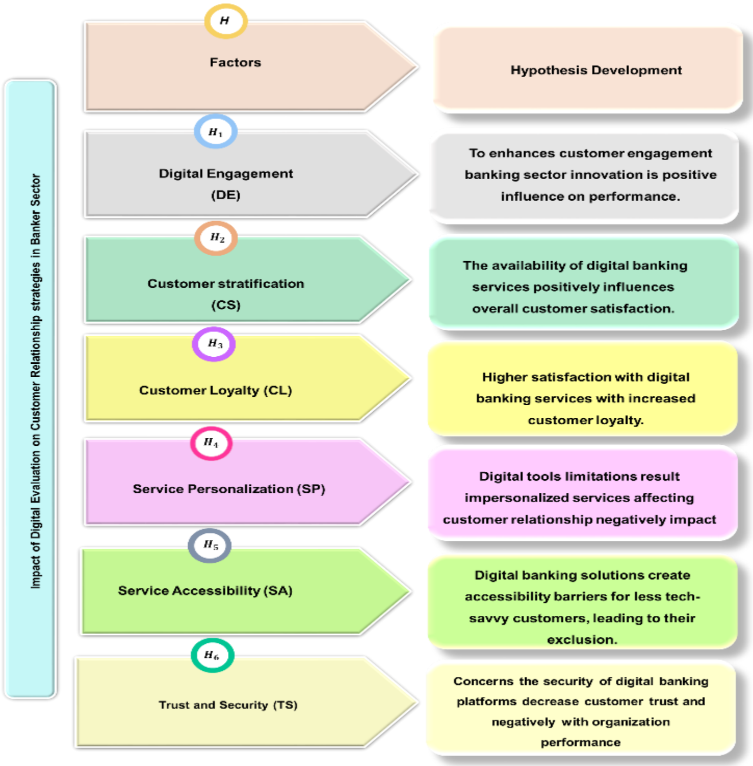

Fig 3 Structure of framework

Data collection: The questionnaire was distributed to 600 banking customers, representing various demographics such as age, income, and digital literacy. The banking customers were divided into two groups. Digital banking, which encompasses online and mobile banking for managing financial transactions is represented by Group 1 with 300 participants, while traditional banking which involves conventional services provided through physical branch locations and personal interactions, is represented by Group 2 with 300 participants. The survey aims to gather quantitative data on customers' experiences and preferences with digital banking services. The survey included questions designed to assess customer satisfaction, usage patterns, and the perceived effectiveness of digital tools. This approach provided a comprehensive view of customer interactions and feedback related to digital banking strategies. Table 1 shows the demographic profile of the participants.

Table I: Demographic profile of the participants

Attribute	Category	Count	Percentage
Age	18-24	100	16.67%
	25-34	150	25.00%
	35-44	120	20.00%
	45-54	130	21.67%

	55+	100	16.67%
Gender	Male	300	50.00%
	Female	300	50.00%
Location	Urban	350	58.33%
	Rural	250	41.67%
Income Level	Low	150	25.00%
	Medium	300	50.00%
	High	150	25.00%
Occupation	Student	200	33.33%
	Professional	250	41.67%
	Retired	100	16.67%
	Unemployed	50	8.33%
Bank Frequency	Daily	100	16.67%
	Weekly	200	33.33%
	Monthly	150	25.00%
	Rarely	150	25.00%

Research design

The study aims to examine the impact of digital evolution on customer relationship strategies in the banking sector. The research design combines quantitative analysis to evaluate trends and patterns with factors diving the changes.

- Quantitative Data

The online survey, consisting of 17 questionnaires was administered to participants to gather extensive data about the association between digital engagement, customer satisfaction, service personalization, customer loyalty, service accessibility, trust and security surveys administered to banking professionals and customers. The survey instrument includes questions on the adoption of digital tools, customer satisfaction, and the effectiveness of various customer relationship strategies. The survey uses a Likert scale to measure responses, allowing for a detailed analysis of perceptions and experiences.

Statistical analysis

To examine the surveyed data, statistical techniques were employed using SPSS to discover patterns in how digital transformation influences customer engagement, satisfaction, loyalty and challenges banks face in maintaining personalized interactions in a digital environment. The study evaluates tests including the t-test, chi- square and Pearson correlation. T-test is employed to evaluate the various association between groups based on their exposure to different customer satisfaction and a chi- square is used to assess the association between categorical variables, which is determined by comparing observed and predicted frequencies. Pearson correlation were calculated relationship between positive variables such as customer satisfaction (CS), digital engagement (DE), customer loyalty (CL) and also negative variables are service personalization (SP), service accessibility (SA), trust and security (TS). Banking customer relationship strategies are changing as a result of digital developments, which have enhanced customer engagement through digital channels, streamlined service delivery and support procedures, and increased data-driven insights.

Result analysis

To assess the digital development has affected the banking sector and customer relationship strategies. The positively correlated variables, such as digital engagement (DE), customer loyalty (CL), customer satisfaction (CS), also negatively correlated variables are service personalization (SP), service accessibility (SA), trust and security (TS). Group 1 with 300 participants represents in digital banking and group 2 with 300 participants represents traditional banking. The degree of digital evolution on customer relationship strategies in the banking sector are measured, using pearson coefficient analysis, the linear relationship among two variables, correlation customer data and relationship strategy effectiveness. T-tests evaluate differences in customer satisfaction or service quality by comparing the means of two groups. Chi-square tests look for patterns in the correlations between categorical data, such as service preferences and consumer demographics.

- Pearson coefficient Analysis

To measure the direction and intensity of a linear relationship between digital progress and customer interaction strategies in the banking industry, a pearson coefficient analysis is conducted. Evaluation of the impact of digital technology innovations on customer engagement and strategy efficacy is facilitated. It has two potential values as follows: positive and negative. The strength of linear relationship between factors pertaining to digital evolution and customer relationship strategies in the banking sector is demonstrated by the Pearson correlation matrix as shown in Table II.

Table II: Pearson coefficient Analysis

Factors	Customer Satisfaction	Digital Engagement	Customer Loyalty	Service Personalization	Service Accessibility	Trust/Security
Customer Satisfaction	1.00	0.45	0.60	-0.30	-0.25	0.52
Digital Engagement	0.45	1.00	0.55	-0.20	-0.10	0.42
Customer Loyalty	0.60	0.55	1.00	-0.35	-0.20	0.47
Service Personalization	-0.30	-0.20	-0.35	1.00	0.60	-0.35
Service Accessibility	-0.25	-0.10	-0.20	0.60	1.00	-0.30
Trust/Security	0.52	0.42	0.47	-0.35	-0.30	1.00

Customer satisfaction has a strong positive correlation with customer loyalty (0.60) and a moderate correlation with trust security (0.52) indicating that higher satisfaction is associated with increased loyalty and perceived security. Digital engagement also shows a positive relationship with customer loyalty (0.55) and trust and security (0.42)greater loyalty and trust are correlated with increased involvement. Service Personalization and Service Accessibility both show negative correlations $(-0.35 \text{ and } -0.30)$ with trust/security, indicating that performance in the domains could result in a decrease in perceived security and trust.

- T-test

To examine how the banking industry's customer interaction strategies are impacted by digital evolution. To determine digital innovations substantially improve consumer engagement, contentment, and loyalty, t-test used to compare the traditional and digital techniques, and emphasizes that the technology is changing banks interact with their customers to assess their difference are statistically significant. Table III shows the T-test factors.

Table III: T-test of the factors

Variable	Group 1	Mean	SD	Group 2	Mean	SD	t − value	p − value
Digital Engagement	4.7	0.5	3.5	0.8	7.74	1.4	7.74	$<$ 0.001
Customer Satisfaction	4.6	0.6	3.7	0.9	7.64	1.8	7.64	$<$ 0.024
Service Personalization	4.4	0.7	3.3	1.0	8.18	2.4	8.18	$<$ 0.028
Customer Loyalty	4.5	0.5	3.6	0.7	8.83	1.8	8.83	$<$ 0.021
Service Accessibility	4.6	0.4	3.8	0.6	10.43	2.7	10.43	$<$ 0.001
Trust and Security	4.4	0.5	4.0	0.7	3.41	3.1	3.41	$<$ 0.011

The analysis of t-test significant difference between two groups across several variables, such as t-values of digital engagement (7.74%), customer satisfaction (7.64%), service personalization 8.18%, customer loyalty (8.83%), service accessibility (10.43 %), trust and security (3.41%). Higher values in Group 1 suggest a stronger impact of the digital evolution on customer relationship strategies.

- Chi square

The statistical method known as the chi-square test is used to compare the expected and observed frequencies for each category to determine that categorical variables show a significant connection correlation. Customer connection strategies in the banking industry are evaluated in relation to the progress of digitalization using the chi-square test. Banks could better engage with their customers and strategy in the changing digital world with assistance in identifying important and significant implications. Table IV shows the chi square of factors.

Table IV: chi square of factors

Factors	Group 1	Group 2	Chi − Square Value	p − Value
Digital Engagement	180	120	12.01	$<$ 0.001
Customer Satisfaction	200	100	33.34	$<$ 0.001
Service Personalization	150	150	0.06	1.00
Customer Loyalty	160	140	1.34	0.25
Service Accessibility	170	130	5.34	0.02
Trust and Security	190	110	21.34	$<$ 0.001

The analysis of chi- square test showed a significant difference between two groups across several variables. Chi square values of digital engagement (12.01%), customer satisfaction (33.34%), service personalization (0.06%), customer loyalty (1.34%), service accessibility (5.34%), trust and security (21.34%). Higher scores in Group 1 indicate more significant influence of digital evolution on customer interaction strategies. Fig 4 illustrates the customer segments and banking preferences.

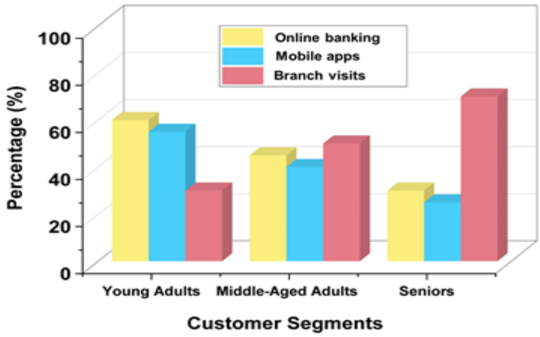

Fig 4 Customer segments

It depicts that the digital evolution in the banking sector across different demographics such as young adults, middle-aged adults and seniors. Young adults mostly use online banking (62%) and mobile apps (58%) with only 30% visiting branches. Middle-aged adults use online banking (45%) and mobile apps (42%), while 50% still visit branches. Seniors mostly visit branches (70%), with less use of online banking (30%) and mobile apps (25%). Fig 5 illustrates the feedback categories.

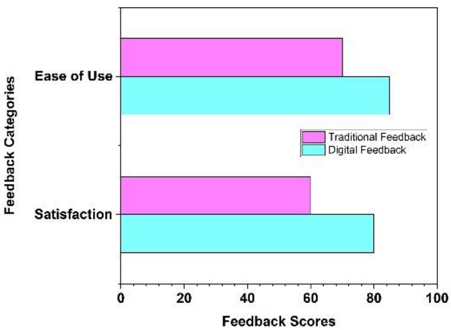

Fig 5 Feedback categories in two groups

Digital feedback scores are higher than the traditional feedback in both categories: satisfaction, with digital feedback at 80% and traditional feedback at 60%, and ease of use, with digital feedback at 85% compared to traditional feedback at 70%. This indicates that digital approaches are more useful and user-satisfied when it comes to improving customer connection tactics in the banking industry.

Discussion

The study highlights significant disparities in consumer views concerning several aspects of engagement and contentment when analyzing how the digital revolution has affected customer relationship strategies in the banking industry. Customer satisfaction has a substantial positive association with customer loyalty (0.60) and a moderate correlation with trust security (0.52), implying that higher satisfaction is linked to improved loyalty and perceived security. Digital engagement has a positive association with consumer loyalty (0.55) and trust and security (0.42); service personalization and service accessibility both show negative correlations (-0.35 and -0.30) with trust/security, indicating that performance in the domains could result in a decrease in perceived security and trust. The findings highlight how digital technologies could improve customer connections and provide more individualized banking services.

Conclusion

The study examined how the banking industry's customer interaction strategies have been impacted by the digital revolution, with a particular emphasis on the incorporation of digital technologies including mobile applications, AI, data analytics, and online banking. The research looked at the difficulties banks had sustaining individualized relationships in a digital setting as well as how digital transformation affected customer engagement, satisfaction, and loyalty. The finding demonstrated that digital banking was at higher level compared to traditional banking, indicating a significant evolution in the digital banking sector. Future scope will examine how digital banking is affected by cutting-edge technology like blockchain and quantum computing. Virtual and augmented reality integration in banking, as well as enhanced AI-driven customization and customer service automation, will improve customer happiness and engagement.

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