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Digital Transformation in Banking Management: Optimizing Operational Efficiency and Enhancing Customer Experience

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Abstract

Digital transformation in the banking sector has become a fundamental phenomenon, fundamentally changing how banks operate and interact with customers. The adoption of digital technologies across various operational aspects of banks, from internal processes to customer services, has the potential to improve efficiency and deliver a better customer experience. The primary objective of this study is to analyze the impact of digital transformation on operational efficiency and the enhancement of service quality in the banking sector. This research also focuses on identifying the challenges and opportunities banks face during digitization. In their pursuit of greater efficiency, banks are integrating various technologies such as process automation, big data, artificial intelligence (AI), and cloud-based systems to replace previously used manual methods. This reduces operational costs and improves speed, accuracy, and consistency in service delivery. However, implementing these technologies requires adequate infrastructure readiness, skilled human resources, and a shift in organizational culture to support adopting new technologies. This study reveals that banks implementing digital transformation can experience increased productivity and competitiveness. However, challenges related to initial investments, resistance to change, and the management of technological risks remain significant barriers that must be addressed. The research offers valuable insights for banks planning digital transformation and stakeholders developing technology-driven banking policies.

Keywords:
Digital Transformation; Banking Management; Operational Efficiency; Customer Experience; Digital Technologies.

1. INTRODUCTION

Digital transformation in banking management has become crucial due to the growing demand for efficiency and service quality. Digitalization is not only fundamentally changing the way banks operate but also influencing their interactions with customers. Banks increasingly focus on digital technology to renew traditional business models and create more effective and responsive operational systems. With this transformation, internal processes previously done manually can now be automated, reducing costs and speeding up processing times (Sri Sulistyawati & Munawir, 2024). Using technologies such as Artificial Intelligence (AI), Big Data Analytics, and Robotic Process Automation (RPA) has become the foundation for improving operational efficiency. These technologies help speed up decision-making and allow banks to identify relevant patterns and trends in the financial market. Additionally, cloud computing facilitates data management and enhances operational flexibility to respond to continuously evolving business needs (Shanti, 2023). At the same time, digital transformation provides opportunities to improve customer experiences significantly. Technologies like chatbots and virtual assistants provide 24/7 services, enabling banks to respond to questions and complaints quickly. Meanwhile, service personalization based on customer data helps banks create more relevant and satisfying interactions. Omnichannel integration, which includes mobile

apps, websites, and physical branches, allows customers to access services seamlessly across platforms, enhancing satisfaction and loyalty (Li, 2023). Digital transformation also demands readiness to face cybersecurity risks and significant investment needs. Therefore, banks must ensure that these changes are made with careful planning and adequate infrastructure support. In this way, digital transformation is not just an option but a necessity to face competition in the era of Industry 4.0 and meet increasingly higher customer expectations.

One fundamental element of digital transformation is its ability to optimize operational efficiency significantly. Banks implementing digital technologies can automate various routine processes, reducing reliance on manual procedures and controlling operational costs. This automation enables more effective resource allocation, focusing on developing strategic services and ultimately improving profitability (Pristiyono et al., 2022; Shi, 2024). Mobile banking applications and AI-based management systems have accelerated various activities such as financial transactions, balance checks, and account management. This innovation makes it easier for customers to access services and improves the speed and accuracy of internal banking processes. This efficiency boost drives a more positive customer experience while minimizing the potential for human errors (Nalini, 2024). Additionally, AI technologies can provide predictive and analytical services, allowing banks to respond proactively to customer needs. Digitalization also opens new opportunities in risk management, including credit and liquidity risks, which have long been critical challenges in banking management. By using data-driven analytics, banks can identify risk patterns more quickly and accurately. This technology enables financial institutions to mitigate potential risks before significantly impacting operations. Furthermore, automating credit application processing can enhance credit assessment accuracy and reduce the risk of defaults (Shanti, 2023; Yongjie & Jin, 2023). Digital transformation enables banks to create more efficient and adaptive operational models to cope with market changes. Banks can enhance competitiveness while maintaining long-term growth in the face of increasingly intense financial industry competition by controlling operational costs, effectively managing risks, and speeding up service processes.

Digitalization has significantly impacted customer experiences, changing their expectations and preferences toward banking services. Modern customers now demand faster, safer, and more convenient access to services, prompting banks to innovate in digital solutions continuously. Innovations such as peer-to-peer payments and AI-based chatbots have revolutionized customer interactions, enabling automatic responses to questions and complaints in real-time, regardless of time or location (Li, 2023; Nalini, 2024). These services provide greater customer flexibility while reducing wait times, previously a constraint in conventional services. In addition to providing more efficient services, digital transformation also plays a role in improving transaction security. Encryption technologies and two-factor authentication have become new standards in digital banking services, providing a sense of security to customers in every transaction. Moreover, using data analytics allows banks to understand customer behavior and preferences better, creating better and more relevant personalized experiences for each individual. These personalized services increase customer satisfaction and strengthen long-term loyalty (Jia, 2024). Research shows that banks that successfully implement digital transformation excel not only in operational efficiency but also in strengthening emotional and functional customer relationships. A superior customer experience has become one of the key factors in maintaining a competitive advantage, especially in an increasingly competitive banking industry. In the face of changing consumer behavior and rapid technological development, success in digital transformation allows banks to remain relevant and responsive to market needs. Therefore, continuous investment in technology and service innovation is a priority and an essential foundation for sustaining business growth in the digital age (Jia, 2024).

The implementation of digital transformation in banking is not without its complex challenges. One of the main challenges is the change in organizational structure and work culture. Digital transformation demands fundamental changes in business processes and work patterns, which require full support from management and active involvement from all employees. In this context, human resource management plays a strategic role in managing resistance to change and ensuring employees have the skills required for digitalization (Salam & Munawir, 2024). Training and competency development programs must be prioritized so employees can adapt to new technologies and contribute effectively. Besides human resources, another challenge arises from developing robust information technology (IT) infrastructure. Adequate IT infrastructure is the backbone of the success of any digital initiative, enabling smooth and efficient operational processes. Banks must invest in the latest technologies, such as cloud computing, big data, and cybersecurity systems, to ensure that customer data and services are well-protected. Competent IT management skills are also essential for integrating various digital platforms and ensuring smooth operations in the face of rapid technological advancements (Xin et al., 2022). Beyond just adopting technology, the success of digital transformation heavily depends on an organization's capacity to adapt and innovate continuously. Banks must create a collaborative work ecosystem responsive to market changes while continuously seeking opportunities to improve services and operational efficiency. This transformation is not merely a technological project but a strategic change involving all elements of the organization. Therefore, synergy between technology, human resource management, and organizational innovation is the key factor in

achieving success in digital transformation in the banking sector and maintaining a competitive advantage in the digital age.

Optimizing operational efficiency and enhancing customer experience are key pillars in modern banking management, particularly in the fast-developing digital age. Digital transformation acts as a significant catalyst in achieving both aspects by applying technology that not only perfects internal processes but also enriches the quality of services for customers. Operational efficiency can be achieved by implementing effective information systems and digital technologies. Research shows that banks that optimally integrate technology can significantly reduce operational costs and enhance performance productivity (Deanna, 2018; Setyowati, 2019). One key indicator in measuring efficiency is the ratio of Operating Expenses to Operating Income (BOPO). Banks that adopt digital technologies, such as automation and data-based analytics, show a decrease in the BOPO ratio, reflecting better management of costs and income (Wetapo, 2023). Automation technology allows banks to reduce repetitive manual processes, increase service speed, and minimize human errors.

Meanwhile, big data analytics provides valuable insights for management to identify operational areas that need improvement and make more informed strategic decisions. By utilizing available data, banks can predict market trends and optimize resource allocation more effectively (Devi et al., 2022). Enhancing customer experience is also a primary goal in digital transformation. Customers now expect quick, easy, and secure service access, prompting banks to introduce innovations such as mobile banking apps and AI-based services. These technologies enable customers to conduct transactions independently anytime and anywhere while receiving more responsive and personalized services. By combining operational efficiency and improved customer experience, banks can strengthen their competitive position in the market. Digital transformation is not just about technology adaptation but also a long-term strategy that brings sustainable growth and higher customer satisfaction.

2. RESEARCH METHOD

This study employs a quantitative approach using a survey method based on a questionnaire designed to measure and analyze the impact of digital transformation on operational efficiency and customer experience in the banking sector. This method was chosen as it enables the evaluation of causal relationships between variables through numerical data and allows for identifying patterns and trends in respondents' answers (Hasridayyana, Ahmad, & Junaidi, 2024). The research design is descriptive correlational, with the primary objective of measuring the relationship between variables related to digital transformation, operational efficiency, and customer experience. The quantitative approach through surveys allows for large-scale data collection in a relatively short period while maximizing statistical analysis to identify relationships between variables. The population of this study includes bank employees working in operational and customer service departments, as well as customers who have used digital banking services, such as mobile banking and Internet banking. The sample is determined using purposive sampling, which selects respondents based on specific criteria, namely those with direct experience using digital banking services. The sample consists of 200 respondents, including 100 bank employees and 100 customers who have used digital banking services for at least six months. This sample size is considered adequate to generate representative data and avoid sampling bias that may occur in small-scale studies. The primary instrument used in this study is a questionnaire designed to collect data on respondents' perceptions of operational efficiency and customer experience within the context of digital transformation. The questionnaire consists of several sections: a demographic section that gathers basic information about respondents such as age, gender, job position (for employees), and frequency of digital service use (for customers); an operational efficiency section that measures employees' perceptions regarding the efficiency resulting from digitalization, focusing on indicators such as processing time, automation, and work accuracy; and a customer experience section that assesses customers' perceptions of digital services, including ease of access, service speed, convenience, and satisfaction. To enhance the validity and reliability of the data, the questionnaire was pre-tested on a small sample to ensure respondents' understanding of the questions posed.

Data was collected by distributing the questionnaires online and offline, according to respondents' preferences. The online questionnaires were distributed through an online survey platform to reach customers with internet access. In contrast, offline questionnaires were printed for bank employees willing to participate. Data collection took place over two weeks to ensure optimal responses from each selected respondent. The collected data were then analyzed using descriptive and inferential statistical methods. Descriptive statistical analysis was used to describe the demographic characteristics of the respondents and provide an overview of respondents' perceptions of operational efficiency and customer experience. Pearson's correlation test was applied to measure the degree of relationship between digital transformation and the dependent variables (operational efficiency and customer experience) and to identify if a significant relationship exists. Additionally, linear regression analysis was used to determine the factors of digital transformation that have the most significant impact on these two variables. Reliability testing used Cronbach's Alpha to measure the instrument's consistency. In contrast, validity testing was performed

through factor analysis to ensure that each questionnaire item measures the appropriate variable. The research procedure was conducted systematically, starting with formulating the problem and objectives, questionnaire design while considering validity and reliability, data collection using online and offline questionnaires, and data analysis using appropriate statistical techniques. The analysis results were then interpreted in the context of relevant theories, followed by conclusions and recommendations for further development based on the research findings.

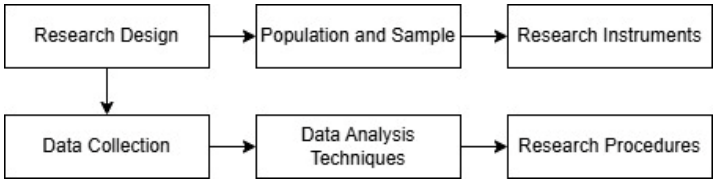

Figure 1. Research Design

The image above illustrates the research methodology flow. It starts with the research design, which forms the foundation for the subsequent steps, including determining the population and sample and selecting research instruments. Afterward, data is collected according to the planned design. The data is then analyzed using relevant analytical techniques to ensure the research outcomes align with the objectives. The research procedure is carried out systematically to maintain the validity and reliability of the data, which supports the findings and conclusions of the study.

3. RESULTS AND DISCUSSION

3.1. Results

This study aims to comprehensively examine the impact of digital transformation on improving operational efficiency and customer experience quality in the banking industry. The primary focus of this research is to analyze how implementing digital technologies, such as process automation, mobile banking applications, and chatbots, can enhance operational performance and strengthen the relationship between banks and their customers. Data was collected through a survey of 200 respondents, consisting of bank employees from the operations and customer service divisions and customers who have used various digital banking services. The quantitative data was analyzed using statistical methods to identify patterns and correlations between technology adoption and its impact on operational efficiency and customer experience. The findings show a significant improvement in operational efficiency, mainly through adopting automation, which reduces manual workloads and enhances service accuracy. Furthermore, customers reported a more satisfying experience due to easier and more responsive service access, especially with omnichannel features. This study also reveals that digital innovation plays a key role in creating more personalized and proactive services while strengthening customer loyalty. The research provides valuable insights for the banking industry regarding the importance of continuous investment in technology and human resource development to stay competitive and meet evolving customer needs.

3.1.1. Descriptive Statistical Analysis Results

The descriptive statistical analysis results from this study show that most respondents had a positive perception of the impact of digital transformation on improving operational efficiency and customer experience in the banking sector. These findings offer important insights into how digital technologies contribute to improving operational performance and enhancing interactions between banks and customers. A comprehensive analysis was conducted to identify the perceptions of both employees and customers regarding the implementation of digital banking services and its impact on business processes and user satisfaction (Ahmad & Safrizal, 2024). Based on demographic characteristics, the respondents were evenly split between bank employees and customers, representing 50% of the total respondents. Respondents were selected using purposive sampling to ensure the involvement of individuals relevant to the research topic. The average age of respondents ranged from 25 to 40 years, indicating that the respondents were from a productive age group familiar with digital technologies.

Additionally, around 68% of respondents had used digital banking services for over one year, allowing them to provide informed and accurate assessments based on firsthand experience. Regarding operational efficiency, bank employees gave an average score of 4.2 on a 1-5 Likert scale for indicators such as processing time, automation, and work accuracy. 76% of employees stated that digital technology significantly accelerated operational processes, particularly in handling daily transactions and administrative services. Furthermore, 80% of respondents acknowledged that automation, through technologies like Robotic Process Automation (RPA), had reduced manual workloads and improved data processing accuracy. This indicates that digital transformation not only eases internal tasks but also allows for more efficient resource allocation across various operational divisions (Imilda, Andalia, & Ahmad, 2024). From the customers'

perspective, the adoption of digital technology also had a positive impact on their user experience. Customers gave an average score of 4.4 on the Likert scale for indicators such as ease of access, service speed, convenience, and overall satisfaction. 82% of customers were satisfied with the features and accessibility of the mobile banking app, particularly in terms of navigation and quick access to key services. Moreover, 78% of customers reported that digital services facilitated their daily transactions, including fund transfers, bill payments, and opening new accounts. These findings suggest that digital transformation in the banking sector optimizes operational efficiency and enhances customer satisfaction and loyalty through a more responsive and convenient experience. The results of this study reinforce the conclusion that adopting digital technology is a crucial factor in improving operational performance and enriching the customer experience in the banking sector. Digital transformation enables banks to integrate process automation and digital services into daily operations, creating a more effective, efficient, and customer-relevant service ecosystem.

Table 1. Analysis of Perception of Operational Efficiency and Customer Experience

Aspect	Indicator	Average Score (1-5)	Percentage of Respondents Agree (%)	Key Findings
Operational Efficiency	Processing Time	4,2	76%	Digital transformation accelerates operational and transaction processes.
	Automation and Manual Burden Reduction	4,3	80%	Automation reduces manual work and increases efficiency across divisions.
	Work Accuracy	4,1	-	The implementation of automation increases accuracy and consistency in work.
Customer Experience	Ease of Access	4,5	82%	Mobile banking applications facilitate access and navigation for customers.
	Service Speed	4,3	78%	Digital services speed up daily transactions such as transfers and payments.
	Convenience of Use	4,4	-	Customers feel more comfortable using digital services.
	Overall Satisfaction Level	4,4	-	Customer satisfaction increases with ease of access and responsive service.

This table presents the findings regarding the impact of digital transformation on improving operational efficiency and customer experience in the banking sector. From the employees' perspective, automation and the reduction of manual workloads received a score of 4.3, with 80% of respondents agreeing that digitalization enhances efficiency. Processing times also showed a significant improvement, with a score of 4.2 and 76% of respondents in agreement. On the customer side, ease of access scored 4.5, with 82% of respondents satisfied with the mobile banking app. Service speed recorded a score of 4.3, supported by 78% of respondents who acknowledged that digital services facilitated their daily transactions. Overall customer satisfaction reached a score of 4.4, indicating that digital transformation positively contributes to customer loyalty.

3.1.2. Pearson Correlation Test

The results of the Pearson correlation test identify a positive and significant relationship between the independent variable, digital transformation, and two dependent variables: operational efficiency and customer experience. These findings provide a solid foundation for the banking industry to further integrate digital technologies into operations and services for higher productivity and improved customer satisfaction (Idwan, Haikal, & Wali, 2024). The positive correlation also suggests that adopting digital technologies is a key factor in enhancing the overall performance of banks. The correlation analysis between digital transformation and operational efficiency reveals a coefficient of $r = 0.65$ with a significance level ($p < 0.05$). This indicates a relatively strong relationship between the two variables. Implementing digital technologies, such as automation and digitizing operational processes, has played a vital role in accelerating processing times and improving the accuracy of various banking services. Automation, mainly through the application of Robotic Process Automation (RPA), helps banks reduce manual tasks that previously required significant time and effort. As a result, various routine and administrative tasks can be completed more quickly and accurately. Digital transformation enables back-office and front-office processes to become more efficient through cloud computing and real-time data analytics. This increase in efficiency is reflected in faster

transaction completion and improved service accuracy, which ultimately helps banks achieve optimal productivity. The correlation coefficient of 0.65 suggests that the higher the adoption of digital technologies, the more optimal the operational efficiency achieved. This efficiency significantly impacts banks by reducing operational costs and more effectively allocating resources. The Pearson correlation test between digital transformation and customer experience shows a coefficient of $r = 0.70$ ($p < 0.05$), indicating a strong relationship between the two variables. This reveals that digital banking services significantly positively impact customer perceptions and satisfaction. Services such as mobile banking apps, e-wallets, and chatbots have enhanced convenience and accessibility for customers to carry out daily transactions, such as bill payments, fund transfers, and account openings. Service speed is also a crucial factor in enhancing the customer experience. Banks that effectively adopt digital technologies can provide 24/7 services through digital platforms, reducing wait times and offering customers a seamless experience (Novita, Tarmizi, & Lidiana, 2024). This high level of convenience plays a role in fostering customer loyalty, as customers feel more connected and satisfied with the quality of the services they receive. The correlation of 0.70 indicates that the better the implementation of digital transformation, the higher the level of customer satisfaction and loyalty. This is vital for banks to retain existing customers and attract new ones.

The results of the Pearson correlation test emphasize that investments in digital transformation provide dual benefits for banks: increased operational efficiency and enhanced customer experience. The positive relationship between digital technology and operational efficiency ensures banks can operate more effectively and respond to market changes. On the other hand, improved customer experience directly contributes to increased satisfaction and customer loyalty.

Table 2. Correlation Between Digital Transformation and Customer Service

ariable	Correlation Coefficient (r)	Significance Level (p)	Relationship Interpretation	Impact Explanation
Digital Transformation and Operational Efficiency	0.65	< 0.05	Positive and Moderately Strong	Digitalization improves operational efficiency by reducing manual workloads, speeding up transaction processes, and enhancing work accuracy.
Digital Transformation and Customer Experience	0.70	< 0.05	Positive and Strong	Digital transformation enhances customer satisfaction by providing fast, easily accessible, and convenient services, which drive customer loyalty.

This table displays the results of the Pearson correlation test between digital transformation and operational efficiency and customer experience in the banking sector. A correlation coefficient of $r = 0.65$ indicates a moderately strong relationship between digitalization and operational efficiency, emphasizing the role of automation in accelerating processes and improving accuracy. Meanwhile, a correlation of $r = 0.70$ indicates a strong relationship between digital transformation and customer experience, where digital services enhance customer satisfaction and comfort through quick and easy access. These findings highlight the important role of digital transformation in boosting productivity and fostering customer loyalty.

3.1.3. Linear Regression Analysis

Linear regression analysis evaluates the relationships between the variables influencing operational efficiency and customer experience in implementing digital transformation in the banking sector. This method helps identify specific factors that significantly impact both aspects, which are crucial for prioritizing strategies in digital transformation (Iqbal, Ismail, & Anisah, 2024). Two main factors identified as having the most significant impact are process automation on operational efficiency and ease of access to customer experience. Process automation was the most significant factor in improving bank operational efficiency, with a regression coefficient 0.48 ($p < 0.05$). This result indicates that implementing automation, such as automatic transaction processing, customer data verification, and document management, significantly improves operational performance. Automation allows for substantial time reduction, where tasks that previously required a long time with manual methods can now be completed instantly. For example, an automation system can speed up transaction approvals or credit applications using algorithms that directly analyze feasibility based on integrated data. In addition, automation also improves work accuracy as it reduces the chances of human error, which is often an issue in manual processes. The benefits of automation also include resource efficiency. With fewer manual tasks, staff can be redirected to more strategic activities, such as new product development or customer service enhancement. This also enables banks to scale operations without significantly increasing the workforce. Banks can focus on innovation and data-driven strategic decision-making by improving time and resource management.

Ease of access to digital services is another factor that has a significant influence, particularly on customer experience, with a regression coefficient of 0.52 ($p < 0.05$). This result indicates that customers with easy access to digital banking services exhibit higher satisfaction levels. Features that simplify access, such as user-friendly mobile banking applications, stable internet banking services, and integration with other digital payment systems, provide convenience that customers highly appreciate. With these services, customers can perform various transactions, from fund transfers to bill payments, quickly and independently without the need to visit a branch. This flexibility saves customers time and provides a more modern and efficient experience. Ease of access also allows banks to reach a broader market segment, including younger generations who prioritize technology and people previously underserved by traditional banking services.

Furthermore, personalized data-based services and real-time notifications enhance the interaction between banks and customers, fostering closer relationships and higher loyalty. Easy-to-access digital services also help banks reduce operational burdens at branch offices, enabling them to allocate resources more effectively. The linear regression analysis shows that process automation and ease of access are two key elements in digital transformation that significantly impact operational efficiency and customer experience. By prioritizing investments in technology that supports automation and accessibility, banks can enhance their operational performance while strengthening relationships with customers. This strategy will help banking institutions maintain competitiveness amidst increasing competition and the evolving demands of customers.

Table 3. Results of Linear Regression Analysis

Factor	Dependent Variable	Regression Coefficient	Significance (p-value)	Impact Description
Process Automation	Operational Efficiency	0.48	$p < 0.05$	Increases efficiency through reduced processing time, improved accuracy, and error reduction.
Ease of Access to Digital Services	Customer Experience	0.52	$p < 0.05$	Facilitates customers in accessing services quickly and independently, improving satisfaction and loyalty.

The table above presents the results of the linear regression analysis regarding the impact of digital transformation factors on operational efficiency and customer experience in the banking sector. The process automation factor has a regression coefficient of 0.48 ($p < 0.05$), showing a significant contribution to improving operational efficiency through reduced processing time and increased accuracy. Meanwhile, ease of access to digital services has a regression coefficient of 0.52 ($p < 0.05$), indicating a dominant influence on enhancing customer experience, particularly through fast and flexible services. These findings emphasize the importance of prioritizing automation and accessibility in the digital transformation of banks for optimal results.

3.1.4. Reliability and Validity Tests

Reliability and validity testing are critical in research to ensure that the measurement instruments provide consistent and accurate results. Reliability focuses on how consistently an instrument can produce stable results, while validity assesses whether it measures what it intends to measure. Both aspects are crucial in supporting data integrity and the reliability of conclusions drawn from the research.

a. Reliability Test. The reliability test is conducted to assess the internal consistency of the research instrument. This study tested reliability using Cronbach's Alpha as the primary indicator. The analysis results show Cronbach's Alpha values of $\alpha = 0.82$ for the operational efficiency variable and $\alpha = 0.85$ for the customer experience variable. These values exceed the threshold of 0.70, generally considered the minimum standard for good internal consistency in social and management research. High Cronbach's Alpha values indicate that each item in the instrument has a strong internal correlation with other items within the same variable group. Therefore, the questionnaire instrument has proven to produce reliable results, ensuring that the data collected are consistent and not influenced by external factors such as respondents' interpretations or environmental conditions during data collection. These results provide a solid foundation for the researcher to proceed with more complex statistical analyses, such as linear regression, without concerns about potential inaccuracies due to unreliable instruments.
b. Validity. Construct validity was tested using exploratory factor analysis to ensure that each item in the research instrument accurately reflects the theoretical concept it aims to measure. The test results show that all items have a loading factor above the threshold of 0.50, indicating significant relationships between the items and their respective constructs. Each item for the variables of digital transformation, operational efficiency, and customer experience demonstrated adequate values, with no significant cross-loadings to other variables—for example, the items designed to measure digital transformation strongly correlated with the variable. At the same time, items for operational efficiency and customer experience also exhibited correlations consistent with their respective constructs. This ensures that the questionnaire instrument is relevant and capable of measuring the concepts with high precision. The factor analysis

supports the validity of the collected data, providing further confidence that the interpretation and conclusions of the research are based on valid data. This construct validity testing is also essential to ensure the instrument is reliable and aligned with the theoretical concepts it aims to evaluate. With good construct validity, the research findings can be used to test hypotheses and support broader generalizations without concerns about measurement bias.

Based on the reliability and validity test results, the research instrument used in this study demonstrates high quality. The Cronbach's Alpha values indicate an adequate level of internal consistency, while the construct validity ensures that the questionnaire items truly measure the intended variables. Therefore, the data generated from this instrument can be relied upon to support further analysis, such as linear regression tests, hypothesis testing, and data-driven decision-making. These test results also provide confidence that the interpretation of the research findings, particularly regarding the impact of digital transformation on operational efficiency and customer experience, is reliable. With a valid and reliable instrument, this study contributes significantly to the literature and supports strategic decision-making in the banking sector's digital transformation context.

3.2. Discussion

Digital transformation has become a critical factor in improving the operational efficiency and competitiveness of the banking and MSME (Micro, Small, and Medium Enterprises) sectors. In the banking sector, adopting digital technologies, such as big data analytics, AI, and cloud computing, has significantly enhanced efficiency. According to research, banks that embrace digitalization experience faster service delivery, reduced operational costs, and improved customer experiences, all of which contribute to a more substantial market presence (Jia, 2024; Li, 2023; Shanti, 2023). By utilizing digital tools, banks can streamline their operations, automate processes, and provide quicker, more efficient services, giving them a competitive advantage. Similarly, MSMEs have reaped significant benefits from digital transformation, particularly during the COVID-19 pandemic. Adopting digital platforms has enabled MSMEs to accelerate their business processes, increase productivity, and extend their market reach, even during economic disruptions. Businesses that embraced e-commerce, digital marketing, and online payment systems could recover quickly and maintain business continuity during the pandemic. Research shows that MSMEs that adopted digital technologies early on were more resilient and competitive than those still relying on traditional business methods (Fatimah, 2023; Salam & Munawir, 2024; Salam & Imilda, 2024). These businesses can expand their operations beyond local boundaries and access global markets by leveraging digital tools. In addition to efficiency and competitiveness, digitalization also plays a crucial role in building consumer trust. Banks and MSMEs that effectively implement digital technologies can create stronger customer relationships. This, in turn, leads to increased customer loyalty and more informed purchasing decisions, providing a critical edge in an increasingly competitive marketplace (Pristiyono et al., 2022; Iqbal et al., 2024; Yongjie & Jin, 2023). However, the path to complete digital transformation is not without its challenges. Many banks and MSMEs face obstacles related to the readiness of human resources, infrastructure limitations, and the security of customer data. To maximize the benefits of digitalization, organizations need to invest in employee training, infrastructure development, and robust cybersecurity measures (Nasir & Yuslinaini, 2024; Shabri, 2022). while the digital transformation of banks and MSMEs offers significant advantages in efficiency, competitiveness, and consumer trust, overcoming existing challenges will be key to fully realizing its potential.

4. CONCLUSION

Digital transformation in banking management is essential for optimizing operational efficiency and enhancing customer experience. By integrating advanced technologies such as artificial intelligence, machine learning, and automation into banking operations, financial institutions can streamline processes, reduce costs, and improve the accuracy of services. These improvements enhance the bank's internal efficiency and contribute to faster service delivery, enabling banks to meet the growing expectations of today's tech-savvy consumers. Digital transformation also plays a crucial role in enhancing the customer experience. Banks can provide customers with more convenient, personalized, and responsive services by adopting digital channels such as mobile banking, online platforms, and chatbots. Customers can now access a wide range of services 24/7, efficiently conduct transactions, and receive tailored recommendations based on their preferences and behaviors. This shift toward digital banking helps build stronger, more trusting relationships between customers and banks. Despite its potential, digital transformation in banking comes with challenges, including the need for robust cybersecurity measures, data privacy protection, and continuous staff training to manage new technologies effectively. Nevertheless, banks that successfully navigate these challenges will optimize their operations and create exceptional customer experiences that drive loyalty and long-term growth. Embracing digital transformation is no longer a luxury but a necessity for banks striving to remain

competitive in an increasingly digital world. By leveraging technology to improve both efficiency and customer experience, banks are well-positioned to succeed in the future of banking.

REFERENCES

Ahmad, A., & Safrizal. (2024). Sistem Informasi Notifikasi Monitoring Status Perangkat BTS dan Client Serta Datacenter pada ISP PT. Acehlink Media. Jurnal Ilmu Komputer Dan Teknologi Informasi, 1(2), 1-12. https://doi.org/10.35870/jikti.v1i2.1062

Andhyka, B., Nisa, C., & Puwoko, B. (2017). Penggunaan buku dan kepemilikan dalam menganalisis efisiensi perbankan di indonesia. Al Tijarah, 3(2), 1. https://doi.org/10.21111/tijarah.v3i2.1587

Deanna, J. (2018). Determinan efisiensi operasional perbankan indonesia (studi empiris pada perbankan umum konvensional di indonesia tahun 2011-2016).. Jurnal Muara Ilmu Ekonomi Dan Bisnis, 2(1), 217. https://doi.org/10.24912/jmieb.v2i1.1554

Devi, S. and Amaliah, I. (2022). Efisiensi perbankan syariah di indonesia periode 2015-2020. Bandung Conference Series Economics Studies, 2(1). https://doi.org/10.29313/bcses.v2i1.1067

Fachrurazi, F., Rukmana, A. Y., Supriyanto, S., Syamsulbahri, S., & Iskandar, I. (2023). Revolusi Bisnis di Era Digital: Strategi dan Dampak Transformasi Proses Teknologi terhadap Keunggulan Kompetitif dan Pertumbuhan Organisasi. Jurnal Bisnis Dan Manajemen West Science, 2(03), 297–305. https://doi.org/10.58812/jbmws.v2i03.563

Fatimah, S. (2023). Model konseptual untuk transformasi digital ukm selama pandemi covid-19 di indonesia (r-model transformasi digital). Journal Social Society, 3(1), 11-20. https://doi.org/10.54065/jss.3.1.2023.341

Hasridayyana, I., Ahmad, L., & Junaidi, R. (2024). Sistem Informasi Manajemen Kos-Kosan Menggunakan Metode Content Management System Di Kota Banda Aceh. Jurnal Sistem Komputer (SISKOM), 3(2), 84-94. https://doi.org/10.35870/siskom.v3i2.797

Idwan, H., Haikal, M. H., & Wali, M. (2024). Pemanfaatan Tools Canva Dan Template.Net Dalam Pembuatan Sertifikat Online Pada Dinas Pangan Provinsi Aceh. Jurnal Sistem Komputer (SISKOM), 4(2), 72-86. https://doi.org/10.35870/siskom.v4i2.814

Imilda, Andalia, T. I. R., & Ahmad, A. (2024). Analisis Pengaruh Penerapan Sistem Informasi Rujukan Terintegrasi (Sisrute) Terhadap Kinerja Karyawan Rsud Meuraxa Kota Banda Aceh. Jurnal Sistem Komputer (SISKOM), 4(2), 115-125. https://doi.org/10.35870/siskom.v4i2.817

Indah, R. (2023). Perubahan bank di indonesia dari bank konvensial menjadi bank digitalisasi di era evaluasi industri 4.0. Student Research Journal, 1(3), 168-175. https://doi.org/10.55606/srjyappi.v1i3.328

Iqbal, T., Ismail, & Anisah. (2024). Dampak Persepsi Konsumen dan Pelayanan terhadap Keputusan Pembelian: Studi Empiris di Sektor Kuliner. Jurnal Manajemen Dan Teknologi, 1(2), 45-57. https://doi.org/10.35870/jmt.v1i2.1107

Jia, K. (2024). Bank digital transformation, bank competitiveness and systemic risk. Frontiers in Physics, 11. https://doi.org/10.3389/fphy.2023.1297912

Li, L. (2023). The digital transformation of the banking industry in the era of big data. Advances in Economics Management and Political Sciences, 39(1), 24-30. https://doi.org/10.54254/2754-1169/39/20231929

Muhajir, M., Akib, H., & Niswaty, R. (2023). Transformasi digital pada rumah sakit umum daerah prof.dr.h.m. anwar makkatutu kabupaten bantaeng. Jurnal Altifani Penelitian Dan Pengabdian Kepada Masyarakat, 3(1), 129-139. https://doi.org/10.25008/altifani.v3i1.327

Nalini, D. (2024). A study on the impact of digital transformation in the banking sector on customer's experience. International Journal of Innovative Research in Engineering & Management, 11(2), 40-44. https://doi.org/10.55524/ijirem.2024.11.2.8

Nasir, & Yuslinaini. (2024). Membangun Smart City di Indonesia Tantangan dan Peluang: Studi Kasus di Kota Bada Aceh. *Jurnal Manajemen Dan Teknologi*, *1*(1), 22-32. https://doi.org/10.35870/jmt.v1i1.774

Novita, Y., & Zahra, R. (2024). Penerapan Artificial Intelligence (AI) untuk Meningkatkan Efisiensi Operasional di Perusahaan Manufaktur: Studi Kasus PT. XYZ. Jurnal Manajemen Dan Teknologi, 1(1), 11-21. https://doi.org/10.35870/jmt.v1i1.773

Novita, Y., Tarmizi, & Lidiana. (2024). Analisis Pengaruh Lingkungan Toko dan Kualitas Layanan terhadap Keputusan Pembelian Impulsif pada Konsumen. Jurnal Manajemen Dan Teknologi, 1(2), 32-44. https://doi.org/10.35870/jmt.v1i2.1103

Pristiyono, P., Juliana, J., & Prayoga, Y. (2022). Measuring customer trust through digital transformation of banking as a competitive advantage. Jurnal Ekonomi Bisnis Dan Kewirausahaan, 11(2), 214. https://doi.org/10.26418/jebik.v11i2.51986

Salam, A., & Imilda. (2024). Transformasi Digital UMKM Indonesia di Era Industri 5.0: Studi Kasus di Kota Banda Aceh. Jurnal Manajemen Dan Teknologi, 1(1), 1-10. https://doi.org/10.35870/jmt.v1i1.772

Salam, A., & Munawir, M. (2024). Utilization of Technology in Human Resource Management Optimizing Efficiency and Productivity in the Digital Era. International Journal of Management Science and Information Technology, 4(2), 236–245. https://doi.org/10.35870/ijmsit.v4i2.2910

Setyowati, D. (2019). Pengaruh efisiensi operasional terhadap kinerja keuangan pada bank umum syariah di indonesia. Jurnal Maps (Manajemen Perbankan Syariah), 3(1), 17-30. https://doi.org/10.32483/maps.v3i1.31

Shabri, H. (2022). Transformasi digital industri perbankan syariah indonesia. elkahfi, 3(02), 1-7. https://doi.org/10.58958/elkahfi.v3i02.88

Shanti, R. (2023). Role of digital transformation on digital business model banks. Sustainability, 15(23), 16293. https://doi.org/10.3390/su152316293

Shi, D. (2024). A study of the impact of digital transformation on the stability of banks., 46-52. https://doi.org/10.2991/978-94-6463-408-2_6

Sri Sulistyawati, U., & Munawir. (2024). Decoding Big Data: Mengubah Data Menjadi Keunggulan Kompetitif dalam Pengambilan Keputusan Bisnis. Jurnal Manajemen Dan Teknologi, 1(2), 58-71. https://doi.org/10.35870/jmt.v1i2.1114

Wetapo, U. (2023). Pengaruh kecukupan modal, risiko kredit, efisiensi, dan likuiditas terhadap profitabilitas perbankan. Jurnal Manajemen, 11(1), 82-90. https://doi.org/10.36546/jm.v11i1.870

Xin, Z., Xu, Y., & Ma, L. (2022). Research on successful factors and influencing mechanism of the digital transformation in smes. Sustainability, 14(5), 2549. https://doi.org/10.3390/su14052549

Yongjie, Z. and Jin, S. (2023). How does the digital transformation of banks improve efficiency and environmental, social, and governance performance?. Systems, 11(7), 328. https://doi.org/10.3390/systems11070328