

Navigating Digital Transformation in Rural Banks: A Study of Critical Success Factors in Indonesia

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Abstract

Digital transformation (DT) has become imperative for rural banks in Indonesia to enhance efficiency and customer service in response to evolving market demands and technological advancements. This study investigates the factors that influence successful DT implementation in rural banks, focusing on three banks in Indonesia. Through Structural Equation Modeling (SEM) analysis, leadership emerged as a critical factor significantly impacting DT implementation, emphasizing the need for digital-oriented leadership to drive digital initiatives effectively. Additionally, resource allocation and technology adoption were identified as the key drivers of successful DT implementation. These findings underscore the importance of fostering digitally oriented leadership, enhancing employee skills, and reallocating resources effectively to support DT initiatives in rural banks. Moreover, adapting organizational structures and processes to align with digital transformation goals is crucial for rural banks to thrive in an increasingly digital landscape, ultimately enabling them to enhance competitiveness, improve customer service, and achieve sustainable growth.

1. Introduction

Indonesia has a long history of providing microfinance services (MFIs) in both rural and urban areas. These MFIs have made important contributions to improving the financial condition of low-income families and helping them escape the poverty cycle. The government has supported the development of these services through various efforts, including regulations, subsidies, and focused credit policies. Currently, there are two main types of MFIs in Indonesia: those that partner with banks, such as BRI Unit Desa and Bank Perkreditan Rakyat (BPR), and those that operate independently, such as credit cooperatives, sharia-based microfinance institutions, and arisan groups. To maintain sustainability as a business entity, MFIs must continuously improve their operational efficiency. On the other hand, banks are currently experiencing significant digital transformation driven by the emergence of new types of financial technology (FinTech). These Fintech companies provide innovative services that attract customers and investors. FinTech startups generally focus on the concept of unbundling banks, where they offer one specific type of product or service. FinTech players separate financial services into discrete parts, allowing consumers to find and structure product combinations that suit their preferences. This is especially possible with the increasing focus on the aspect of better financial services for customers [1]. Digital transformation (DT) is essential for every business and society, and the banking industry is probably one of the industries most affected by its impact. The rapidly changing business situation also impacts Rural Banks with several trends of increasing challenges, including changes in retail customer preferences that are increasingly digitally savvy, weakening trends in macroeconomic conditions, value chain disruption with increasing competition with non-financial institutions such as fintech, and changes in regulations that cause profitability and

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liquidity management to be increasingly stressed. The fluctuations in performance during the pandemic and the changing business situation required the management of the Indonesian Rural Bank to formulate a digital transformation. Digital transformation is a gradual process that includes three phases, namely digitization, digitalization, digital transformation [2]. According to Westerman *et al.*, digital transformation is an organizational change involving people, processes, strategies, structures, through the use of technology and business models to improve performance [3].

Digital transformation focuses more on people than digital technology, changing the organization to be customer-centric [4–6]. It is supported by leadership and driven by challenges to corporate culture, empowering employees with technology [7]. DT involves skilled employees and executives using technology to develop products and services. It often results in a change of core business, adaptation of resources and capabilities, as well as reconfiguration of processes and structures [8,9]. Existing literature mostly analyzes the impacts of DT at a macro or industry level such as firm internationalization, innovation, digital disruption sustainability, and dynamic processes for transforming asset-intensive organizations. DT leads not only to adapting products and services but also changes in how they are promoted and delivered based on new direct interactions with customers.

Digital transformation (DT) is more about the people involved than the technology itself because it involves shifting an organization's focus to prioritize customer needs, guided by strong leadership and willingness to evolve the company's culture [10]. It is about using technology to empower employees and make changes to the business model, culture, products, processes, and organizational structures [11]. For DT to be effective, the active participation of skilled employees and leaders who can leverage technology to innovate and develop new products and services is required. DT often leads to fundamental changes in a company's main activities and requires the organization to adapt its resources and capabilities [7]. This includes rethinking processes and structures, and making adjustments to leadership. While much of the research on DT looks at its effects on a larger scale, such as how it influences international business, innovation, and sustainability, it is also about the day-to-day changes in how products and services are marketed and delivered. This involves new ways of interacting directly with customers to meet their evolving needs.

Digital transformation has become an essential strategy for many industries, including the financial sector, to remain competitive and meet the evolving needs of customers [12]. In the context of MFI in Indonesia, the introduction of digital technologies has opened up new opportunities for enhancing efficiency and customer service. The impact of digital technologies, such as big data, artificial intelligence, and the Internet of Things, has been significant across various industries, and the financial sector is no exception [13]. As rural banks strive to enhance their competitiveness and customer service, digital transformation has become imperative. This study aims to delve into the internal and external factors that can influence the successful implementation of digital transformation in rural banks, with a specific focus on the Rural Bank in Indonesia. Internal factors that can affect the implementation of digital transformation at rural banks include the readiness and capability of the organization to embrace change, availability of skilled employees and management support, financial resources allocated to digital transformation initiatives, and existing infrastructure and technology systems [14]. External factors are the regulatory environment, technological advancements, competition within the industry, customer expectations and demands, and market trends [15].

2. Method

The two-step method to reach the proposed research model, the literature reviews a script was produced for semi-structured interviews, conducted with four board members of the rural banking industry. These interviews revealed that it was very important to fine-tune the questions used to complete questionnaires with 50 banking employees, aiming to understand their perceptions about the main factors affecting DT in the Indonesian banking system, according to the expected results of this process, that is, organizational performance and business volume increase. Based on interviews and evidence from scholarly sources, digital transformation has been identified as a thorough process involving internal and external changes. This study aims to test the proposed hypotheses, which include the influence of various factors on the implementation of digital transformation in rural banks. The hypotheses included the role of leadership, resources, employee skills, customer orientation, risk management, technology, regulatory aspects, and economic conditions in influencing the success rate of digital transformation. Using a sample of 50 observations from banking employees in three Rural Banks in Indonesia, this study aims to provide a deeper understanding of the factors that influence the digital transformation process in the rural banking context.

This study tests eight hypotheses related to the factors that influence the implementation of digital transformation at Rural Bank, as shown in Table 1. First, the first hypothesis states that leadership has a significant influence on the implementation of digital transformation in rural banks. The second hypothesis suggests that resources play an important role in the implementation process. The third hypothesis highlights the influence of employee skills on the success of digital transformation. The fourth hypothesis states that customer orientation

contributes to the effectiveness of digital implementation. The fifth hypothesis considers the impact of risk management on the digital transformation process. The sixth hypothesis proposes that technology plays an important role in the success of digital transformation. The seventh hypothesis highlights the influence of regulatory aspects on the process, while the eighth hypothesis links economic conditions to the implementation of digital transformation in Rural Banks. This study investigates the relationship and significance of each of these factors in digital transformation in the context of rural banking. The research model design is shown in Fig. 1.

Table 1 Research variables and indicators

Variables	Indicators	References
Leadership (X1)	1. Digital Leadership 2. Leadership Style 3. Leader Support	Koseoglu <i>et al.</i> (2020), Amoo <i>et al</i> (2019)
Resources (X2)	1. Employee Engagement 2. Resources Allocation 3. Budget Availability	Vankatesh (2016), London <i>et al.</i> (2021)
Employee Skills (X3)	1. Digital Literacy (ability to use digital tools) 2. Training Attendance 3. Skill Development (certification, training)	Campanelli (2017), Bayu (2019)
Customer Centricity (X4)	1. Customer Satisfaction Scores 2. Market Share	Kurniawan <i>et al</i> (2021)
Risk Management (X5)	1. Legal Risk Assessment 2. Data Privacy and Cyberattack 3. Interest Rate Fluctuation	Capusneanu (2021), Trinugroho (2022)
Technological Trends (X6)	1. Adoption Rate of Fintech Solutions 2. Technological Innovation Index 3. Innovation Orientation	Singh <i>et al.</i> (2021),
Regulatory Environment (X7)	1. Compliance Burden 2. Regulatory Changes Frequency	Vankatesh (2016), Capusneanu (2021)
Economic Conditions (X8)	1. GDP Growth Rate 2. Inflation Rate	Kester (2013), Wiliandri (2020)
Digital transformation Implementation (Y)	1. Performance Growth 2. Business Process Efficiency 3. Customer Satisfaction	Capusneanu (2021)

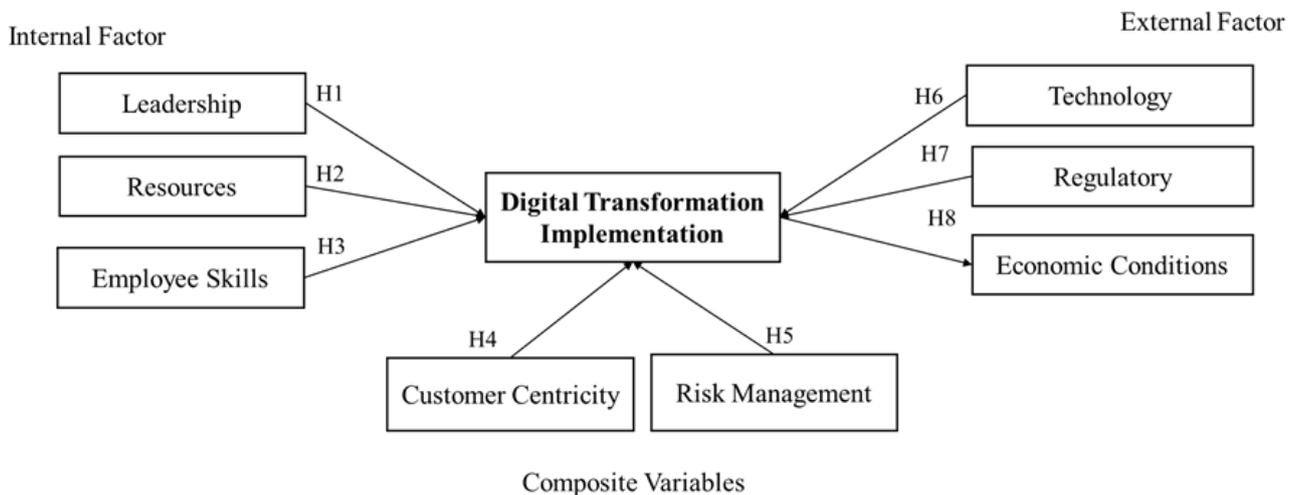


Fig. 1 The research model design

2.1 Internal and External Factors of Digital Transformation

In the context of digital transformation (DT), communication plays an important role as a crucial internal factor. A German bank report on sustainability by Diener and Spacek revealed that information related to digitalization is often insufficient and incomplete [16]. This leads to banks having an excessive degree of freedom in the report formulation process. Vermeulen, in his analysis of the financial services sector, particularly banks and insurance companies, found that many companies in this sector have outsourced parts of their information technology [17]. This is due to a shortage of experts in the field of information technology, which in turn affects communication related to product innovation. The impact is that financial products driven by information technology may lose some of the innovative value of their initial conceptualization.

Regulation and compliance are external factors that influence digital transformation (DT) in the banking industry. According to Diener and Spacek, regulatory requirements are often the bottleneck that slows the progress of digitalization in the banking sector [16]. They also highlight the role of customers as another important external factor in banking DT. The same study concluded that there is variation in customer trust and acceptance of the use of apps and technology, reflecting varying expectations and levels of knowledge about the potential use of digital technology. An analysis of Italian bank customers by Filotto *et al.* found that, in the early stages of adoption, the main determinants were economic benefits and a friendly user experience [18]. In addition, maintaining customer loyalty to electronic channels requires special attention to structural assurance mechanisms, such as the clarity of security policies. In the context of a financial executive perspective, customers tend to combine and reconfigure the resources offered by their chosen ecosystem business actors, emphasizing the importance of following consumer behavior patterns to increase the penetration of digital technologies in the banking industry [19].

Thus, DT in the banking industry is a multifaceted process that is influenced by various internal and external factors. Communication emerges as a critical internal factor, as highlighted by the insufficient and incomplete information related to digitalization reported by Diener and Spacek [16]. This underscores the importance of effective communication channels within banks to ensure the successful implementation of digital initiatives. External factors, such as regulation and compliance, also significantly impact DT, with regulatory requirements often posing challenges that hinder progress, as indicated by Diener and Spacek [16]. Moreover, the role of customers in driving DT cannot be understood, with varying levels of trust and acceptance of digital technologies influencing adoption rates, as observed in the research by Filotto *et al.* [18]. As the banking industry navigates the complexities of digital transformation, it becomes imperative for institutions to prioritize communication strategies, address regulatory challenges effectively, and tailor digital solutions to meet customers' diverse needs and expectations. Furthermore, understanding and adapting to evolving consumer behavior patterns will be crucial in maximizing the potential of digital technologies to drive innovation and growth in the banking sector [19].

3. Result and Discussion

Respondents were categorized into two groups. The first group consisted of individuals directly involved in executing digital transformation, selected based on their roles within the transformation team, length of service, age, gender, and the highest level of education attained. The second group comprises expert resources in digital transformation, drawn from both internal and external sources, and tasked with formulating strategies to enhance the implementation of digital transformation initiatives. In total, there were 50 respondents: 27 males (50.59%) and 23 females (49.41%). Regarding age, the majority fell within the 30-39 age range, constituting 69.41% of the sample. The majority of respondents in the digital transformation team at Rural had tenures exceeding 6-9 years, totaling 33 individuals (38.82%). Additionally, the majority of respondents primarily served as team members responsible for executing digital transformation initiatives, totaling 41 individuals (48.23%). The majority held a bachelor's degree, accounting for 63.53% of the sample. The second group of respondents consisted of five expert sources, both internal and external, contributing to the formulation of strategies aimed at strengthening the implementation of digital transformation. While it is important to consider the characteristics and perspectives of employees directly involved in digital transformation within a company, it could be equally valuable to include external experts who offer different viewpoints. These external parties may provide insights that differ from those of internal team members, leading to a more well-rounded understanding of the challenges and opportunities present in digital transformation strategies.

The SEM-PLS analysis entails two sequential stages for data examination: assessment of the measurement model (outer model) and structural model (inner model). The structural model is used to describe the relationship between each variable and other variable and between indicators and variables. The PLS structural model in this study is in accordance with Fig. 2.

The former focuses on validating and ensuring the reliability of model measurements within the research framework. Evaluation of the outer model encompasses several key aspects, including convergent validity, composite reliability, average variance extracted (AVE), and discriminant validity. Convergent validity, as

indicated by Ghozali and Latan, is verified through loading factor values exceeding 0.7 for each latent variable indicator [20]. The analysis depicted in Fig. 2 confirms that all loading factor values surpass the 0.7 threshold, satisfying the validity criteria. Additionally, the assessment includes examining the Average Variance Extracted (AVE) values within the reflective indicator model. The model exhibits robust validity when AVE values for each latent variable with reflective indicators surpass 0.5, as shown in Table 2. Furthermore, reliability was assessed through Cronbach's alpha (CA) and Composite Reliability (CR). CA gauges the reliability of all model indicators, while CR predicts the internal consistency of the constructs. The meticulous evaluation of the measurement model and structural model using the SEM-PLS approach underscores the imperative of accurate data analysis in reinforcing the significance of weather forecasting.

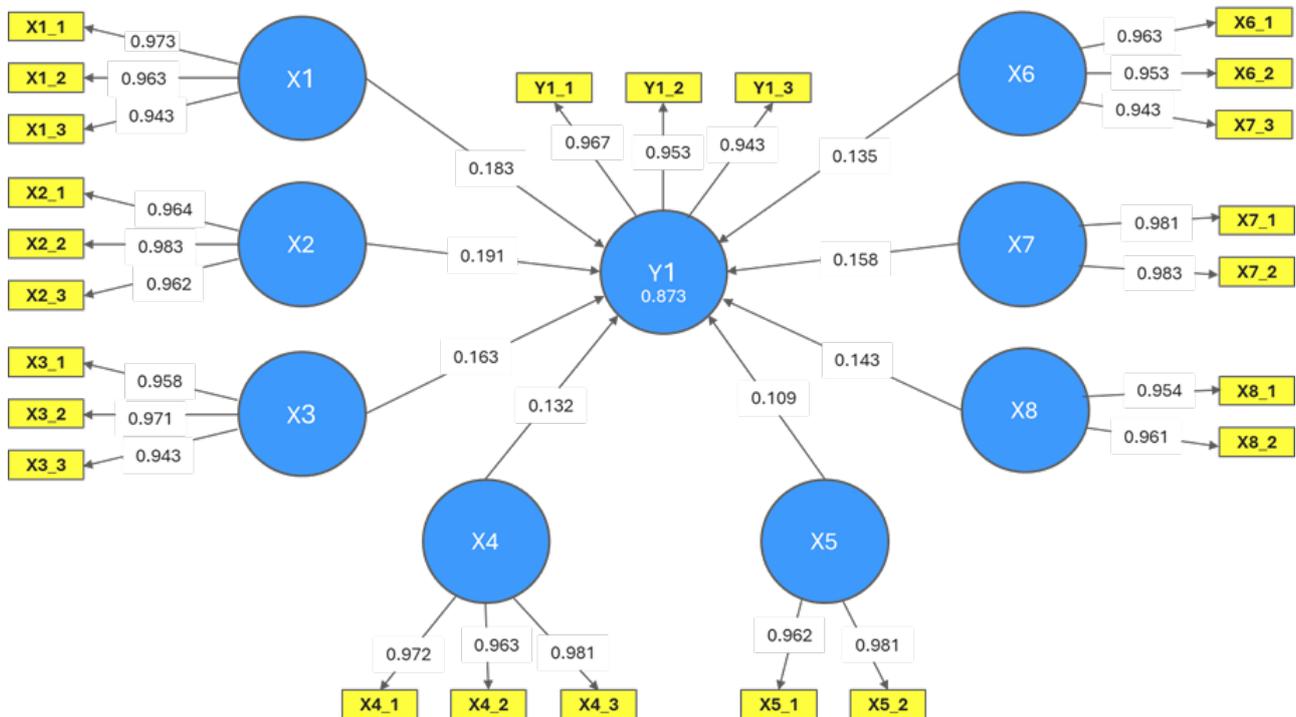


Fig. 2 PLS structural model

The final phase of assessing the reflective indicator measurement model involves examining discriminant validity at both the indicator and variable levels. Utilizing the Fornell-Larcker criterion detailed in Table 3, it is observed that the square root of the Average Variance Extracted (AVE) for each variable surpasses the correlation value with other latent variables. This signifies the discriminant ability of each variable to meet the requisite standards. Subsequently, the evaluation of the inner model commences by analyzing the R-Square (R²) values attributed to endogenous variables. A higher R² value, closer to 1, indicates greater predictive accuracy. In the context of digital transformation implementation, the R² value is 0.827, underscoring a strong predictive accuracy regarding the influence of exogenous variables on endogenous ones. Following the fulfillment of the measurement criteria, hypothesis testing ensues by employing the bootstrapping method within SmartPLS, yielding t-values and corresponding p-values. Decisions regarding hypotheses are derived by comparing the obtained t-values against the critical t-table value or probability value (p-value), while adhering to a confidence level $\alpha = 0.05$, with the t-table value set at 1.96.

Table 2 AVE, cronbach's alpha, and composite reliability

Variables	Average Variance Extracted (AVE)	Cronbach's Alpha (CA)	Composite Reliability (CR)
Leadership (X1)	0.931	0.979	0.943
Resources (X2)	0.938	0.964	0.961
Employee Skills (X3)	0.921	0.974	0.971
Customer Centricity (X4)	0.961	0.981	0.941

Risk Management (X5)	0.933	0.975	0.971
Technological Trends (X6)	0.962	0.981	0.958
Regulatory Environment (X7)	0.928	0.979	0.964
Economic Conditions (X8)	0.933	0.972	0.971
Digital transformation Implementation (Y)	0.919	0.972	0.969

Table 3 Fornell-Larcker criterion table

Variables	X1	X2	X3	X4	X5	X6	X7	X8	Y
Leadership (X1)	0,974								
Resources (X2)	0.598	0.962							
Employee Skills (X3)	0.597	0.615	0.964						
Customer Centricity (X4)	-0.179	-0.122	-0.132	0.974					
Risk Management (X5)	0,974	0.598	0.555	-0.263	0.968				
Technological Trends (X6)	0,974	0.624	0.603	-0.202	0.536	0.961			
Regulatory Environment (X7)	0,974	0.611	0.616	-0.214	0.558	0.593	0.982		
Economic Conditions (X8)	0,974	0.620	0.615	-0.216	0.640	0.607	0.606	0.966	
Digital Transformation Implementation (Y)	0,974	0.759	0.752	-0.161	0.685	0.733	0.735	0.746	0.957

In today's rapidly evolving business landscape, digital transformation has emerged as a critical imperative for organizations striving to remain competitive and relevant. This paradigm shift, characterized by the integration of digital technologies into every facet of organizational operations, transcends mere technological adoption to fundamentally reshape workplace environments and cultures. Central to the success of digital transformation initiatives are leadership and organizational culture, which play pivotal roles in driving and facilitating this transformative journey. The influence of leadership is unmistakable, as evidenced by its significant positive impact on digital transformation implementation, as indicated by the t-statistic. Leaders with a digital orientation possess the vision and acumen to navigate the complexities of digital initiatives, fostering an environment conducive to the digitization of workflows and cultural norms within companies. This assertion finds support in prior research, which underscores the indispensable role of leadership in steering organizations towards success in digital transformation endeavors [21]. Similarly, organizational culture exerts a significant positive influence on the implementation of digital transformation. Embracing digital culture and fostering innovation can instigate a shift in mindsets, enabling adaptation to digital advancements and fostering seamless collaboration to expedite the digital transformation process. This observation aligns with previous studies underscoring the necessity of addressing cultural change as a prerequisite for commencing the transformation journey [22].

The impact of organizational culture on digital transformation implementation is underscored by its significantly positive effect. Embracing digital culture and fostering innovation can catalyze shifts in mindsets, enabling adaptation to digital advancements and fostering seamless collaboration to expedite the implementation of digital transformation initiatives. This finding aligns with prior research that emphasizes the necessity of addressing cultural changes as a prerequisite for initiating the transformation process [22]. Conversely, the impact of organizational structural changes on digital transformation implementation presents various findings. The statistical analysis indicates that the t-statistic value of the variable representing organizational structural changes in digital transformation implementation is 0.851, which falls below the t-table value of 1.96. Consequently, it can be inferred that the organizational structural change variable lacks a significant influence on the implementation of digital transformation. This outcome diverges from prior studies by Pella *et al.*, which found significant effects of organizational structure on digital transformation [23]. Organizational structural changes are purposeful processes aimed at altering organizational conditions from their previous state.

The impact of resources on digital transformation implementation manifests significantly, with a positive effect on the implementation variable. This finding corroborates prior research emphasizing the need to enhance worker capabilities alongside employee engagement, particularly in adapting to technological changes across various domains to bolster competitiveness and productivity [24]. Moreover, budgetary support assumes a critical role given the substantial investment costs entailed by digital transformation initiatives. Similarly, the effect of

technology on digital transformation implementation is notably positive. Technology assumes a pivotal role in facilitating the successful execution of digital transformation endeavors, as its application within businesses yields myriad benefits in terms of time efficiency and cost savings. Consistent with prior studies, it is underscored that beyond merely being future-ready, technological infrastructure should also prioritize data accuracy, security, and user-friendly design to significantly enhance the effectiveness of implementation strategies [25].

The journey of digital transformation in rural banks encompasses multifaceted factors, both internal and external, as highlighted in the discussions across various aspects. Leadership emerges as a crucial internal factor, showing a significant positive influence on digital transformation implementation. Leaders with a digital orientation play a pivotal role in driving the digitization of work environments and cultures, aligning with previous studies emphasizing the importance of leadership in digital transformation success. Moreover, organizational culture proved to be a significant determinant, exerting a positive impact on implementation efforts. Embracing digital culture and fostering innovation are essential for cultivating mindsets adaptable to digital advancements and fostering seamless collaboration.

3.1 Managerial Implications

Based on the results of SEM analysis, the factor that most influences the implementation of digital transformation at Rural Bank is Leadership. Therefore, the Company needs to build digital-oriented leadership and improve buy-in management by conducting bootcamps for Work Unit Leaders at the Head Office, Regional Offices, and Branch Offices to change mindsets, communicate the benefits that will be generated, manage resistance, and provide the training and support needed. In addition, it is necessary to adjust the leader resourcing strategy and the mutation process in the Work Unit, where it is better not to mutate first, so that the leaders in the Work Unit have enough time to implement digital initiatives in each Work Unit.

Bringing these findings into practical application, it becomes evident that fostering digital-oriented leadership is paramount for successful digital transformation within rural banks. Therefore, several managerial implications arise from this study's findings on digital transformation in rural banks. First, there is a clear need for rural bank leaders to prioritize the development of digital leadership capabilities within their organizations. Investing in training and development programs that foster digital orientation among leaders can significantly enhance their ability to effectively drive and sustain digital transformation initiatives. Second, fostering a digital-friendly organizational culture is paramount. Rural banks should actively promote a culture of innovation and digital adoption, encouraging employees to embrace technological advancements and adapt seamlessly to digital changes. Creating an environment that values and rewards digital innovation can facilitate smoother implementation processes and accelerate digital transformation. Third, while changes in organizational structure may not directly impact digital transformation implementation, rural banks should remain vigilant and flexible in adapting their structures to support evolving digital initiatives. This may involve reevaluating existing organizational hierarchies, roles, and processes to ensure alignment with digital objectives and facilitate smoother implementation. Fourth, rural banks must prioritize the allocation of sufficient resources, both in terms of financial investments and human capital, to support digital transformation efforts effectively. Investing in employee training and development programs to enhance digital skills and competencies, alongside allocating adequate budgetary resources for technological investments, is crucial for driving successful digital transformation outcomes.

Finally, rural banks should prioritize the adoption and integration of cutting-edge digital technologies that align with their strategic objectives and customer needs. Emphasizing technologies that enhance operational efficiency, improve customer experience, and ensure data security and compliance can position rural banks for sustainable growth and competitiveness in the digital era. By embracing these managerial implications, rural banks can navigate the complexities of digital transformation more effectively and position themselves for long-term success in the digital landscape.

4. Conclusion

In conclusion, this study sheds light on the multifaceted dynamics of digital transformation within rural banks, uncovering several key insights that have significant implications for organizational practices and strategies. First, it is evident that effective digital leadership plays a crucial role in driving and sustaining digital transformation initiatives within rural banks. Leaders must embrace a digital orientation and spearhead efforts to digitize work environments and cultures. Second, fostering a digital-friendly organizational culture is imperative, as it facilitates seamless adaptation to digital advancements and encourages innovation. Third, while changes in organizational structure may not directly impact digital transformation implementation, maintaining organizational flexibility and alignment with digital objectives is essential. Fourth, adequate resource allocation, including investments in employee training and technological infrastructure, is vital for supporting successful digital transformation endeavors. Finally, prioritizing the adoption of cutting-edge digital technologies that enhance operational efficiency and customer experience is paramount for long-term competitiveness. By embracing these insights and

acting upon the managerial implications outlined, rural banks can effectively navigate the complexities of digital transformation and position themselves for sustainable growth in the digital era. By overseeing the progress of digital initiatives, it is expected that flagging or early warning signs can be implemented on the monitoring system for initiatives that have the potential to experience obstacles for preventive action. In the preparation of digital initiative KPIs, it is hoped that a challenge session can be conducted to sharpen the outcomes and alignment between all stakeholders involved in the digital project team. In future research it is recommended to include external factors that can affect implementation, and research can be expanded with respondents not limited to the digital transformation project team, but all workers involved in digital implementation.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

The authors confirm contribution to the paper as follows: **study conception and design:** Asaduddin Abdullah; **data collection:** Asaduddin Abdullah; **analysis and interpretation of results:** Asaduddin Abdullah, Dikky Indrawan, Nur Hasanah; **draft manuscript preparation:** Asaduddin Abdullah. All authors reviewed the results and approved the final version of the manuscript.

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