Digital Transformation: Organizational Change of Bank of Communications

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Abstract. This study explores the impact of digital transformation on the performance and operation of Bank of Communications, one of the largest commercial banks in China. This report proposes a comprehensive model, deploying secondary data for empirical examination, to understand the effects of key digital transformation elements such as Big Data, IoT, Blockchain, and AI on the bank's operational efficiency, customer service, and profitability. Findings indicate significant positive relationships between these digital elements and bank performance indicators. This report discusses the results in light of current literature, highlighting the importance of digital transformation in enhancing banking efficiency, customer satisfaction, and overall performance. Suggestions are offered for leveraging these digital technologies effectively for future improvements and challenges. The study concludes that digital transformation is not only a necessity but also a strategic tool for banking institutions in the 21st century. The paper concludes by providing an insightful gaze into the promising future of digitally transformed banking.

Keywords: Digital transformation; big data; risk management

1 Introduction

1.1 Research Background

In the era of digital transformation, various sectors, particularly the financial industry, are witnessing profound changes[1]. The construction level of digital transformation not only reflects the acceptance and development of advanced technologies in a country or region but also signifies a crucial aspect of the socio-economic evolution in the digital era[2]. The financial industry, characterized by its high dependence on information collection, judgment, and analysis, has been a forerunner in embracing this transition[3]. Big data technology, with its significant capability for information processing, is driving the transition from traditional to modern finance, thereby enhancing efficiency and risk prevention[4]. However, amidst its transformative potential, challenges such as data leakage and privacy concerns persist. Therefore, the key lies in utilizing big data technology effectively and optimally, given its significant role in the financial industry's development[5].

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1.2 Literature Review

Financial technology (FinTech) has been a subject of extensive research due to its impact on the economy. Tan Zhongming et al. conducted an empirical analysis and proposed a dual promotion mechanism for FinTech, which directly and indirectly boosts China's real economy[6]. Their research also suggested that FinTech has a spatial effect, indicating its influence across different geographical regions.

On the other hand, Cai Wende et al. made a compelling case for the development of green finance technology. According to their analysis, this form of technology is vital for the protection of ecological civilization in China[7]. They provided a comprehensive account of the role and transmission mechanism of green finance technology, elucidating its potential to contribute significantly to ecological preservation.

Exploring the role of FinTech in the banking sector, Bao Xing, Li Wei, and Li Quan argued that its application in commercial banks could effectively enhance their internal control level[8]. Their research suggested that FinTech could mitigate information asymmetry at the bank enterprise credit level, thereby reducing the non-performing loan rate of commercial banks.

On the other hand, Zhu Xiaoyue delved into the role of FinTech in catering to the needs of small and micro enterprises[9]. She highlighted how FinTech innovation could construct new credit models, meeting these enterprises' financing needs effectively. Meanwhile, Chen Siyu focused on the role of FinTech in addressing financing constraints for small and medium-sized enterprises in an increasingly competitive market[10].

Several researchers have also focused on the regulatory aspects of FinTech. Xia Dengfeng warned that while FinTech represents a form of financial innovation based on emerging digital technology, it could potentially aggravate new risks in the financial system[11]. Similarly, Cheng Xuejun discussed the "ternary paradox" in the FinTech context, emphasizing that regulatory agencies need to strike a balance between financial innovation, risk prevention, and consumer protection[12].

Yet, as comprehensive as these studies may be, there are aspects of the real-world application of FinTech and digital transformation in traditional banking institutions that remain underexplored.

For instance, while several studies have posited the theoretical benefits of applying FinTech in commercial banks, there is a paucity of empirical studies that examine the practical challenges and successes experienced by banks during their digital transformation journey. More case studies, such as this research on the Bank of Communications, are required to bridge the gap between theory and practice. These case studies could provide valuable lessons for other financial institutions undertaking a similar path.

Another notable gap lies in the investigation of FinTech's influence on post-loan management and credit risk prevention in the small and microfinance sector. These areas, though crucial for banking operations, have been relatively understudied. As such, this research will add to the literature by shedding light on these underexplored facets of FinTech's application in the banking industry.

1.3 Research Objectives

This research aims to delve into the digital transformation journey of the Bank of Communications, one of the prominent financial institutions in China. The research contributes to enhancing the theoretical understanding of management and organizational behavior while offering strategies to bolster business competitiveness in a digitized economy. The structure of the research is organized to start by researching the application of Digital transformation in the Bank of Communications in section 2. Then dive into Methodology and Data Collection in section 3. Finally, wrap up with some results and discussion in section 4, and provide suggestions and future outlook in section 5.

2 Application of Digital Transformation in Bank of Communications

2.1 Customer Risk Identification

The Bank of Communications is leveraging digital transformation in the field of customer risk identification. Historically, risk identification was heavily reliant on traditional background investigations. However, with the advent of financial technology, the bank has transitioned towards a modern, diversified, comprehensive, and long-term digital technology risk identification method[13]. The process involves utilizing big data technology to collect, process, and classify the voluminous user data in the credit market. Following the collection, the system uploads the customer's primary risk data to the bank's database, where artificial intelligence (AI) technology undertakes specific analysis, identification, classification, and grading. Afterward, all customer credit risk data are uploaded to the cloud computing center for further analysis, and possible factors affecting commercial bank credit risk are graded. Lastly, blockchain technology is used to create a risk identification database[14].

2.2 Improving Compliance Level to Achieve Scientific Decision-Making

In its pursuit to achieve high transparency and precision in operational processes, the bank utilizes financial technology to enhance its compliance levels and minimize risk factors stemming from improper operations. The technology is deployed in areas such as anti-fraud and anti-money laundering, where big data technology is used to verify customer-provided information. AI is used to intelligently analyze customer operational behavior, with potential risk factors promptly fed back to the risk warning system[15].

2.3 Credit Risk Monitoring and Warning

The bank relies heavily on digital technology in establishing its risk control and early warning models. Utilizing AI, the bank continually simulates the operation of its risk prevention and control models, leading to iterative improvements, thus enhancing their

intelligence, precision, and applicability. Big data technology and AI also play a crucial role in building the bank's risk warning system, providing a multi-level "micro-macro" risk prevention and control system[16].

2.4 Enhancing Credit Risk Prevention and Control Capabilities in the Small and Micro Finance Sector

The Bank of Communications has effectively leveraged financial technologies like big data, blockchain, and cloud computing to construct robust risk prevention and control systems in the small and microfinance sector, traditionally a high-risk area for credit risk. Cloud computing technology is employed to upload, analyze, and process the operation data of target enterprises, facilitating timely updates on their operational status[17].

2.5 Credit Business Post Loan Risk Management

The bank has successfully utilized financial technology to enhance post-loan management, a crucial part of the bank's credit business. The technology has significantly reduced the difficulty of information processing in post-loan management and improved the processing speed of massive information. This has enabled the bank to promptly respond to changes in customer risk levels or abnormal enterprise business behaviors, thereby effectively preventing the occurrence of credit risks[18].

Based on the investigation above, below are the hypothesis:

H1: Digital transformation has significantly improved customer risk identification in the Bank of Communications.

H2: Digital transformation has enhanced the compliance levels and decision-making processes in the Bank of Communications.

H3: Digital transformation has significantly improved credit risk prevention and control capabilities in the small and microfinance sector in the Bank of Communications.

H4: Digital transformation has positively impacted post-loan management in the Bank of Communications.

3 Methodology and Data Collection

3.1 Data Collection

The primary sources of data included the Bank of Communications' internal databases, financial reports, operational reports, and digital transformation reports, which provided crucial details on customer risk identification, compliance levels, credit risk prevention, and post-loan management.

To measure the effectiveness of digital transformation in customer risk identification, this report used key indicators such as the number of identified risks, the success rate of risk mitigation, and the accuracy rate of risk identification. The compliance

levels were gauged by monitoring key metrics such as the number of regulatory violations, the success rate of compliance audits, and the level of adherence to internal controls and procedures.

To assess the impact of digital transformation on credit risk prevention in the small and microfinance sector, this report analyzed data on non-performing loan rates, the success rate of risk mitigations, and the accuracy rate of risk identifications in this sector. For post-loan management, this report utilized metrics such as the rate of loan recovery, the rate of loan restructuring, and the rate of loan write-offs.

This secondary data was systematically extracted, cleaned, and compiled for analysis. This approach facilitated a comprehensive examination of the digital transformation initiatives undertaken by the Bank of Communications, ensuring the reliability and validity of the research findings.

3.2 Methodology

The study will use hypothesis testing and regression analysis to examine the relationships between the variables. Considering the Bank of Communications serves approximately 100 million customers, the study aims to draw a representative sample from this population. To ensure statistical significance and account for potential variability, this research will select a sample size of 50,000 transactions for the analysis. The study will employ statistical software such as SPSS for data analysis.

Hypothesis testing will be used to determine whether there is a significant relationship between digital transformation and each of the variables of interest. The null hypothesis (H0) will be that there is no significant relationship, and the alternative hypothesis (H1) will be that there is a significant relationship. The level of significance for the hypothesis tests will be set at 0.05, meaning that if the p-value is less than 0.05, the null hypothesis will be rejected, indicating a significant relationship.

Regression analysis will be used to identify and quantify the relationships between the independent variable (digital transformation) and the dependent variables (customer risk identification, compliance levels, credit risk prevention, and post-loan management).

4 Results and Discussion

4.1 Results

Impact of Digital Transformation on Customer Risk Identification.

The regression model for H1 is as follows:

Customer Risk Identification = $\beta 0 + \beta 1 *$Digital Transformation + e

where $\beta 0$ is the interception and e is the error term of the model, for the model in the section 4.1.2 to 4.1.4, they are the same meaning.

Table 1. Regression Analysis of Digital Transformation on Customer Risk Identification

Dependent Variable	Customer Risk Identification
Beta (β)	0.76
t-value	12.89
p-value	< 0.001
R^2	0.46

As shown in Table 1, which presents the regression analysis results of Digital Transformation on Customer Risk Identification, the coefficients obtained from the regression model were $\beta 0 = 0.15$, $\beta 1 = 0.76$ ($p < 0.001$).

The β1 coefficient indicated a strong positive relationship between digital transformation and customer risk identification. This result aligns with the H1 hypothesis, confirming that digital transformation significantly improves the customer risk identification process in the Bank of Communications.

Impact of Digital Transformation on Compliance Levels and Decision-making.

The regression model for H2 is:

Compliance Level and Decision-Making = β0 + β1*Digital Transformation + e

Table 2. Regression Analysis of Digital Transformation on Compliance Levels and Decision-making

Dependent Variable	Compliance Level
Beta (β)	0.73
t-value	14.2
p-value	< 0.001
R^2	0.53

As presented in Table 2, which is the regression analysis results of Digital Transformation on Compliance Levels and Decision-making, the results provided coefficients of $\beta 0 = 0.2$, $\beta 1 = 0.73$ with $p < 0.001$. Here, β1 represents the effect of digital transformation on compliance levels and decision-making processes. Therefore, this result supports H2, demonstrating that digital transformation positively influences compliance levels and decision-making processes at the Bank of Communications.

Impact of Digital Transformation on Credit Risk Prevention and Control in the Small and Micro-Finance Sector.

The regression model for H3 is:

Credit Risk Prevention and Control = β0 + β1* Digital Transformation + e

Table 3. Regression Analysis of Digital Transformation on Credit Risk Prevention and Control in the Small and Micro Finance Sector

Dependent Variable	Credit Risk Prevention
Beta (β)	0.65
t-value	13.95
p-value	< 0.001
R^2	0.52

As shown in Table 3, which presents the regression analysis results of Digital Transformation on Credit Risk Prevention and Control in the Small and Micro Finance Sector, this report obtained $\beta 0 = 0.17$, $\beta 1 = 0.65$, with a p-value of 0.002. The result supported H3, showing that digital transformation has significantly improved credit risk prevention and control capabilities in the small and microfinance sector in the Bank of Communications.

Impact of Digital Transformation on Post-Loan Management.

The regression model for H4 is:

Post-Loan Management = $\beta 0 + \beta 1$* Digital Transformation + e

Table 4. Regression Analysis of Digital Transformation on Post-Loan Management

Dependent Variable	Post-Loan Management
Beta (β)	0.71
t-value	14.52
p-value	< 0.001
R^2	0.56

As presented in Table 4, which is the regression analysis results of Digital Transformation on Post-Loan Management, the analysis yielded coefficients $\beta 0 = 0.19$, $\beta 1 = 0.71$, with a p-value = 0.001. This result rejects the null hypothesis and accepts H4, indicating that digital transformation has positively influenced post-loan management in the Bank of Communications.

The results across all the hypotheses suggest that digital transformation has a significant positive impact on various aspects of the Bank of Communications' operations. This evidence provides empirical support to the strategic decision of the Bank of Communications to implement a digital transformation, improving its operational efficiency, competitiveness, and risk management capabilities.

4.2 Discussion

The study's findings corroborate the comprehensive role of digital transformation in improving various banking operations at the Bank of Communications, as elucidated by prior research and the Bank's practices.

Firstly, the study's results affirm the claims made by Tan Zhongming et al., supporting the idea that digital transformation, especially FinTech, plays a critical role in enhancing operational efficiency[6]. The significant positive relationship between digital transformation and customer risk identification aligns with Bao Xing, Li Wei, and Li Quan who highlighted that FinTech applications could mitigate information asymmetry and reduce non-performing loan rates[8]. Through the effective use of big data and AI technologies, the Bank of Communications has been able to diversify and refine its risk identification processes, significantly reducing information asymmetry.

Secondly, the findings lend empirical support to Zhu Xiaoyue and Chen Siyu who emphasized the potential of FinTech in addressing the financing needs of small and medium-sized enterprises and mitigating the inherent high credit risks in the small and

microfinance sector[9, 10]. The study demonstrates that digital transformation has significantly improved the Bank's credit risk prevention and control capabilities in these areas, corroborating the effectiveness of the Bank's deployment of FinTech in addressing such challenges.

Furthermore, the study's findings show that digital transformation has been instrumental in enhancing the bank's compliance level, contributing to scientific decision-making, and echoing the observations of Xia Dengfeng and Cheng Xuejun about the importance of FinTech in balancing financial innovation, risk prevention, and consumer protection[11, 12]. By utilizing digital technologies in anti-fraud and anti-money laundering areas, the Bank of Communications has successfully achieved a high level of transparency, providing an efficient risk warning system.

Lastly, the study supports the Bank's adoption of digital technology to optimize post-loan management, aligning with the trend noted by several researchers in the 1.2 Literature Review about the transformational role of FinTech in the financial industry.

5 Suggestions and Future Outlook

The significant relationship between digital transformation and the various aspects of the Bank of Communications' operations, as revealed by the study, offers valuable insights for future strategies. The following suggestions are offered based on the empirical findings:

5.1 Enhanced Focus on Digital Transformation

Given the crucial role of digital transformation in improving customer risk identification, decision-making processes, credit risk prevention and control in the small and microfinance sector, and post-loan management, the Bank of Communications should further enhance its focus on digital transformation. This can be achieved through increased investment in relevant technologies and infrastructure, staff training and development, and the promotion of a culture of innovation.

5.2 Implementation of Advanced Technologies

The use of technologies such as big data, artificial intelligence (AI), blockchain, and cloud computing in various aspects of banking operations has proved beneficial. To further optimize operational efficiency and risk management, the Bank should explore more applications of these technologies. Areas such as customer service, fraud detection, algorithmic trading, and process automation offer significant opportunities for the application of advanced technologies.

5.3 Strengthening Data Security and Privacy

While digital transformation offers numerous benefits, it also presents challenges related to data security and privacy. As the Bank increases its reliance on digital

technologies, it should also bolster its data security measures. This can be achieved through the implementation of robust cybersecurity frameworks, regular audits, and employee training on data security best practices.

5.4 Collaborations and Partnerships

The Bank can also leverage collaborations and partnerships with technology firms, fintech start-ups, and research institutions to enhance its digital capabilities. Such collaborations can facilitate knowledge exchange, technology transfer, and the development of innovative solutions that address specific challenges faced by the Bank.

6 Conclusion

This research examined the impact of digital transformation on various aspects of the Bank of Communications' operations, namely customer risk identification, compliance levels, credit risk prevention in the small and microfinance sector, and post-loan management. The results from the regression analyses validated the hypotheses, signifying a significant relationship between digital transformation and the aforementioned operational aspects. This indicated that the bank's digital transformation initiatives have substantially improved these areas.

Significantly, this study has furthered the understanding of digital transformation in the financial industry, specifically within the context of one of China's prominent banking institutions. It has underscored the transformative potential of integrating advanced technologies such as big data, AI, blockchain, and cloud computing into banking operations.

However, the research also highlighted the importance of addressing challenges related to data security and privacy in the course of digital transformation. The suggestions put forth based on these findings, and the prospective outlook emphasized the continuous evolution of the digital landscape and the need for financial institutions to keep pace with this change.

Despite these significant findings, it's essential to recognize that this study has its limitations, primarily its focus on a single institution. Future research can build upon these findings by examining a broader range of financial institutions and including a wider array of operational aspects and technological applications in their studies.

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