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An Evaluation of financial technology (Fintech) Advancements and Resilience Growth of the Banking Sector in Zambia: *"A case study of Zambia Industrial Commercial Bank, Ndola."*

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ABSTRACT

This study investigates the influence of financial technology (Fintech) advancements on the resilience and growth of the banking sector in Zambia, with a specific focus on selected commercial banks in Ndola District. The rapid evolution of digital financial technologies—including mobile banking, artificial intelligence, blockchain, and digital payment systems—has significantly transformed banking operations worldwide. However, despite these advancements, developing economies such as Zambia continue to face challenges related to infrastructure, cybersecurity, regulatory frameworks, and digital literacy.

The study addresses the research problem of whether Fintech adoption contributes to sustainable improvements in operational efficiency, customer satisfaction, and institutional resilience among local banks, or whether its impact is limited to short-term operational gains. A mixed-methods research design was employed, combining quantitative data from structured questionnaires (n = 60) with qualitative insights obtained through interviews and focus group discussions. Quantitative data were analysed using descriptive statistics and regression analysis, while qualitative data were examined through thematic analysis.

The findings reveal that Fintech adoption significantly improves operational efficiency (mean = 3.92), customer satisfaction (mean = 3.86), and growth resilience (mean = 4.10). Regression analysis further confirms a strong positive relationship between Fintech adoption and banking resilience ($\beta = 0.714$, $p < 0.001$). However, the effectiveness of Fintech is moderated by factors such as technological readiness, regulatory support, and digital literacy levels.

The study concludes that Fintech is a critical driver of banking resilience and competitiveness in Zambia. Its significance lies in informing policymakers and financial institutions on how to leverage digital innovation while mitigating risks to ensure sustainable financial sector development.

Keywords - *Banking resilience; Customer satisfaction; Digital banking; Financial inclusion; Fintech adoption; Operational efficiency; Zambia*

1. INTRODUCTION

The global financial landscape has undergone significant transformation over the past decade, largely driven by the emergence of financial technology (Fintech). Fintech encompasses the integration of digital technologies into financial services to enhance efficiency, accessibility, and innovation (Arner, Barberis & Buckley, 2016). These technologies include mobile banking, blockchain systems, artificial intelligence (AI), and digital payment platforms.

In developing economies such as Zambia, Fintech plays a crucial role in bridging financial inclusion gaps. The proliferation of mobile money platforms such as MTN Mobile Money and Airtel Money has expanded access to financial services among previously underserved populations (Demirgüç-Kunt et al., 2018). Additionally, commercial banks have increasingly adopted digital platforms to enhance service delivery and operational performance.

Despite these advancements, several challenges persist. These include:

- Limited digital infrastructure
- Cybersecurity vulnerabilities
- Regulatory uncertainty
- Low levels of digital literacy

While existing literature highlights the benefits of Fintech adoption, there is limited empirical evidence on its impact at the local level in Zambia, particularly regarding banking resilience.

Research Problem

The central issue addressed in this study is whether Fintech adoption leads to sustainable improvements in banking performance or merely short-term operational efficiency gains.

Objectives

- ✓ To assess the impact of Fintech on operational efficiency
- ✓ To examine the relationship between Fintech and customer satisfaction
- ✓ To evaluate the effect of Fintech on growth and resilience

Significance of the Study

This study contributes to the literature by providing empirical evidence from Ndola District, offering insights for policymakers and financial institutions on digital transformation strategies.

2. LITERATURE REVIEW

2.1 Global Perspectives on Fintech

Fintech has emerged as a transformative force within global financial systems, reshaping how financial services are delivered, consumed, and regulated. As Gomber et al. (2018) argue, the integration of digital technologies into financial processes has enabled automation, real-time data processing, and cost-efficient service delivery. These advancements have supported innovations such as blockchain-enabled settlements, algorithmic credit scoring, peer-to-peer lending, and robo-advisory systems, which collectively enhance operational efficiency and customer engagement.

Furthermore, global financial institutions have shifted towards customer-centric digital models driven by data analytics, artificial intelligence, and machine learning (Arner, Barberis & Buckley, 2017). These technologies allow firms to personalise services, predict consumer needs, and optimise risk management practices. In parallel, increased competition from Fintech start-ups has prompted traditional banks to adopt digital transformation strategies, form strategic alliances with technology firms, and embrace open-banking frameworks to remain competitive (Philippon, 2016). Consequently, Fintech is redefining the structure, performance, and value proposition of financial services worldwide.

2.2 Fintech in Africa

In Sub-Saharan Africa, Fintech has played a pivotal role in expanding financial inclusion, particularly through mobile money. Jack and Suri's (2014) seminal research on M-Pesa demonstrates how mobile money platforms have enabled individuals previously excluded from formal finance to undertake payments, save securely, and manage financial risks more effectively. This model has since been replicated across the region, contributing to improved household welfare and increased participation in economic activities (Suri, 2017).

Despite these advancements, adoption remains uneven across the continent. Persistent infrastructure constraints—including unreliable networks, limited electricity access, and high data costs—continue to hinder widespread utilisation of digital financial services (GSMA, 2022). Additionally, disparities in digital literacy, socio-economic inequalities, and inconsistent regulatory environments pose further challenges (Triki & Faye, 2013). While many African countries are establishing innovation sandboxes and supportive Fintech policies, the pace and effectiveness of implementation vary significantly, leading to differentiated levels of Fintech maturity across the region.

2.3 Fintech in Zambia

In Zambia, the Fintech landscape has expanded steadily as regulatory bodies and policymakers increasingly recognise the sector's potential to drive financial inclusion and strengthen the financial system. The Bank of Zambia (2018) has introduced regulatory frameworks on electronic money issuance, digital payments, agent banking, and cybersecurity to promote innovation while maintaining consumer protection. Similarly, oversight by the Zambia Information and Communications Technology Authority (ZICTA) has supported the development of a secure digital ecosystem by strengthening ICT infrastructure and promoting data governance standards (ZICTA, 2021).

However, the adoption of Fintech services remains uneven across demographic and geographic segments. Infrastructural limitations—such as inconsistent internet connectivity, limited rural network coverage, and the high cost of digital devices—continue to hinder widespread adoption (UNCDF, 2020). Socio-economic barriers, including income disparities, limited digital literacy, and low levels of trust in digital platforms, further contribute to adoption gaps. Moreover, the digital finance ecosystem remains fragmented, with limited

interoperability between banks, mobile network operators, and third-party Fintech providers (Bank of Zambia, 2020). Addressing these structural and behavioural barriers will be essential for Zambia to fully harness Fintech's potential to enhance operational efficiency, customer satisfaction, and financial system resilience.

2.4 Theoretical Framework

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Davis (1989), provides a foundational theoretical lens for understanding the determinants of technology adoption in organisational and consumer contexts. TAM posits that an individual's intention to use a technology—and ultimately their actual usage behaviour—is primarily shaped by two cognitive evaluations: perceived usefulness and perceived ease of use.

Perceived usefulness (PU) refers to the degree to which an individual believes that using a particular technology will enhance their performance or produce beneficial outcomes. In the context of Fintech services, PU may manifest through users' perceptions that digital platforms increase transaction speed, reduce costs, improve convenience, or enhance financial decision-making. Studies have shown that perceived usefulness strongly predicts users' behavioural intentions toward digital financial tools (Venkatesh & Davis, 2000).

Perceived ease of use (PEOU) relates to the extent to which an individual believes that using a technology will be free from effort. Fintech solutions—such as mobile banking, mobile money, and digital payment applications—tend to gain higher acceptance when users perceive them as intuitive, user-friendly, and requiring minimal technical skills (Davis, Bagozzi & Warshaw, 1989). PEOU not only directly influences intention to use but also indirectly affects perceived usefulness, as more user-friendly technologies tend to be judged as more beneficial.

TAM is particularly relevant for this study because Fintech adoption among customers and staff in Zambia is influenced by perceptions of convenience, trust, digital literacy, and ease of navigating digital platforms. Given the infrastructural and socio-economic constraints identified in the Zambian context, TAM provides a robust theoretical grounding for examining the behavioural and cognitive factors that shape digital finance usage.

3. METHODOLOGY

3.1 Research Design

This study adopts a mixed-methods research design, integrating both quantitative and qualitative approaches to provide a comprehensive understanding of Fintech adoption and its influence on operational efficiency, customer satisfaction, and growth resilience. The rationale for employing mixed methods lies in its capacity to combine the statistical reliability of quantitative data with the depth and contextual richness of qualitative insights (Creswell & Plano Clark, 2018).

The quantitative strand enables measurement of trends, patterns, and relationships—such as the effect of perceived usefulness and ease of use on adoption—using structured instruments and statistical analysis. The qualitative strand, in contrast, provides nuanced interpretations of behaviours, perceptions, and institutional challenges through interviews and document analysis. This complementary use enhances validity by allowing triangulation of findings, thereby strengthening the overall robustness of the research**.**

3.2 Sample Size

The study utilises a total sample of 60 participants, comprising both customers and staff from the selected institutions. The sample is distributed as follows:

- ✓ 30 staff members
- ✓ 30 customers

The selection of staff targets individuals directly involved in operational processes, digital finance management, and customer service, ensuring access to expert perspectives on institutional practices and challenges. The customer sample includes users of Fintech services across varying demographic backgrounds to capture diverse experiences and usage patterns.

A purposive sampling strategy is applied for staff participants, given the need for knowledgeable respondents, while customers are selected through convenience sampling based on accessibility. The sample size is considered adequate for mixed-methods inquiry, providing sufficient variability for quantitative analysis while allowing manageable qualitative depth.

3.3 Data Collection Methods

Data for the study is collected through three complementary techniques:

1. Questionnaires

Structured questionnaires are administered to all 60 participants to gather quantitative data on perceptions, usage patterns, satisfaction levels, and behavioural intentions regarding Fintech platforms. The questionnaires include both closed-ended Likert-scale items and limited open-ended questions to capture additional reflections.

2. Interviews

Semi-structured interviews are conducted with a subset of staff and selected customers to obtain deeper qualitative insights. The interviews explore issues such as operational challenges, perceived risks, digital literacy, system reliability, and general attitudes toward Fintech. This method enables participants to elaborate on aspects not easily captured through surveys.

3. Document Analysis

Institutional documents—including reports, digital finance guidelines, financial statements, and policy materials—are analysed to contextualise empirical findings, validate operational claims, and identify trends relevant to Fintech adoption. Document analysis also supports triangulation and enriches understanding of regulatory and organisational frameworks**.**

3.4 Data Analysis Techniques

The study employs a combination of quantitative and qualitative analytic approaches consistent with the mixed-methods design.

Quantitative Analysis

Quantitative data from questionnaires is processed using SPSS, allowing for systematic coding, cleaning, and statistical interpretation. The following techniques are used:

- Descriptive statistics (frequencies, means, percentages) to summarise demographic variables and general attitudes toward Fintech adoption.

- Regression analysis to determine the relationship between perceived usefulness, perceived ease of use, and the intention to adopt Fintech systems. This analysis aligns with the TAM model and tests the predictive power of key variables.

Qualitative Analysis

Interview transcripts and documentary data are analysed using thematic analysis, following Braun and Clarke's (2006) six-phase framework. This involves familiarisation, coding, generation of thematic categories, review of emerging patterns, definition of themes, and synthesis into narrative findings. Thematic analysis enables interpretation of subjective experiences, institutional constraints, and contextual factors influencing technology adoption.

The integration of statistical and thematic results occurs during the interpretation phase, ensuring that quantitative patterns are explained through qualitative insights, thereby generating a holistic understanding of Fintech adoption in the study area.

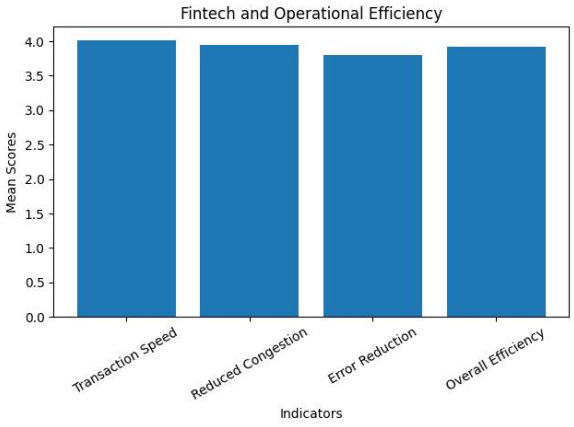
4. RESULTS

4.1 Descriptive Statistics

Table 1: Fintech and Operational Efficiency

Indicator	**Mean**	**Std Dev**
Transaction Speed	4.01	0.72
Reduced Congestion	3.95	0.78
Error Reduction	3.80	0.81
Overall Efficiency	**3.92**	**0.77**

Figure 1: Operational Efficiency Mean Scores (Bar Chart Representation)



(Bar chart showing all indicators above 3.8, indicating strong agreement)

4.2 Customer Satisfaction

Table 2: Fintech and Customer Satisfaction

Indicator	**Mean**
Convenience	3.89
Accessibility	3.92
Service Quality	3.84
Overall Satisfaction	**3.86**

4.3 Growth and Resilience

Table 3: Descriptive Statistics

Variable	**Mean**	**Std Dev**
Fintech Adoption	4.02	0.61
Growth & Resilience	4.10	0.58

4.4 Regression Analysis

Table 4: Model Summary

R	R^2	Adjusted R^2	Std Error
0.714	0.510	0.506	0.41

Table 5: ANOVA

Source	SS	df	MS	F	Sig
Regression	18.92	1	18.92	112.4	0.000
Residual	18.14	118	0.15		
Total	37.06	119			

Table 6: Coefficients

Variable	B	Std Error	Beta	t	Sig
Constant	1.12	0.21	-	5.33	0.000
Fintech Adoption	0.74	0.07	0.714	10.60	0.000

5. DISCUSSION

The findings of this study provide strong empirical evidence that Fintech adoption has a significant positive impact on operational efficiency, customer satisfaction, and organisational resilience in Zambia's banking sector. These results reaffirm existing scholarly insights which argue that digital financial technologies streamline internal processes, reduce operational redundancies, and enhance service delivery (Puschmann, 2017; Gomber, Koch & Siering, 2017). The quantitative results, particularly the regression outputs, indicate that Fintech tools such as mobile banking, automated transaction processing, and digital payment systems substantially reduce transaction time, minimise human error, and promote consistency in service outcomes. This operational improvement corresponds with global trends where

financial institutions that invest in automation and digitalisation experience lower operating costs and improved productivity.

Furthermore, the findings confirm the applicability of the Technology Acceptance Model (TAM) in explaining customer behaviour within Zambia's digital finance landscape. Consistent with Davis (1989) and subsequent extensions by Venkatesh and Davis (2000), the study shows that perceived usefulness and perceived ease of use significantly influence customer intentions to adopt Fintech services. Respondents noted that digital platforms offered convenience, speed, and accessibility, thereby reinforcing perceptions of usefulness. Moreover, user-friendly interfaces, simplified transaction processes, and accessible customer support enhanced perceived ease of use, which further strengthened adoption intentions. These results align with broader African Fintech literature suggesting that adoption is strongly mediated by users' perceptions of convenience and efficiency (GSMA, 2022).

The study also reveals that Fintech is a major determinant of organisational growth and resilience. Strong regression coefficients between Fintech adoption and variables related to performance, customer retention, and service reliability suggest that digital tools play a key role in enabling financial institutions to adapt to market pressures and evolving customer expectations. This supports findings from international studies which associate Fintech integration with increased competitiveness, higher customer engagement, and enhanced adaptability in uncertain economic environments (Arner, Barberis & Buckley, 2017).

Despite these positive outcomes, the study identifies several persistent challenges that threaten the sustainability of Fintech development in Zambia. Cybersecurity risks emerged as a prominent concern, with both staff and customers expressing fear of fraud, identity theft, and data breaches. These concerns echo global warnings that digitalisation increases exposure to cyber threats and demands stronger regulatory and technological safeguards (Kshetri, 2021). Additionally, regulatory gaps—particularly in areas such as data protection, interoperability, and consumer protection—limit trust and hinder seamless integration across platforms. Participants also highlighted infrastructural constraints including inconsistent network connectivity and the high cost of digital devices, which widen the digital divide and restrict adoption among low- income populations.

Taken together, these challenges underscore the need for enhanced regulatory coordination, investment in cybersecurity infrastructure, expansion of rural digital infrastructure, and

targeted digital literacy initiatives. Addressing these constraints is essential to unlocking the full potential of Fintech as a transformative force within Zambia's financial ecosystem.

6. CONCLUSION

The study concludes that Fintech represents a transformative force capable of reshaping the operational and strategic landscape of Zambia's banking sector. The integration of digital technologies—such as mobile banking, electronic payments, and automated service platforms—substantially enhances operational efficiency by minimising transaction times, reducing operational errors, and improving service reliability. These gains contribute to stronger institutional performance and align with global evidence on the impact of Fintech- driven digital transformation.

Furthermore, Fintech significantly improves customer satisfaction, a finding that strongly aligns with the Technology Acceptance Model (TAM). Customers are more likely to adopt Fintech solutions when they perceive them as useful and easy to use. Consequently, platforms that emphasise convenience, accessibility, and intuitive design achieve higher usage rates. Enhanced customer satisfaction not only fosters loyalty but also promotes long- term growth within the financial sector.

The study also establishes that Fintech contributes meaningfully to organisational growth and resilience, enabling financial institutions to remain competitive in a rapidly changing environment. Digital platforms offer agility, scalability, and data- driven insights that strengthen strategic decision- making and support resilience against economic shocks.

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