An Investigation of the Impact of Financial Institution's Digital Transformations Strategies on Agribusiness Supply Chain Management: A Case Study of Stanbic Bank Zambia (SBZ), Mkushi district

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ABSTRACT

Digital transformation is redefining the landscape of agribusiness supply chain management (SCM), particularly in regions where financial institutions serve as key enablers of innovation and digital adoption. This study investigates the effects of digital transformation strategies on SCM among agribusiness clients of Stanbic Bank Zambia (SBZ), focusing on the Mkushi branch, a region characterized by a high concentration of commercial and smallholder farming operations. The research applies a mono-method quantitative design within a positivist paradigm and employs the Technology-Organization-Environment (TOE) and Resource-Based View (RBV) theoretical frameworks to analyze factors influencing adoption, challenges encountered, and the impact of institutional policies. Data were collected via structured questionnaires distributed to a stratified sample of 141 agribusiness clients, with analysis conducted using SPSS version 26. Reliability was confirmed through Cronbach's alpha ($\alpha = 0.918$), and assumptions of normality were tested using the Shapiro-Wilk test. Key findings include a strong positive relationship between digital adoption and supply chain effectiveness ($\rho = 0.822$, $p < 0.001$), a significant inverse relationship between challenges and digital adoption ($r = -0.657$), and strong influence of institutional policy support ($R^2 = 0.366$) on adoption outcomes. These results highlight the role of SBZ's digital tools and strategies such as mobile banking platforms, agribusiness apps, and digital training programs as facilitators of SC improvements. The study confirms the relevance of the TOE framework in analyzing technological, organizational, and environmental adoption factors and supports the RBV perspective that internal resources and capabilities significantly enhance firm competitiveness. However, digital divides and infrastructural limitations persist, especially in rural Zambia, affecting inclusivity and scalability. The dissertation concludes with recommendations for expanding policy-driven support, promoting digital upskilling, strengthening ecosystem collaboration (banks, fintech's, cooperatives), and conducting comparative studies across other banks and geographic regions to improve generalizability. Ultimately, the findings serve as a blueprint for financial institutions aiming to support inclusive, digitally empowered agribusiness supply chains across Sub-Saharan Africa.

KEYWORDS: *Digital Transformation strategies, Agribusiness, Supply Chain Management, Financial Institutions, Policy Measures*.

Introduction

The digital transformation approach has evolved as a practical means of resolving various issues that traditional supply chain management (SCM) strategies in the agriculture confront (Khalifa et al., 2021).

Pierre. J (2023) defines digital transformation strategy as plans and actions that organizations take on to integrate digital technologies across various aspects of their operations in creating value by enhancing customer experience, as well as efficiency, innovation, and competitiveness. In relation to this report refers to comprehensive plans of action undertaken by Stanbic bank Zambia (SBZ) to integrate digital platforms, data analytical tools as well as automation processes into its agribusiness customers operations in enhancing stakeholder collaboration, affordability, efficiency, and transparency in supply chain management (SCM).

In agribusiness, supply chains are often fragmented, data-poor, and vulnerable to inefficiencies and disruptions. The adoption of digital technologies such as cloud computing, Internet of Things (IoT), and data analytics presents opportunities to enhance transparency, agility, and decision-making in these complex networks (Nasiri et al., 2020).

This investigative study is with intentions to contribute to the existing literature on SCM practices in the agricultural and banking sectors by examining the effects of digital

transformation strategies implemented by financial institutions. It focuses specifically on Stanbic Bank Zambia (SBZ) in Mkushi, a region known for its agricultural productivity.

This study aims to examine the adoption of digital transformation strategies, identify challenges in implementation, and evaluates the effectiveness of policy measures in supporting agribusiness supply chain management. It further explores the strategic role of SBZ in promoting inclusive, tech-driven agricultural growth

Literature Review

This chapter provides a review of literature relevant to the study at hand in alignment with the report tile "An investigation of The Impact of Financial Institution's Digital Transformations Strategies on Agribusiness Supply Chain Management-A Case Study of Stanbic Bank Zambia (SBZ), Mkushi." It reviews the literature from a global, continental (Africa), regional (Southern Africa) and national (Zambia) perspective of the three themes and a summary.

Digital transformation strategy:

Pierre. J (2023) defines digital transformation strategy as plans and actions that organizations take on to integrate digital technologies across various aspects of their operations in creating value by enhancing customer experience, as well as efficiency, innovation, and competitiveness. In relation to this proposal refers to comprehensive plans of action undertaken by Stanbic bank Zambia (SBZ) to integrate digital platforms, data analytical tools as well as automation processes into its agribusiness customers operation processes in enhancing stakeholder collaboration, affordability, efficiency, and transparency within the ecosystem supply chain management.

Agribusiness:

Refers to the combination of agriculture and business, inclusive of all economic activities such as marketing, distribution and sales while linking businesses that provide inputs to farmers, process and distribute (Najibullah Hassanzoy, 2019; Sikalumbi, 2022).
In this study, agribusiness includes small- to medium-scale farming enterprises and Agro-dealers in Mkushi, Zambia, who rely on financial institutions like Stanbic Bank Zambia for support in adopting digital tools to enhance productivity, market access, and operational efficiency within their agricultural supply chains.

Supply chain management:

Ivanov & Dolgui (2022) explain that it involves the coordination and optimisation of interconnected networks of stakeholders such as producers, suppliers, and distributors, within the context of the agricultural and financial industry of this research (Sikalumbi, 2021). Leveraging digital platforms and technologies in streamlining processes, enhancing transparency while creating value for all participants (Ivanov & Dolgui,2022).
Within this research, supply chain management focuses on how agribusinesses linked to Stanbic Bank Zambia integrate digital transformation strategies such as mobile banking, digital record, and e-commerce platforms to streamline operations, reduce inefficiencies, and improve competitiveness across the agricultural supply chain.

Financial Institution

Like Stanbic Bank Zambia, is an organization that assists companies with their financial requirements, big and little, examples of these include loans for foreign currency conversions, real estate purchases, and capital acquisitions (Rosas, 2024).

Policy Measure:

Policy measures are structured actions, strategies, or regulations implemented by institutions to achieve specific objectives, address challenge within a given sector. They often include guidelines, incentives, and frameworks designed to influence behaviour and outcomes (OECD, 2019). For this article, policy measures refer to Stanbic Bank Zambia's initiatives, regulations, and strategies aimed at supporting the adoption of digital transformation tools in agribusiness supply chain management. These measures include:

- Providing digital banking platforms (e.g., mobile and online banking).
- Introducing digital literacy training programs to reduce technological barriers.
- Implementing institutional policies that promote financial inclusion and affordable access to digital services for rural farmers.

Adoption of Digital Transformation in Agribusiness SCM

Digital technologies such as IoT, AI, and blockchain enhance supply chain efficiency by improving real-time tracking, reducing costs, and enabling data-driven decisions (Orellano & Tiss, 2024). In Africa, adoption remains gradual due to infrastructural deficits and low digital literacy (Dong & Ahmad, 2023). Zambia exhibits similar trends, where mobile banking and digital advisory platforms are emerging (Nalwimba, 2024); but lack full integration into agribusiness supply chains (Sikalumbi, 2023).

Challenges in Adoption

Barriers include inadequate infrastructure, high costs, and limited skills (Munyua, 2019). Rural connectivity and digital literacy remain critical obstacles. Unlike global contexts where

advanced tech ecosystems support digitalization, Zambia faces systemic gaps in policy coordination and resource availability.

Policy Measures

Global frameworks such as AFI and GAFSP promote digital financial inclusion, while Africa's Digital Transformation Strategy (2020–2030) emphasizes ICT infrastructure and harmonization (AU, 2020). Zambia's National Financial Inclusion Strategy advocates for digital finance, yet lacks sector-specific agribusiness policies (World Bank, 2020).

Knowledge Gap

Based on the reviewed literature, several critical gaps emerged that underscored the need for further research, particularly in the context of agribusiness supply chain management within financial institutions. It was drawn that Digital transformation significantly improves supply chain management in agribusiness. Strategies like mobile banking and digital platforms enhance efficiency, access to finance, and competitiveness. However, challenges such as infrastructure limitations, digital literacy, and policy gaps hinder full adoption especially in rural Zambia, highlighting gaps for further research and innovation.

Methodology

The study is structured using the research onion framework developed by Saunders et al. (2019). It additionally employed a positivist philosophy and a quantitative mono-method design using structured questionnaires. A stratified random sample of 141 agribusiness clients from SBZ Mkushi branch was surveyed. Data were analyzed using SPSS 26, with reliability confirmed (Cronbach's alpha = 0.918). Normality was tested via Shapiro-Wilk; regression and correlation analyses assessed relationships among variables.

Hypothesis:

H1: Adoption of digital transformation strategies positively influences SCM effectiveness.

H2: Challenges negatively affect adoption.

H3: Policy measures significantly support digital adoption.

Underlying Philosophy

The research is grounded in a positivist philosophy, which advocates for objective and quantifiable observations. Positivism supports the use of statistical tools and scientific methods to test hypotheses and establish causal relationships (Bryman & Bell, 2015). This paradigm was appropriate for this study, which aims to empirically examine the adoption of digital transformation strategies in agribusiness supply chains.

A positivist stance was appropriate for this study because it allowed the researcher to test hypotheses derived from theory and measure variables quantitatively (Saunders et al., 2019). In digital transformation studies, a positivist philosophy has been widely applied, such as that by Khalifa et al. (2021), who assessed ICT adoption using statistical tools in agricultural finance contexts.

Research Approach

A deductive research approach is employed. This approach tests predefined hypotheses derived from existing theories and literature (Bryman & Bell, 2015). Deduction ensures that findings are rooted in theory and generalizable to similar contexts, providing logical progression from theory to empirical validation (Sikalumbi, 2023).

This study used a deductive approach to test hypotheses about the relationship between digital strategies and supply chain performance. Deductive logic is especially relevant for investigating policy effectiveness and adoption barriers, following similar work by Nasiri et al. (2020) and Liu et al. (2023).

Time Horizon

The study uses a cross-sectional time horizon, collecting data at a single point in time (Saunders et al., 2019). This is appropriate for assessing the current status of digital transformation strategies and their perceived effectiveness without tracking changes over time. Prior studies, such as Gao and Gao (2024), also used cross-sectional surveys to assess digital finance impacts in agricultural contexts.

A cross-sectional time horizon was appropriate for this study as it allowed the researcher to collect data at a single point in time, providing a snapshot of current digital transformation strategies and their impact on supply chain management among agribusinesses in financial institutions like Stanbic Bank Zambia in Mkushi and Mazabuka. This design is particularly suitable for exploratory studies, as it enables the researchers to compare multiple variables efficiently across different regions without the need for prolonged observation (Creswell & Creswell, 2018).

Given the dynamic nature of digital transformation in agribusiness, a cross-sectional approach captured prevailing trends, perceptions, and adoption challenges in real-time. Similar studies have successfully employed this approach to explore the role of digital finance and ICT in agriculture and rural supply chains in regions like East Africa and rural China (Munyua & Adera, 2021; Zhou & Li, 2020).

Research method and Justification

This Study employed a mono-method quantitative design. The Quantitative strategy supports the use of numerical data, structured instruments, and statistical analysis, which are suited for measuring levels of adoption, challenges, and policy effectiveness (Creswell,2024).
According to Bryman and Bell (2015) quantitative data allows for hypothesis testing using structured instruments like questionnaires. This approach was used effectively in studies like Bag et al. (2021), who used Likert-scale surveys to quantify digital impact on supply chains.

Sampling frame and sample size

The sample size for this study was based on the population of agribusiness customers under Stanbic Bank Zambia, Mkushi branch. The estimated population (N) is approximately 217 agribusiness clients.

A probability sampling technique was used to enhance the representativeness of the sample. The Yamane formula (Yamane, 1967) was employed to determine an appropriate sample size:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = sample size,
N = population size,
e = margin of error (typically 0.05 for a 95% confidence level).

This formula is widely used in quantitative studies involving finite populations, including similar studies in the agribusiness and banking sectors, and ensured that the findings were statistically significant and generalizable.

Additionally, the use of the Yamane formula is supported by precedent in similar quantitative research within the same geographical and sectoral context. For instance, in the study titled "An Assessment of Sustainable Small-Scale Farming Business and Village Savings in Mkushi, Zambia" conducted by Mwaka and Muchemwa (n.d), the researchers successfully applied a similar sampling approach using the Yamane formula to derive a statistically sound sample size that ensured generalizability across farming households. They applied the same Yamane formula to derive an appropriate sample size for their investigation. In their study, a known population of 150 village groupings at a 95% confidence level resulted in the following calculation:

$$n = \frac{150}{1 + 150(0.05)^2} = \frac{150}{1 + 0.375} = \frac{150}{1.375} \approx 109$$

As noted by Mwaka and Muchemwa (n.d), a sample of 109 respondents was statistically sufficient for analysis and allowed the researchers to draw meaningful inferences about the broader farming population in Mkushi. By following this precedent, this study adopts a similar method to ensure that the sample of agribusiness clients of Stanbic Bank Zambia is representative, statistically valid, and suitable for inferential analysis.

Given the comparable scope, location, and target population in both studies, agribusinesses operating in Mkushi apply same logic and methodological uniformity. Therefore, adopting a similar sample size estimation technique enhances the credibility and contextual relevance of this study.

To calculate the sample size for a total population of 217 Agribusiness customers, Using Yamane's (1967) formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = sample size

N = population size (217)

e = margin of error (0.05)

n = 217 / (1 + 217 × 0.0025) = 217 / (1 + 0.5425) = 217 / 1.5425 ≈ 141

Therefore, a total sample size of approximately 141 respondents was selected. This ensured that the study maintained at 95% confidence level with a 5% margin of error (Yamane, 1967), and the sample was representative of the population.

The justification for the sample size was based on ensuring reliability, precision, and generalizability of results within the context of a quantitative, cross-sectional design. Previous empirical studies with similar scope, such as Chitundu (2021) and Mwansa (2019), successfully utilized this formula when studying the banking and agricultural sectors in Zambia, reinforcing its suitability for this study.

The calculated sample size of 141 respondents was more than sufficient given a small population of 217. Nyathi and Gomo

(2021) in their study on digital transformation in financial services for agricultural clients used stratified sampling and addressed cardinal population parameters.

Additionally, Jones' study utilized a sample of 196 customers from a single urban branch of Stanbic Bank. In contrast, this research addressed a more diverse and rural agribusiness clientele. A sample size of 141 was proportionate and provided a robust representation of Mkushi's agribusiness sector.

Furthermore, stratification across farm categories enhances generalizability and enables subgroup analysis to capture differences in digital transformation adoption.

Stanbic Bank Zambia (2019) article on titled Stanbic boosts Zambia's agriculture sector with over K1.5 billion investment retrieved from Zambian Business Times, confirms that Stanbic Bank operates in key agricultural towns beyond Mkushi**,** including Chisamba and Mazabuka, known for large-scale farming, making them ideal for further expanding the sample.

This geographic and economic diversification reduces the risk of overrepresenting a narrow segment of agribusiness clients and helps ensure a more balanced understanding of digital transformation strategies across varied supply chains (Creswell & Creswell, 2018).

Furthermore, by choosing a more distant location, the researcher avoids convenience sampling bias associated with proximity to Lusaka as in contrast to a study by Jones (2022), thereby improving methodological rigor and external validity (Etikan & Bala, 2017). It also allows for the analysis of different levels of digital adoption and infrastructure, contributing to richer comparative insights.

The sample size furthermore allowed the researcher to assess the current state of the population and compare groups across the whole population, that is Mkushi versus other locations for instance Mazabuka in which Stanbic bank Zambia has portfolio of agribusiness customers while achieving reliable statistical power.

With this sample size, the researcher had enough power to detect statistically significant relationships and patterns in data while accounting for variability.

Data collection and analysis

Secondary and primary sources were used in the collection of data for this study. Primary data was collected using structured survey questionnaires administered to agribusiness clients of Stanbic Bank Zambia in Mkushi and Mazabuka. The questionnaires were delivered through multiple channels: self-completion, email**,** Google Forms, and telephone interviews, where the researcher called respondents and provided guidance through the questions. This multi-mode strategy enhances response rates, accommodates different levels of digital access, and offers convenience especially since the researcher was based in Lusaka and must reach remote locations Mkushi. Self-completion is useful for respondents with higher literacy levels, while phone surveys allow clarification and inclusiveness for less tech-savvy participants (Bryman & Bell, 2015; Dillman et al., 2014).

Structured questionnaires were selected with a five-point Likert scale. The first part included the demographic questions for the participants because they support standardization, comparability, and quantitative measurement across diverse regions. This method also aligns with similar research conducted in agribusiness contexts by Zhou and Li (2020) and Munyua and Adera (2021), although those studies lacked emphasis on financial institutions' role in digital supply chain strategies. This study bridges that gap by capturing bank led digital initiatives using a structured instrument tailored to both location specific dynamics and institutional engagement. Additionally, using tools like Google Forms and telephone surveys overcomes logistical barriers and minimizes data collection bias caused by location or technology access limitations, improving the external validity and reliability of findings (Creswell & Creswell, 2018; Saunders et al., 2019). In order to fully meet the objectives of the study, the primary data gathered was accompanied by secondary data from, journals, corporations' websites, text books and newspapers.

The quantitative data collected was analysed using SPSS version 26. Specifically, reliability analysis (Cronbach's alpha), normality testing (Shapiro-Wilk test), Pearson and Spearman correlation analyses, and ordinal regression were conducted in line with the positivist and deductive methodological approach. These analyses were selected to directly test the hypotheses derived from the TOE and RBV theoretical frameworks and aligned with the study's objectives. Results are detailed in Chapter Four

Data visualization such as bar charts and figures to present key findings and trends are additionally utilized for this analysis, in enhancing communication and interpretation of research findings, making complex information more accessible to relevant stakeholders (Wang et al.,2023).

Reliability, Validity and Generalizability of Research Findings

The researcher undertook a reliability test to get assurance of the consistency of the set scale items in the questionnaire. According to Pallant (2020) A reliability test conducted in SPSS with a Cronbach's alpha of >= 0.7 is acceptable, and in this study out of 21 questionnaire items 15 of which were 5 point Likert scale items measuring the variables were picked and the

analyzed. Results from the reliability test analysis revealed a Cronbach's alpha of 0.918 as depicted in table 0.1.

Table 0.1 reliability statistics

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.918	.919	5

The results of the Cronbach's Alpha test confirm the reliability of the data collected, indicating that the set of questions administered was highly consistent. However, a normality test was also necessary to assess the distribution of the data and determine whether it followed a normal distribution or deviated from it.

Table 0.2 Test normality

Tests of Normality				
	Kolmogorov-Smirnov[a]			
	Statistic	df	Sig.	Statistic
B_ Adoption	.180	112	.000	
C_ Challenges	.092	112	.021	
D_ Polices	.097	112	.011	
a. Lilliefors Significance Correction				

A normality test was undertaken using the Shapiro-Wilk test (Ghasemi & Zahediasl, 2012). The Shapiro-Wilk test unlike the Kolmogorov-Smirnova was ideal for this study because it is generally more reliable for small to medium samples, like the researchers n = 112 (Razali & Wah, 2011). The mean composite scores of the three variables: Adoption of Digital Strategies – B; Challenges faced in Adoption – C and Policy measures and Institutional Support – D were developed to determine normality and assess whether a parametric or non-parametric test can be done on each variable.

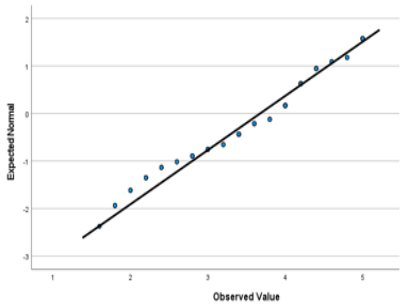
The results as indicated in table 4.2 show that for variable B-Adoption the Shapiro-Wilk Sig. Was statistically significate at 0.000 ($p < .05$) .This variable violates normality implying that the distribution was not normal, while for variable C-(Challenges) the Shapiro-Wilk was not statistically significant at Sig level of 0.443 ($p > .05$) implying that the variable C did not violate normality, furthermore the Shapiro-Wilk Sig for variable D – Policy Measures and Institutional Support was 0.251 ($p > .05$) which implies non deviate from a normal distribution because of its significance level being not statistically significant.

In light of this for variable B Adoption of Digital Strategies the researcher will undertake non parametric tests while for variable C (Challenges) and D (Policy Measures and Institutional Support) the researcher will undertake parametric tests.

The Q-Q plots below (Fig 0.1; 0.2 &0.3) show how distinct variables either conform or deviate from being normally distributed, A Q-Q plot compares your variable's actual data distribution to a normal distribution. The closer the dots are to the diagonal line; the more normally distributed data is. The figures below show that the variable B predicting adoption strategies has points away from the line violating the test of normality while the variables C and D have points falling approximately on the line meaning data is roughly normal.

Q-Q Plot for B (Adoption Strategies)

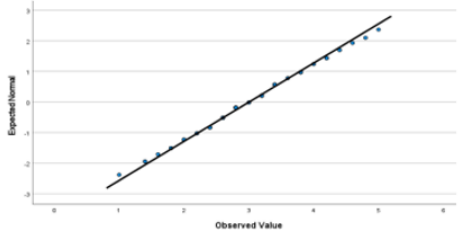
Figure 0.1



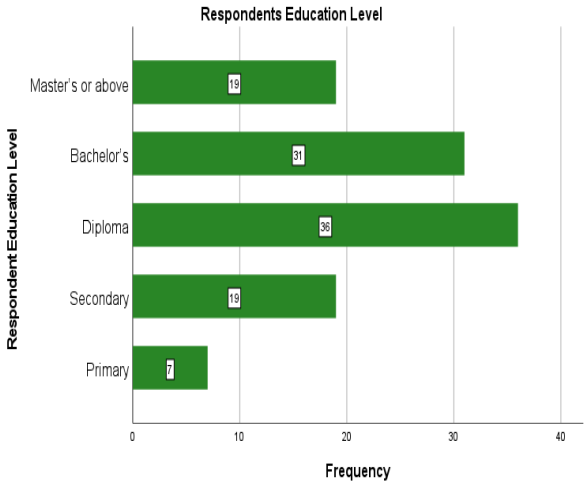
Source: Field data (2025)

Q-Q Plot for C (Challenges)

Figure 0.2

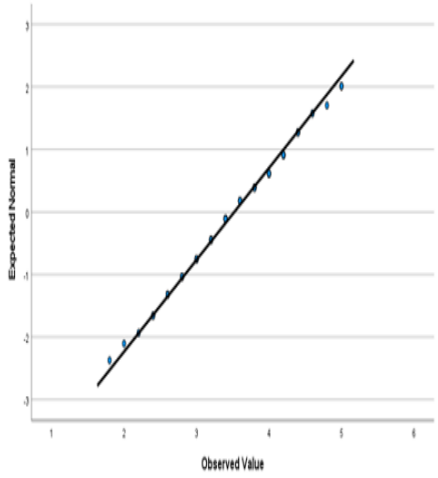


Source: Field data (2025)



: Q-Q Plot for D (Policy Measures and Support)

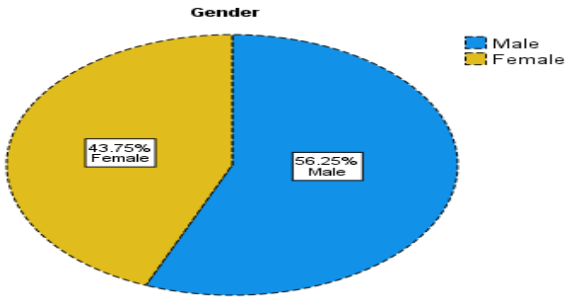
Figure 0.3



Source: Field data (2025)

Based on descriptive Statistics and Demographic Profile illustrated in pie chart below, it can be seen that about 56% of respondents were male, and 44 % were female; which made the men the majority of respondents.

Figure 0.4: Gender Distribution of Respondents



Source: Field data (2025)

The table below further shows that out of the valid 112 responses on age groups,13 ,12% were below the age of 25 years; 38,34 % were aged between 25-34 years; 30,27% were between 35-44 years; 20,18% were between 45-54 and 11, 10% were over 55 years. Table confirms that out of the 112 respondents, the majority were between the age 25-34 years old, representing 33.9% of the study, and the least were aged above 55 years, represented by only 9.8%.

Table 0.3: Respondent Age Distribution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 25	13	11.6	11.6	11.6
	25–34	38	33.9	33.9	45.5
	35–44	30	26.8	26.8	72.3
	45–54	20	17.9	17.9	90.2
	55+	11	9.8	9.8	100.0
	Total	112	100.0	100.0	

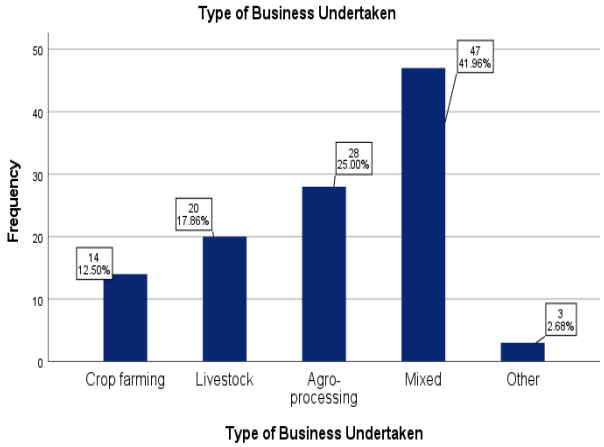
Source: Field data (2025)

When asked what the respondents highest educational background was, they responded as illustrated in the pie chat and table 3 above. Showing;7 ,6% with Primary; 19,17% Secondary; 36,32% Diploma; 31,28% Bachelor's Degree and 19,17% Master's degrees and above. Thus, in the graph below, it can be seen that majority of respondents were holders of Diploma's.Figure 0.5: Educational Level of Respondent

Bar chart below proved that 21,19% of respondents were into crop farming;32,29% into Livestock ;46, 41% into Agro-processing,33,30% into mixed farming and 4,4% into other forms of agribusinesses. It is the majority of participants into Agro-Processing represented by 41.1% and the least at 3.6% being other forms of Agribusiness types.

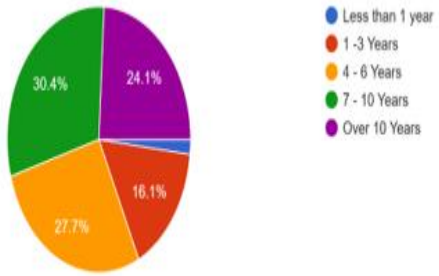
Additionally, recorded in the pie chart below it was drawn that 2% of respondents had been running their agribusinesses for less than 1 year;16% between 1-3 years;28% between 4-6 years;31% between 7-10 years and 24% for over 10 years respectively. Therefore, it can be seen that the majority of the respondents had banked with the bank for 6-10 years represented by 31.3%.

Figure 0.6: Business Type of Respondent



Source: Field data (2025)

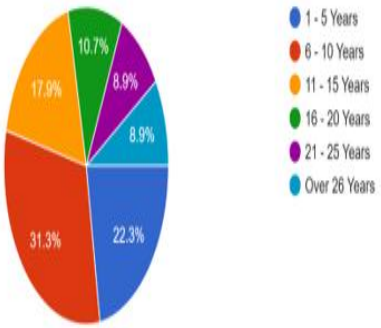
Figure 0.7: Years in Business



Source: Field data (2025)

It was furthermore observed as illustrated in the pie chart below that 22% of respondents had banked with the bank for approximately 1-5 years;31% ,6-10 years;18% ,11-15 years;11%,16-20 years,9%,21-25 years and 9% over 26 years. It was also observed that the majority of respondents that engaged in digital services held accounts to the time of data collection for between 6-10 years at 31.3 % and with least adopters at 8.9% holding accounts between years 21-25 years and over 26 years respectively.

Figure 0.8: Tenure of Banking with SBZ



Source: Field Data

Correlation analysis

The researcher undertook a correlation analysis. Correlation analysis is a statistical technique used to measure and quantify the relationship between two or more variables (Creswell & Creswell, 2018). It provided the researcher with insights into how changes in one variable are associated with changes in another variable. Correlation analysis helped the researcher understand the degree and direction of the relationship between variables, but it does not imply causation.

Correlations

		B_ Adoption	C_ Challenges	D _Polices
B_ Adoption	Pearson Correlation	1	-.657**	.630**
	Sig. (2-tailed)		.000	.000
	N	112	112	112
C_ Challenges	Pearson Correlation	-.657**	1	-.537**
	Sig. (2-tailed)	.000		.000
	N	112	112	112
D_ Polices	Pearson Correlation	.630**	-.537**	1
	Sig. (2-tailed)	.000	.000	
	N	112	112	112

**. Correlation is significant at the 0.01 level (2-tailed).

The most commonly used correlation coefficient is Pearson's correlation coefficient (also known as Pearson's r), which measures the linear association between two continuous variables (Field, 2018). According to Gravetter and Wallnau (2020) Pearson's correlation coefficient ranges from -1 to +1, where -1 represents a perfect negative correlation, +1 represents a perfect positive correlation, and 0 indicates no linear correlation. The table below shows the inter correlations of the variables under observation in this study.

table below shows the inter correlations of the variables under observation in this study.

Pearson's correlation analysis revealed a strong negative relationship between digital transformation adoption and challenges ($r = -0.657$, $p < 0.001$), indicating that higher adoption is associated with fewer challenges. A strong positive correlation was also found between adoption and policy support ($r = 0.630$, $p < 0.001$), suggesting that effective policy measures promote digital adoption. Additionally, policy measures were negatively correlated with challenges ($r = -0.537$, $p < 0.001$), implying that stronger institutional support helps reduce adoption barriers.

Hypothesis Testing

To test the three study hypotheses, both Spearman's rank correlation and ordinal regression were employed. Spearman's correlation was used to examine the strength and direction of the relationships between key variables, although some variables violated the assumption of normality all three hypotheses revealed significant correlations indicating meaningful associations between digital adoption, challenges faced, policy measures, and supply chain effectiveness. To further validate these relationships, ordinal regression analysis was conducted by categorizing the dependent variables where necessary. A model fitting test was conducted and the results confirmed that all three models were statistically significant and the data fitted the model very well. This dual approach of utilizing regression and correlation analysis strengthened the reliability of the findings and provided a more robust understanding of the factors influencing digital transformation in agribusiness supply chains.

Hypothesis 1 (Adoption of Digital Transformation Strategies)

Null Hypothesis (H_0): There is no significant relationship between the digital transformation strategies adopted by agribusiness customers of Stanbic Bank Zambia and the effectiveness of their supply chain management.

Alternative Hypothesis (H_1): There is a significant positive relationship between the digital transformation strategies adopted by agribusiness customers of Stanbic Bank Zambia and the effectiveness of their supply chain management

To test this particular hypothesis which will answer research question 1 and objective 1 the researcher will undertake Correlation Analysis using Spearman's rho. Since the variable adoption of digital strategies isn't normally distributed as earlier discussed the researcher will use a non-parametric test such as ordinal regression and correlation. The researcher classified Variable B5 (supply chain efficiency) vs the Independent Variable C (Composite score of Adoption strategies). The table below shows the correlation between the two variables.

Correlations

			CS_ Adoption	Digital technologies have improved the efficiency of my supply chain operations.
Spearman's rho	CS_ Adoption	Correlation Coefficient	1.000	.822**
		Sig. (2-tailed)	.	.000
		N	112	112
	Digital technologies have improved the efficiency of my supply chain operations.	Correlation Coefficient	.822**	1.000
		Sig. (2-tailed)	.000	.
		N	112	112

**. Correlation is significant at the 0.01 level (2-tailed).

The Spearman's correlation analysis revealed a strong, statistically significant positive relationship between the adoption of digital transformation strategies (CS_Adoption) and the perceived improvement in supply chain efficiency ($r = 0.822$, $p < 0.001$).

This indicates that agribusinesses that more actively adopt digital tools such as mobile banking, digital platforms, and other digitization strategies from Stanbic Bank Zambia are much more likely to report enhanced efficiency in their supply chain operations.

These findings suggest that increasing the adoption of digital technologies could directly contribute to more streamlined, effective, and responsive supply chains within the agribusiness sector. The statistically significant positive correlation ($\rho = 0.822$, $p < 0.001$), indicates that higher adoption of digital transformation strategies is associated with improved supply chain efficiency.

Thus, the null hypothesis was rejected in favor of the alternative hypothesis.

Regression Analysis Hypothesis 1

An ordinal regression analysis was conducted to provided strong evidence in support of Hypothesis 1. Three outcomes were produced in line with the test analysis the model fitting information, goodness of fit and the pseudo r-square. The model fitting p value was P<0.01 entailing that the model fits the data well this is also supported by a non-significant value of P>0.01 from the chi-square deviance results.

The model was statistically significant ($\chi^2(1) = 122.240$, $p < .001$) the Nagelkerke R^2 of 0.711 implies that 71% of the change in . This confirms a significant positive relationship between the adoption of digital transformation strategies and the effectiveness of supply chain management among agribusiness clients of Stanbic Bank Zambia in Mkushi.

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	250.606			
Final	128.365	122.240	1	.000

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	157.342	111	.003
Deviance	98.195	111	.802

Link function: Logit.

Pseudo R-Square

Cox and Snell	.664
Nagelkerke	.711
McFadden	.400

Link function: Logit.

The ordinal regression model was statistically significant compared to the null model, $\chi^2(1) = 122.240$, $p < .001$, indicating that the inclusion of digital adoption (CS_Adoption) significantly improved the ability to predict perceived supply chain effectiveness. This supports the hypothesis that adoption of digital technologies is associated with higher perceived supply chain efficiency.

The ordinal regression model fits the data well, as indicated by the non-significant Deviance test ($p = .802$). The Nagelkerke pseudo R-square value of 0.711 suggests that the model explains approximately 71.1% of the change in supply chain efficiency variable B5 is as a result of adoption strategies. These results reinforce the conclusion that higher adoption of digital transformation strategies significantly and strongly predicts improved supply chain performance among agribusiness clients of Stanbic Bank Zambia.

To top it off these findings imply that as agribusinesses increasingly adopt digital tools such as mobile banking, digital platforms, and supply chain automation technologies supported by the bank, they experience measurable improvements in supply chain efficiency. Therefore, to strengthen supply chain performance in the agribusiness sector, it is essential for financial institutions like Stanbic Bank to continue promoting digital adoption through targeted support, training, and accessible digital services. The results also suggest that investment in digital transformation is not just a technological upgrade but a strategic pathway to greater operational effectiveness and resilience.

Hypothesis 2 (Challenges Faced in Adoption)

Null Hypothesis (H_0): The key challenges faced by agribusiness customers of Stanbic Bank Zambia in adopting digital transformation strategies have no significant impact on their supply chain management effectiveness.

Alternative Hypothesis (H_1): The key challenges faced by agribusiness customers of Stanbic Bank Zambia, Mkushi in adopting digital transformation strategies significantly hinder the effectiveness of their supply chain management.

To test Hypothesis 2, the researcher examined the relationship between challenges faced in adopting digital transformation strategies and the effectiveness of supply chain management using Spearman's Correlation.If the results from correlations of hypothesis 2 reveal a statistically significant P value that is P < 0.05 the researcher will Reject null hypothesis H_0, which states that challenges do impact SCM effectiveness, below is the table of correlation outcomes from SPSS.

Correlations

			C_ Challenges	Digital technologies have improved the efficiency of my supply chain operations.
Spearman's rho	C_ Challenges	Correlation Coefficient	1.000	-.566**
		Sig. (2-tailed)	.	.000
		N	112	112
	Digital technologies have improved the efficiency of my supply chain operations.	Correlation Coefficient	-.566**	1.000
		Sig. (2-tailed)	.000	.
		N	112	112

**. Correlation is significant at the 0.01 level (2-tailed).

Observed results from the output table show that there is a statistically significant moderate to strong negative correlation between the challenges faced in adopting digital transformation strategies and the perceived effectiveness of supply chain operations. The coefficient correlation value of -0.566 and a statistically significant P value of 0.000 denotes that as the number or intensity of challenges increases such as digital illiteracy, poor internet access, or lack of support, the effectiveness of the supply chain is likely to decrease.

In this instance since the output table shows a statistically significant result of 0.000 therefore the researcher rejected the Null Hypothesis.

Hypothesis 3 (Policy Measures to support)

Null Hypothesis (H_0): The policy measures implemented by Stanbic Bank Zambia, Mkushi do not significantly influence the adoption of digital transformation strategies among agribusinesses in effective supply chain management.

Alternative Hypothesis (H_1): The policy measures implemented by Stanbic Bank Zambia, Mkushi and other significantly influence the adoption of digital transformation strategies among agribusinesses for effective supply chain management.

The hypothesis test of H3 will comprise spearman's correlation to test the strenghth and direction of the relationship between policy measures introduced by the bank and supply chain management efficiency experienced by the farmers the tables below show the construct outcome from SPSS.

Correlations

	Digital technologies have improved the efficiency of my supply chain operations.	D_ Polices		
Spearman's rho	Digital technologies have improved the efficiency of my supply chain operations.	Correlation Coefficient	1.000	.548**
		Sig. (2-tailed)	.	.000
		N	112	112
	D_ Polices	Correlation Coefficient	.548**	1.000
		Sig. (2-tailed)	.000	.
		N	112	112

**. Correlation is significant at the 0.01 level (2-tailed).

The Spearman's correlation analysis revealed a statistically significant and moderately strong positive relationship between policy measures and the adoption of digital transformation strategies ($\rho = 0.584$, $p < 0.001$). This suggests that supportive policies implemented by Stanbic Bank Zambia significantly contribute to increased digital adoption among agribusiness clients.

Therefore, Hypothesis 3 is supported, highlighting the importance of institutional support and well-designed policy frameworks in driving digital transformation in the agricultural sector.

Regression Analysis – Hypothesis 3

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	155.348			
Final	108.458	46.891	1	.000
Link function: Logit.				

Goodness-of-Fit			
	Chi-Square	df	Sig.
Pearson	63.409	63	.462
Deviance	57.092	63	.686

Link function: Logit.

Pseudo R-Square	
Cox and Snell	.342
Nagelkerke	.366
McFadden	.154

Link function: Logit.

The ordinal regression model testing the influence of Stanbic Bank Zambia's policy measures on digital adoption was statistically significant ($\chi^2(1) = 46.891$, $p < 0.001$), with strong model fit (Pearson $p = 0.462$; Deviance $p = 0.686$). The model explained approximately 36.6% of the variation in adoption levels (Nagelkerke $R^2 = 0.366$). These results provide strong evidence in support of Hypothesis 3, confirming that institutional policy measures significantly influence the adoption of digital transformation strategies among agribusiness clients in Mkushi.

This highlights the critical role of financial institutions in enabling digital uptake through policy support, capacity-building programs, and access initiatives.

Findings

The findings derived from the data collection process, were guided by the chosen sample sizes. It focused on how the participants in the sample responded to the questions from the survey. The research instruments were employed to gather responses that addressed the research objectives,hypothesis and ultimately achieve the aim of the study.

Data analysis overview

Quantitative data from structured google questionnaires where respondents rated their adoption of digital banking services using with a five-point Likert scale where; 1 was a representation of very low with highest 5 being very high adoption. All were analysed using SPSS (Version 26), focusing on reliability, normality, descriptive statistics, and correlation, regression analyses, aligned with the study's three hypotheses.

The researcher targeted to collect data from 141 number of respondents but was only able to collect 112. The response rate was 84.2% of the planned sample responses which some scholars have approved to be highly statistically acceptable for quantitative studies and enhances the reliability of the findings (Hair et al. ,2014).

Most respondents (72%) reported moderate to high adoption of tools like mobile banking and online platforms. Major challenges included cost, poor internet access, and low digital literacy.

Conclusions and Recommendations.

This study concludes that digital transformation has a substantial and positive impact on agribusiness supply chain management in Mkushi. Tools such as mobile banking and digital payment platforms improve operational efficiency and market responsiveness. However, a digital divide persists especially in rural areas due to limited infrastructure and digital capacity.

The TOE and RBV theories were confirmed; both external enablers (infrastructure, policy) and internal resources (digital skills, ICT access) jointly determine the success of digital transformation strategies (Hamilandu, 2025).

This study demonstrated that digital transformation strategies, when supported by adequate infrastructure, institutional policies, and client readiness, significantly enhance supply chain performance in the agribusiness sector. For financial institutions like Stanbic Bank Zambia, the adoption of digital tools is not only a competitive strategy but a developmental imperative that enables financial inclusion, resilience, and sustainable growth in Zambia's agriculture sector. With targeted investments in digital infrastructure, inclusive policies, and collaborative platforms, the potential for digital agriculture to transform rural economies and improve agribusiness bankability remains immense (Tembo, 2025).

Overall findings

Based on quantitative data analysed, the study revealed that; a majority of respondents (72%) reported moderate to high adoption of digital tools such as mobile banking and internet platforms. It also alluded the cost of digital tools, internet access, and lack of digital literacy were the most cited barriers. While SBZ has initiated policy interventions and training programs, awareness and participation were limited. Statistical analyses confirmed significant positive relationships between digital adoption, policy support, and supply chain performance, and a negative relationship between barriers and performance.

Findings furthermore confirmed TOE and RBV frameworks, indicating that technological readiness, organizational capacity, and environmental support influence adoption. Digitalization enhances visibility, cost efficiency, and resilience, aligning with global studies (Ning & Yao, 2023). However, persistent infrastructural and literacy gaps highlight Zambia-specific constraints.

TOE Framework: Confirmed that technological tools, organizational capabilities, and environmental context (rural ICT constraints, regulatory factors) influence adoption.

RBV Framework: Validated that digital platforms, trained personnel, and bank policies are valuable resources that shape competitive outcomes in supply chain performance.

Research limitations/implications

i. The study was limited to clients of Stanbic Bank Zambia in Mkushi; which may not reflect experiences in other regions or banks.
ii. It used a cross-sectional design; thus, could not measure changes over time.
iii. The study relied on self-reported data; which may include biases related to perception or recall.

SBZ's role shows that financial institutions are key enablers of supply chain modernization**.** The research has theoretical, practical/managerial and policy implications. The research confirms that digital transformation strategies /tools positively influence supply chain performance, bridges knowledge gaps, and links policy and performance. Practical implications include targeted digital investment, inclusive products, enhanced decision-making, and infrastructure prioritization. Policy implications include infrastructure prioritization, government incentives for inclusive digital finance, and a harmonized national digital agriculture strategy aligned with regional goals. The findings can be used to improve agribusiness efficiency and enhance financial inclusion/attract finance.

Originality/value

The study bridges the knowledge gap on how digital ttransformation strategies affect agribusiness supply chains within financial institutions. It informs policymakers, financial institutions, and agribusinesses on how to leverage digital transformation strategies to promote not only food security but efficiency, and financial inclusion.

Recommendations

For Stanbic Bank Zambia & Financial Institutions

i. *Expand Digital Literacy*: Use localized, mobile-friendly training for rural users.
ii. *Affordable Digital Packages*: Tier services for smallholder affordability.
iii. *Boost Awareness*: Use SMS, radio, local language marketing.
iv. *User Feedback Loops*: Track satisfaction via surveys/chatbots for continuous improvement.
v. *Build a Digital Ecosystem*: Enable collaboration via a shared platform.
vi. *Design for Women:* Promote gender-inclusive features and onboarding to increase female adoption rate of 43.75% compared to male adoption of 56.25% of respondents.
vii. *Promote CSR/Green financing:* Support digital training, environmental awareness on platforms and Financial inclusion.
viii. *Gamify Services*: Use rewards & quizzes to drive engagement and enhance adoption.

For Policymakers & Regulators

i. *Improve ICT Infrastructure*: Invest in rural broadband.
ii. *Subsidize Connectivity:* Reduce internet costs for agribusiness clusters.
iii. *Regulatory Incentives:* Offer tax breaks and digital grants.
iv. *National Digital Policy:* Align with African Union Commission and the FAO (2023) digital agriculture strategy.
v. *Foster Ecosystem Models:* Encourage platform-based partnerships.

For Agribusiness Stakeholders

i. *Upskill Staff Digitally*: Train on mobile, finance, and tracking tools.
ii. *Join Digital Hubs:* Share market data & logistics tools.
iii. *Use Digital Monitoring:* Record gains to attract finance/investment.

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