

Effect of Management Information System on Growth of Agro-Firms in Anambra State

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Abstract

The study examined the effect of management information systems on the growth of agro-firms in Anambra State. The objectives were to: determine the effect of decision-making information systems on the Return on Investment (ROI) of agro-businesses in Anambra State, Nigeria, and ascertain the extent to which database management systems affect the ROI of agro-businesses in Anambra State, Nigeria. The study adopted a survey research design, with data generated from both primary and secondary sources. The data collection method was a questionnaire, which was randomly administered to staff of selected agro-firms. The population of the study was 6,727, while the sample size was 1,293, out of which 929 questionnaires were retrieved. The hypotheses were tested using the multiple regression analysis method at a 0.05% level of significance. The findings revealed that decision-making information systems had a significant effect on the ROI of agro-businesses in Anambra State, with a t-statistic of 7.743 and a probability value of 0.000. Additionally, database information systems had a significant effect on the ROI of agro-businesses in Anambra State, with a t-statistic of 2.476 and a probability value of 0.013. The study concluded that management information systems have a significant positive effect on agro-firms in Anambra State. It recommended that agricultural firms should invest in advanced decision support tools to aid data-driven decisions that maximize ROI. Furthermore, agro-business managers should focus on optimizing their database information systems to improve data organization and accessibility. Regular maintenance and updates of the database systems are crucial for ensuring accurate and timely information, which can positively impact ROI.

Keywords: Decision-Making Information, Return on Investment, Agro-Business, Database Management System, Agricultural Firms, Management Information System.

Introduction

Management Information Systems (MIS) have become pivotal tools in enhancing the growth and operational efficiency of businesses. Over the years, the agricultural sector in Nigeria has provided employment opportunities for the majority of the nation's populace, especially those in rural areas (Omotayo, 2020). Agriculture is a data-intensive business, with data collected from a range of sources, including ecological, nutritional, economic, and market presence (Junior, Oliveira, & Yanaze, 2019). Modern agriculture requires a complex administrative environment, supported by information systems designed to meet strict requirements (Junior et al., 2019). However, the sector faces challenges such as limited access to information, inefficient supply chain management, and low productivity. In the

context of agribusiness, the efficient management of resources, data-driven decision-making, and the adoption of modern technologies have become imperative for achieving growth and competitiveness (FAO, 2020; World Bank, 2021). By leveraging MIS, Nigerian agro-firms are better positioned to optimize their operations, compete in both local and global markets, and drive sustainable growth in the agricultural sector.

The integration of MIS also addresses the challenge of information asymmetry in the agricultural sector, allowing farmers and agro-firms to make data-driven decisions that foster growth. In regions such as Kwara State, Nigeria, MIS has been shown to improve access to agricultural information sources, ultimately contributing to better farm management and increased productivity (Adio, Abu, Yusuf, & Nansoh, 2016).

Anambra State, Nigeria, represents an interesting context for studying the relationship between MIS and agribusiness growth. The state's agricultural sector plays a vital role in its economy, and the challenges faced by agribusinesses in the region resonate with global trends. Policymakers and stakeholders in the state recognize the importance of technological advancements and innovative practices to overcome these challenges and maximize the sector's contributions to economic development and food security (Anambra State Government, 2021). The agribusiness sector in Nigeria plays a pivotal role in the region's economic landscape, offering substantial opportunities for growth and development. It contributes significantly to food production, which is crucial for food security in the state and beyond.

Despite the recognized potential of Management Information Systems (MIS) to enhance the efficiency and growth of businesses, including agro-firms, the adoption and effective utilization of MIS among agro-firms in Nigeria, particularly in Anambra State, remains limited. Agro-firms in this region face challenges such as inadequate access to real-time market information, poor supply chain management, and inefficient resource allocation, which impede their ability to compete in both local and global markets. According to Apulu & Ige (2011), MIS, through the integration of information technology and data management, provides agro-firms with the capacity to streamline operations, improve decision-making processes, and enhance overall productivity. While studies have highlighted the potential of mobile technology and ICT tools in supporting smallholder farmers (Ogbeide & Ele, 2015) and improving access to market information (Saidu, Clarkson, & Adamu, 2017), there is a notable gap in understanding how MIS specifically contributes to the long-term growth and sustainability of agro-firms on a broader scale.

This paper aims to address these gaps and contribute to a more comprehensive understanding of the role MIS can play in transforming the agricultural sector in Anambra State, Nigeria. In Nigeria, including Anambra State, efforts by both public and private entities have been made to encourage the adoption of MIS in agro-firms to harness its potential benefits (Akpan, Uchendu, & Edinyang, 2019). While the benefits of MIS in agribusiness are widely acknowledged, there is a need for in-depth research and empirical evidence on its actual impact on growth indicators.

The agricultural sector in Anambra State, Nigeria, holds significant importance in terms of employment, income generation, and food security. However, the sector faces several challenges, including limited access to timely and accurate information, inefficient resource management, suboptimal decision-making processes, declining food production, and the inability to meet the growing demands of an increasing population. The issue of stagnant food production in Nigeria has been investigated by Anibogu, Agbasi, & Okoli (2015) in their study on socioeconomic factors influencing agricultural production among cooperative farmers in Anambra State. Their study revealed several insightful factors related to the issue at hand.

In recent years, the adoption of MIS has been advocated as a potential solution to address these issues and enhance the overall performance of agro-firms in the state. Several factors have contributed to the state of the agricultural sector today, including complex in-field monitoring tasks, financial constraints, climate monitoring, subsidy allocation, and cultivation area per farmer (Paraforos et al., 2017). Furthermore, while some studies have explored the impact of MIS on agro-firm performance in other regions of Nigeria (Anyanwu & Amalu, 2019; Udeh & Onuoha, 2020), there is a significant gap in research specific to Anambra State. The unique contextual factors, including diverse agro-firm characteristics, varying government policies, and technological infrastructure, may influence the effectiveness and applicability of MIS in the state (Eze & Ogbuabor, 2019).

By focusing specifically on Anambra State, this study sheds light on the regional challenges and opportunities for MIS adoption, filling a gap in the existing literature and offering practical insights for agro-firms aiming to leverage technology for growth and sustainability.

Objectives of the study

The main objective of this study is to examine the effect of management information system on growth of Agro-firms in Anambra State. The specific objectives are to:

- Determine the effect of decision-making information system on Return on Investment (ROI) of agro-business in Anambra State, Nigeria.
- Ascertain the extent to which Database management System, affect Return on Investment (ROI) of agro-business in Anambra State, Nigeria.

Literature Review

Theoretical Framework

This research will be anchored on three main theories: The Urban-Industrial Impact Model, The Diffusion Model, and Resource Based View Theory. These theories provide a solid foundation to understand the factors influencing MIS adoption and its impact on agro-firm growth.

The Urban-Industrial Impact Model posits that industrial growth in urban regions is driven by the adoption of new technologies and improved management practices, which enhance efficiency and productivity. In the context of agro-firms, the integration of advanced MIS

systems is expected to influence decision-making processes, thereby improving ROI. MIS allows for more informed and data-driven decisions, optimizing resource allocation and streamlining operations. As a result, businesses in the agricultural sector, traditionally less reliant on technology, can leverage MIS to enhance their competitive positioning and profitability (Ogbuagu, 2019). This model is particularly relevant to the first objective, which explores the relationship between decision-making information systems and ROI. The theory provides a basis for understanding how technology adoption can foster industrial growth and profitability in both urban and rural economies.

The Diffusion of Innovations Model further explains the process through which new technologies, such as MIS, are adopted by organizations. This model identifies factors influencing the rate and success of adoption, including the perceived benefits of the technology and the social and organizational context in which it is introduced. For agro-firms in Anambra State, the adoption of Database Management Systems (DBMS) plays a critical role in improving ROI. Effective data management enhances decision-making, allowing firms to track resources, analyze trends, and optimize operational processes. According to Rogers (2003), the speed at which MIS is adopted within an industry can significantly impact its success. Thus, this model helps explain the challenges and facilitators that agro-businesses encounter when adopting MIS, particularly as they seek to improve data management capabilities to drive profitability.

The Resource-Based View (RBV) Theory offers another lens through which to understand the impact of MIS on agro-firms. RBV posits that a firm's internal resources, particularly those that are valuable, rare, and difficult to imitate, are key determinants of its competitive advantage and performance. In this study, MIS is seen as a critical internal resource that can provide strategic advantages to agro-firms in Anambra State. Both decision-making information systems and database management systems are valuable tools that enhance the firm's ability to manage its resources efficiently and effectively, leading to improved ROI. As Barney (1991) argues, firms that can effectively deploy unique resources, such as advanced MIS, are more likely to achieve superior performance. In this case, the ability to use MIS to process data, make faster decisions, and optimize operations positions agro-firms to outperform their competitors in the long run.

These three theoretical perspectives collectively inform the research objectives. The Urban-Industrial Impact Model helps explain how decision-making information systems can enhance productivity and increase ROI by improving the efficiency of decision-making processes in agro-firms. The Diffusion of Innovations Model provides insight into the adoption process of database management systems and the challenges and opportunities that arise during the integration of MIS technologies. Finally, the Resource-Based View highlights the importance of MIS as a strategic resource that drives competitive advantage and profitability. Together, these theories offer a comprehensive framework for understanding the impact of MIS on the growth and performance of agro-businesses in Anambra State, with a particular emphasis on the role of decision-making and database management systems in improving ROI.

In summary, the adoption of MIS in agro-firms, particularly in decision-making and database management, is expected to significantly influence their growth and profitability. The Urban-Industrial Impact Model underscores the importance of technology in fostering economic growth, while the Diffusion Model explains the adoption process of MIS. The Resource-Based View emphasizes the strategic value of MIS as a critical resource for enhancing firm performance. Through the integration of these theories, this study aims to provide a comprehensive understanding of how MIS adoption can drive the growth of agro-firms in Anambra State by improving decision-making and data management, ultimately boosting ROI.

Empirical Review

Asenso-Okyere and Mekonnen (2012) investigated the use of information systems in agricultural productivity in developing countries. They found that MIS allowed farmers to access real-time data on weather conditions, market prices, and crop health, which in turn improved decision-making and led to higher profitability. Farmers who used these systems saw an increase in yields and were better able to plan for adverse weather conditions, resulting in more stable incomes and improved business performance.

Demiryurek, Erdem, Ceyhan, Atasever, and Osman Uysal (2008) investigated Analysis of the agricultural information systems and communication network used by members and non-members of the Dairy Cattle Breeders' Association. System quality in general, information quality, service quality, decision making, satisfaction and use-utility were employed as the independent variables while job satisfaction, job commitment and organizational performance were employed as the dependent variable. Structured interviews were conducted in 2006 with forty-three members and sixtyfive non-members of the Association (total of 108 respondent). 40 sample size was determined by the simple random sampling method. The interviews aimed to be 95% accurate with a 10% margin of error.

Demiryurek (2018) investigated agricultural information systems and communication networks for organic and conventional hazelnut producers in the Samsun province of Turkey. One Hundred and three respondents were sampled for the study. Structured interviews were used to collect data from 64 randomly selected conventional and all 39 organic hazelnut producers living in the study area. Descriptive statistics and spearman's rank correlation were used for data analysis and hypothesis testing. The study findings revealed that more functional cooperation and professional communication between personal and institutional information sources are needed to enhance the diffusion of information and technology among farmers.

Costa, Wickramaratne, and Wickramasinghe (2022) the main purpose of this paper is to investigate the usage and applications of Database Management Systems (DBMS) in the agriculture fields. Smart partial least squares were used to analyze the data and to test the study hypotheses. Findings proof that using DBMS had a significant impact on productivity

generally and on all its dimensions including cost reduction, improving quality and effective decision making.

Misaki, Apiola, Gaiani, and Tedre (2018) explored the adoption of mobile-based MIS among smallholder farmers in Tanzania. The study used a systematic literature search conducted by authors at 3 levels, in which 134 studies initially identified were then narrowed to 11. These 11 studies generated 7 projects that use specialized applications in a farming value chain. Their study demonstrated that access to real-time market information significantly improved farmers' bargaining power and decision-making capacity, leading to higher returns. Farmers who used mobile-based MIS applications experienced a 15% increase in income compared to those who did not adopt these technologies.

According to Bochtis, Sørensen, & Busato, (2014), the adoption of precision agriculture technologies, including DBMS, helps agro-firms to collect and process data on soil conditions, crop health, and machine operations. Their study on the adoption of farm management information systems (FMIS) in Europe found that farms using DBMS experienced significant reductions in input costs (e.g., seeds, fertilizers) and increases in output quality, which led to higher profitability.

Mwakaje (2015) investigated the impact of information and communication technology (ICT) for rural farmers' market information access in Tanzania with the case study of Rungwe District. Two hundred farmers were selected randomly to provide information about ICT use for accessing agricultural market information. A structured questionnaire was used to gather information at household level. There were also consultations with key informants, service providers and government officials. Findings show that market information sources are still dominated by the farmers themselves, relatives and traders. Nevertheless, a considerable number of farmers (23%) used ICT to access market information. The use of ICT by farmers was significantly related to the quantity produced ($P < 1\%$), income level ($P < 1\%$), type of crop marketed ($P < 5\%$) and gender ($P < 5\%$). Farmers who used ICT obtained higher prices ($P < 1\%$) than farmers who did not use ICT for accessing market information.

Habineza, Nsengiyumva, Ruzigamanzi, and Nsanzumukiza (2020) explored the profitability analysis of small scale Irrigation technology adoption to farmers in Nasho sector, Rwanda. Multistage sampling techniques were used to select 317 farmers including adopters and non-adopters of Small Scale Irrigation Technology (SSIT). Descriptive statistics not limited to frequency but also to means, standard deviation, Standard errors were also used to characterize farmers' characteristics while T-test was used to compare means of respondents. Propensity score matching (PSM) and Cost Benefit Ratio methods were employed to estimate effect of small scale irrigation technology adoption using STATA version 13.0. The findings of this study will help the policy makers for deeper sector planning and also, it will facilitate other stakeholders to invest in irrigation technology to improve the livelihoods of Rwandan farmers and other surroundings.

Mittal and Mehar (2015) investigated the socio-economic factors affecting adoption of modern information and communication technology by Farmers in India. The paper links the theoretical understanding of the existing multiple sources of information that farmer use, with the empirical model to analyze the factors that affect the farmer's adoption of different agriculture-related information sources. The analysis is done using a multivariate probit model and primary survey data of 1,200 farmer households of five Indo-Gangetic states of India, covering 120 villages

Methodology

The study adopted a descriptive survey approach. Uses of descriptive statistics were applied because of its capability to summarize large quantities of data using understood measures in form of graphical and numerical techniques (Burns, 2000). Descriptive studies are said to be a type of survey design that can give specific or group characteristics for a sampled population (Kothari, 2006). It determines the frequency with which something occurs or its association or correlation with something else. It also minimizes bias and maximizes reliability of the evidence collected if designed within precise objectives and on relevant data. This research approach was chosen because of its relevance to this research, more particularly it could answer research questions in this study which described behavior/attitudes. With respect to this research, the researcher made use of primary and secondary sources of data. The primary sources of data include the questionnaire, while the secondary sources of data include the journals, magazines, textbooks and internet. The target population of this study was limited to employees working at Agricultural firms in Anambra state. The research population comprised 6727 employees working in Anambra state agricultural firms. Thus, the sample size is 1293 staff of agricultural firms in Anambra State. This study employed a convenience sampling technique in selecting 15 agricultural firms based on factors such as time available for data collection, accessibility, and willingness to participate in the study. The research adopts convenience sampling. Convenience sampling enabled the researchers to choose the respondents that were of interest to the study while the stratified random sampling gave the respondents the opportunity to be selected without bias. A structured instrument questionnaire was designed to reflect the popular five (5) point Likert scale of strongly agree, agree, disagree, strongly disagree and undecided. The questionnaire contains only close-ended questions. Close-ended questions were used to get the views and opinions of respondents on the effect of Management Information System (MIS) on Growth of Agro-business in Anambra State. The collected data was analyzed using quantitative data, analysis methods. Descriptive statistics such as mean and standard deviation were used to present quantitative data in form of tables. Data from questionnaire was coded and entered into the computer using Statistical Package for Social Science (SPSS Version 21) for analysis. The study employs means, standard deviations and correlations to determine the effect of each independent variable on the dependent variable.

Interpretation and Analysis of Data

In this section, data generated from the respondents (employees) of selected agricultural firms were presented, analyzed and interpreted. One thousand two hundred and ninety-three (1293) questionnaires were distributed to the respondents, out of which nine hundred and twenty-nine (929) copies were properly filled and found relevant for the study. The first section covers the demographic features of the respondents. The second contained the analysis of the data relevant to research questions.

Demographic Characteristics of Respondents

SEX

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	MALE	795	85.5	85.6	85.6
	FEMALE	134	14.4	14.4	100.0
	Total	929	99.9	100.0	

Source: Field Survey 2024

The above table reveals that seven hundred and ninety-five (795) of the respondents which represents 85.6% were male respondents, while one hundred and thirty-four (134) respondents which represent 14.4% were female respondents. By implication, male respondents were more than female respondents by 71.1% in our selected population sample for this study. The implication of this is to enable us to know the number of female and male that successfully returned their questionnaire.

STATUS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	MARRIED	692	74.4	74.5	74.5
	SINGLE	237	25.5	25.5	100.0
	Total	929	99.9	100.0	

Source: Field Survey 2024

In table 4.2 above, out of the nine hundred and twenty-nine (929) respondents, six hundred and ninety-two (692) were married, while two-hundred and thirty-seven (237) which represent 25.5 percent were single. It is therefore glaring that the majority of the respondents were married as at the time of this study. Thus marital status table help us to know the number of single, and married, respondents that answered the distributed questionnaire.

LEVEL OF EDUCATION

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	WAEC	116	12.5	12.5	12.5
	OND	71	7.6	7.6	20.1
	BSC/HND	412	44.3	44.3	64.5
	MSC	315	33.9	33.9	98.4
	PHD	15	1.6	1.6	100.0
	Total	929	99.9	100.0	

Source: Field Survey 2024

In table 4.3 above, out of the nine hundred and twenty-nine (929) respondents, one hundred and sixteen (116) are WAEC holders. While seventeen (71) respondents which represent 7.6% are OND holders, four hundred and twelve (412) respondents which represent 44.3% are BSC/HND holders. While three hundred and fifteen (315) representing 33.9% are MSC holders, fifteen (15) which represents 1.6% answered others.

AGE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	15-25	123	13.2	13.2	13.2
	26-35	540	58.1	58.1	71.4
	36-45	182	19.6	19.6	91.0
	46-ABOVE	84	9.0	9.0	100.0
	Total	929	99.9	100.0	

Source: Field Survey 2024

Table 4.4 reveals that respondents whose age bracket falls between 15-25 yrs were one hundred and twenty-three (123) which represent 13.2 percent. This is followed by those with age bracket of 26-35 years with five hundred and forty (540) which represents 58.1%. Also those within age bracket of 36-45yrs were one hundred and eighty-two (182) which represents 19.6%. Lastly, those with age bracket of 46-above with eighty-four (84) respondents which represent 9%. The implication of this age distribution is to enable us to check if the questionnaire was directed to the right age group.

Multiple Regression Analysis

Multiple regression analysis was employed to test the effect of independent or explanatory variables on the dependent variables. The result of the multiple regression analysis is presented in the tables 4.2.1 below.

Summary of the Regression Result

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.433 ^a	.577	.583	.318	.187	42.523	5	923	.000	1.803
a. Predictors: (Constant), DMIS, DBIS,										
b. Dependent Variable: ROI										

The table above shows that R^2 which measures the strength of the effect of independent variable on the dependent variable have the value of 57%. This implies that 57% of the variation in ROI is explained by variations in decision making information system, and database information system, this was supported by adjusted R^2 of 58%.

In order to check for autocorrelation in the model, Durbin-Watson statistics was employed. Durbin-Watson statistics of 1.803 in table 4.2,1 shows that the variables in the model are not auto correlated and that the model is reliable for predications.

ANOVA Result

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.469	5	4.294	42.523	.000 ^b
	Residual	93.202	923	.101		
	Total	114.672	928			
a. Dependent Variable: ROI						
b. Predictors: (Constant), DMIS, DBIS,						

The f-statistics value of 42.523 in table 4.2.2 with f-statistics probability of 0.000 shows that the independent variables have significant effect on dependent variables that is decision making information system and database information system, can collectively explain the variations in ROI.

Coefficients of the Model

T-statistics and probability value from the regression result are the effect of individual independent or explanatory variables on the dependent variables. The summary of the result is presented in the table below.

T-Statistics and Probability Value from the Regression Result Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.163	.071		6.409	.000	1.024	1.302
	DMIS	.195	.025	.242	7.743	.000	-.245	-.146
	DBIS	.029	.012	.081	2.476	.013	-.052	-.006

a. Dependent Variable: ROI

Statistical and Economical Criteria

The t-statistics and p-values of the individual coefficients provide further insights into the significance of each independent variable:

Decision Making Information System (DMIS): The t-value of 7.743 and p-value of 0.000 show that DMIS has a strong and statistically significant impact on ROI. The coefficient of 0.195 suggests that a 1% increase in DMIS usage leads to a 19.5% increase in ROI, all else being equal. This result aligns with economic expectations and implies that improving the decision-making process through better information systems enhances the financial performance of agro-firms.

Database Information System (DBIS): The t-value of 2.476 and p-value of 0.013 demonstrate that DBIS also has a statistically significant impact on ROI, albeit weaker than DMIS. The coefficient of 0.029 suggests that a 1% increase in DBIS usage leads to a 2.9% increase in ROI. Though the effect is smaller, it is still significant, showing that efficient data management contributes positively to firm performance.

The findings from this analysis offer several practical insights for agro-firms looking to enhance their ROI through the implementation of MIS, particularly decision-making and database management systems. These implications are crucial for firm managers, policymakers, and stakeholders in the agricultural sector.

The strong positive relationship between DMIS and ROI (19.5%) underscores the importance of utilizing advanced information systems to improve decision-making processes within agro-firms. Agro-firms often operate in environments characterized by uncertainty, such as fluctuating market prices, unpredictable weather conditions, and varying demand for agricultural products. A well-implemented DMIS can provide real-time data analytics, allowing firms to make informed, data-driven decisions regarding resource allocation, production schedules, and market strategies.

In practical terms, agro-firms should prioritize investment in DMIS technologies that integrate data from various sources (such as weather forecasts, soil health, market demand) to optimize their operations. This could include adopting precision agriculture

technologies, which enable farmers to make precise decisions about planting, irrigation, and harvesting based on real-time data. Improved decision-making through MIS can lead to reduced costs, minimized waste, and maximized profits.

While the impact of DBIS on ROI (2.9%) is smaller than that of DMIS, its significance should not be underestimated. Efficient data management systems allow agro-firms to store, process, and retrieve large volumes of data, enabling better tracking of inventory, finances, and operational activities. This not only reduces operational inefficiencies but also supports compliance with regulatory requirements and enhances transparency across the supply chain.

Agro-firms should implement robust database management systems to keep accurate records of their inputs (such as seeds, fertilizers, and pesticides), monitor crop performance, and track market prices. In doing so, firms can optimize their inventory levels, reduce spoilage, and improve the accuracy of financial reporting. Furthermore, DBIS can support better customer relationship management by maintaining detailed records of customer preferences, sales histories, and feedback, allowing firms to tailor their services more effectively.

From the results obtained, the decision making information system is revealed to be positive and statistically significant with their t- value and p-value of 7.743 (0.0000) respectively. This is because their p-value was greater than 5% level of significance. This result means that decision making information system is positive and has significant impact on ROI of Agricultural Firms in Anambra State, Nigeria.

Database information system has a positive significant impact on ROI of agricultural firms in Anambra State, Nigeria. This was revealed through their t-value which is 2.476 while the p-value of 0.013 was greater than five percent level of significance. This result means that database information system is positive and significant in causing changes in ROI of agricultural firms in Anambra State, Nigeria.

Test of Hypotheses

Here, the two hypotheses formulated in chapter one were tested using t-statistics and significance value of the individual variables in the regression result. The essence of this is to ascertain how the significance of the effect of individual independent or explanatory variables on the dependent variables.

Test of Hypotheses One

Ho₁: Decision-making information system has no significant effect on ROI of Agro-business in Anambra State, Nigeria.

Decision-making information system has a t-statistics of 7.743 and a probability value of 0.000 which is statistically significant. Therefore, we accept the alternative hypothesis and reject the null hypothesis which states decision-making information system has a significant effect on ROI of agro-business in Anambra State, Nigeria.

Test of Hypotheses Two

Ho₂: Database information system has no significant effect on ROI of Agro-business in Anambra State, Nigeria.

In testing this hypothesis, the t-statistics and probability value in table above was used. Database information system has a t-statistics of 2.476 and a probability value of 0.013 which is statistically significant. Therefore, we reject the null hypothesis and accept the alternative hypothesis which states that database information system has a significant effect on ROI of Agro-business in Anambra State, Nigeria.

Summary of the Findings, Conclusion and Recommendation**Summary of the findings**

This study examined the effect of management information system on growth of Agro-business in Anambra State. In this research, the following findings were made

1. Decision-making information system had a significant effect on ROI of Agro-business in Anambra State with t-statistics of t-statistics of 7.743 and a probability value of 0.000. This strong relationship supports the hypothesis that improved decision-making through MIS can lead to better financial outcomes for agro-firms. The role of DMIS in providing real-time data, enhancing decision accuracy, and optimizing resource allocation is a direct application of the Urban-Industrial Impact Model, which suggests that technological advancements, particularly in decision-making, are key drivers of industrial and agricultural growth (Ogbuagu, 2019). This finding is also consistent with the work of Mittal and Mehar (2016), who demonstrated that smallholder farmers in India who accessed market and weather data through ICT platforms experienced significant improvements in yield and income. The positive impact of DMIS on ROI can also be explained by the Resource-Based View (RBV) Theory, which posits that firms that possess unique, valuable, and difficult-to-imitate resources gain a competitive advantage (Barney, 1991). DMIS can be considered a valuable resource, as it enables agro-firms to process complex data, make informed decisions, and respond rapidly to changes in the agricultural environment. Firms that leverage DMIS are likely to outperform competitors who rely on traditional, less efficient decision-making methods. This competitive edge leads to higher ROI and long-term sustainability.
2. Database information system had a significant effect on ROI of Agro-business in Anambra State with t-statistics of 2.476 and a probability value of 0.013. While the impact is less pronounced than that of DMIS, the positive relationship between DBIS and ROI supports the Diffusion of Innovations Model (Rogers, 2003), which suggests that the adoption of new technologies like DBIS occurs gradually and depends on the perceived benefits and ease of use. The implementation of DBIS improves operational efficiency by facilitating better data management, tracking of inputs and outputs, and resource allocation, which ultimately enhances firm performance. In the broader literature, the role of DBIS in improving organizational efficiency is well-recognized. Bochtis et al. (2014) demonstrated that database management systems in precision

agriculture help firms manage large volumes of data related to soil health, crop growth, and machinery operations. By enabling more precise application of inputs and better tracking of resources, DBIS contributes to cost reduction and productivity improvements.

The significant effect of both DMIS and DBIS on ROI highlights the broader importance of MIS in agricultural development, particularly in developing economies like Anambra State, Nigeria. This finding reinforces the Urban-Industrial Impact Model, which posits that technological advancement is a key driver of industrial growth. The adoption of MIS in agro-firms represents a shift towards more industrialized and technology-driven agricultural practices, enabling firms to increase productivity, reduce inefficiencies, and improve profitability.

Moreover, the results also support the Diffusion of Innovations Model, which explains how MIS adoption spreads within the agricultural sector. Early adopters of MIS, particularly those who integrate DMIS and DBIS into their operations, experience significant gains in ROI, which encourages other firms to follow suit. As more firms adopt MIS, the agricultural sector as a whole becomes more competitive, efficient, and sustainable.

The findings of this study also align with the Resource-Based View Theory, which suggests that firms that effectively leverage internal resources, such as MIS, gain a competitive advantage. In the context of agro-firms, MIS serves as a critical resource that enhances decision-making, data management, and operational efficiency. Firms that invest in MIS are better positioned to navigate the complexities of the agricultural market, such as fluctuating prices, changing weather patterns, and evolving consumer demands.

Conclusions

The study evaluated the effect of management information system on Growth of Agro-business in Anambra State, Nigeria. A survey research design was employed for the study. The findings showed that decision making information system and database information system; had both individual and combined positive significant effects on ROI of Agro business in Anambra State.

The study underscores the importance of Management Information Systems (MIS) as a key driver of growth and profitability in agro-businesses in Anambra State, Nigeria. The findings offer both policy and practical insights, emphasizing the need for supportive government policies that facilitate MIS adoption through infrastructure development, capacity building, and financial incentives. For agro-businesses, strategic investments in MIS, particularly in decision-making and data management systems, are crucial for maximizing operational efficiency, reducing costs, and improving ROI. By adopting and optimizing these systems, agro-firms can secure a competitive advantage, contributing to the broader goal of agricultural modernization and economic development in Nigeria.

Recommendations

Based on the results of the analysis of data from this study and the conclusions made above, the following recommendations were made

1. Agricultural firms should invest in advanced decision support tools that are tailored to the specific needs of agro-businesses, taking into account factors like market trends, crop health, environmental conditions, and training/capacity building of staff and managers, which would help improve its adoption process.
2. Agro-businesses should ensure that their DBIS is well-organized, making data easily accessible to decision-makers. This can be achieved by improving data categorization, using automated data processing tools, and implementing cloud-based solutions for easier access to real-time data.
3. Agro-businesses should ensure that their DBIS is well-organized, making data easily accessible to decision-makers. This can be achieved by improving data categorization, using automated data processing tools, and implementing cloud-based solutions for easier access to real-time data.
4. Agro-firms should actively foster a culture that embraces technology and innovation. This can be done by offering incentives to employees who effectively use MIS tools, which encourages faster adoption and utilization, ultimately leading to better performance outcomes.

Potential Areas for Future Research

1. Impact of MIS on Smallholder Farmers: While much of the research focuses on larger agro-firms, future studies could explore the adoption and effectiveness of Management Information Systems (MIS) among smallholder farmers. These smaller farmers often face different challenges, such as limited financial resources and lower levels of digital literacy, which could affect their ability to implement and benefit from MIS. Understanding these dynamics could inform targeted interventions and support systems for small-scale farming operations.
2. Cost-Benefit Analysis of MIS Adoption: Future research could conduct a detailed cost-benefit analysis of MIS adoption in agro-firms. This would help quantify the initial investments, operational costs, and long-term financial benefits for firms of various sizes and types. This could include a comparison of different MIS systems and the financial returns specific to different regions or types of crops.
3. Role of Government Policy in MIS Adoption: Investigating the role of government policies in facilitating or hindering the adoption of MIS in agriculture would provide valuable insights. Research could examine how policies, subsidies, or incentives influence MIS implementation and what specific policy frameworks are most effective in promoting technology adoption among agro-firms.

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