The effects of digital platforms (e-Kilimo, M-Kilimo) on the profitability and market access of agricultural stakeholders in e-business performance in the Coastal Region, Tanzania

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ABSTRACT

Digital platforms in agricultural environment have become powerful tools globally as it enhance coordination and assist provision of market prices, weather prediction, input supplies, extension counselling, and financial help among the agricultural players. However, farmers with digital plattforms still face challenges, such as disrupted supply chains, unpredictable weather, and uncertainty about market conditions. Most studies made earlier concentrated on mobile market information and digital extension services without the identification of the prospects of using digital platforms (e-Kilimo, M-Kilimo) across the entire agricultural value chain in the Coastal Region of Tanzania. Therefore, this current paper seeks to address this gap by provide an intensive assessment of the effect of an integrated digital platforms (e-Kilimo, M-Kilimo) on the profitability and market access of agricultural stakeholders in e-business performance in the coastal region of Tanzania. A descriptive research design and quantitative research approach were utilized in this study. A population of 31,689 agricultural stakeholders was used for the calculation of sample size of 395 using Yamane formula. Stratified sampling strategy and random sampling was used to select respondents for the study. The study was supported by Technology Acceptance Model (TAM) while questionnaires with closed-ended questions and journals, books, and government reports, were used for data collection. Data analysis included descriptive and regression analyses with the help of statistical package for social science (SPSS) software. The study revealed that digital platforms (e-Kilimo, M-Kilimo) had a positive effect on the Profitability and market access of agricultural stakeholders in e-business performance, with a correlation coefficient of 0.812 and a significance level of 0.000. The adjusted R-squared value was 0.654. The study concludes that digital platforms (e-Kilimo, M-Kilimo) have improved the process of sourcing inputs from suppliers and agro-dealers, leading to enhanced Profitability and market access of agricultural stakeholders in e-business performance for stakeholders. The study suggests that company/organization management and stakeholders should enhance the sourcing process from suppliers through advanced digital platforms to increase market access and agricultural profitability.

Keywords: Coastal Region; Digital platforms, e-business performance; e-Kilimo; M-Kilimo; Profitability and market access

I. INTRODUCTION

Traditional methods and manual Labor have always defined the conventional understanding of agriculture. Nevertheless, the industry has undergone a swift change in recent years, driven by digital technologies. The change, which is commonly known as e-agriculture or precision farming, is transforming the manner in which food is manufactured on a global basis. This change is a total reconstruction of agriculture, as compared to the other innovations in the past on agricultural practices. The farmers can be equipped with state-of-the-art technology, such as drones, IoT sensors, satellite imagery, and data analytics, which could supply farmers with real-time information about weather conditions, soil quality, and crop health (Singh et al., 2023).

In Europe, agricultural sector is crucial, employing over 40% of the workforce and contributing significantly to Gross Domestic Product of a country (GDP) (The Commonwealth & McDougall, 2024). These digital tools provide farmers with real-time information on weather, soil, and crops, enabling evidence-based decisions for improved productivity and sustainability (Singh et al., 2023). But, this has not helped the farmers to make better decisions and be able to optimize their farming to achieve better productivity and sustainability. Using this type of data, decisions are no longer made on an experience or tradition basis, but rather, they are made on evidence, efficiency, and sustainability. Smallholder farmers are beginning to experience enhancements in their inclusion and productivity through services such as mobile-based market price alerts, weather forecasts, and access to credit (Birner et al., 2021).

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In Africa, many improvements in agricultural activites don't always work well together. Different farmers focus on different parts of farming, like pricing or weather, instead of connecting the whole value chain (Anggreany et al, 2025). African farmers still face challenges, such as disrupted supply chains, unpredictable weather, and uncertainty about market conditions. Digital solutions are a promising way to solve these problems. Farmers need platforms that offer a wide range of services instead of just separate tools that make it hard to coordinate different systems. A big problem is not just the technology, but also the people who use these tools. Even with access to the right tools, limited digital skills, high data rates, and designs that don't take local conditions into account, widespread adoption is still difficult (Kudama et al., 2021). The African Union's Digital Agriculture Strategy for 2024-2030 acknowledges these challenges and emphasizes the importance of inclusive and farmer-centered approaches (Kudama et al., 2021).

In Tanzania, agricultural activites is crucial that contributing 23.4% of the Gross Domestic Product of a country (GDP) and employing around 65% of the population (Mpogole et al., 2020). Both the government and the private sector are working to make farming more modern. The Data for Digital Agricultural Transformation Joint Program (2024–2027) is one of many programs that work to improve access to data and make market connections stronger. Additionally, e-Kilimo, introduced in 2025 by the Tanzania Ministry of Agriculture, offers a digital platform for extension services. While these programs show progress, challenges persist, according to research. Farmers in many places don't have the right tools or access to the internet. They may know how to use social media, but they don't know much about specialized agricultural apps (Lu & Xinag, 2025).

The Tanzania Coastal Region is a good example because it has both subsistence and commercial farming for food and cash crops. This variety makes it possible for digital platforms to improve access to markets, give people timely information, and boost productivity. Even with these chances, problems like poor infrastructure, a lack of digital skills, and services that don't work well together slow down progress in the area (Maghori & Lubawa, 2025). These challenges underscore the need to make technology accessible as well as to understand its perception and use by people.

The Technology Acceptance Model (TAM), developed by Davis in 1989, can assist us in determining why individuals either adopt or do not adopt new technologies. According to TAM, the general considerations that influence the use or non-use of a technology are the ease and utility of the technology in use. However, these are not the only things that are important in Tanzania. The factors that play a major role in the adoption of new technology include cultural norms, peer pressure, age, and gender (Al-Emran, & Griffy-Brown, 2023). Therefore, a study done in this field has to consider all technical aspects of the technology and the social factors that influence adoption. Agriculture is still an important part of Tanzania's economy. It employs more than 65% of the population and is a big part of the country's economy (Mpogole et al., 2020).

However, farmers and other people who work in the Coastal Region still have problems to deal with. Securing access to markets proves to be a struggle, accurate information is scarce, unpredictable weather patterns disrupt farming activities, and there are weaknesses in the supply chain connections (Paschal et al., 2025). These obstacles not only hinder productivity but also impede farmers from making well-informed decisions, impacting their incomes and overall well-being. In response to the challenges faced by agriculture, digital platforms have become powerful tools globally (Bhaskara & Bawa, 2021). The services provided by these platforms are market prices, weather prediction, input supplies, extension counselling, and financial help. According to Msuya (2022), digital initiatives by both government and privately-owned organizations have also been introduced in Tanzania. Nevertheless, they are not usually integrated, and they may not satisfy the diverse interests of the stakeholders because of ineffective coordination, yet with the digitalization of operations among the agricultural players, all actors were able to perform better. The major challenge is the lack of a holistic digital platform that could bring all the stakeholders in the agricultural sector together on one platform.

The current literature does not provide an intensive assessment of the effect of an integrated platform on the Performance of Agricultural E-Business in the Coastal Region of Tanzania. It is also noted that most studies made earlier concentrated on specific topics like mobile market information or digital extension services without the identification of the prospects of using such tools across the entire agricultural value chain. It has led to a limited understanding of how digital platforms can improve the e-business performance of the agricultural sector, especially in the Coastal Region of Tanzania (Kitole et al., 2024). The current paper seeks to address this gap by investigating the role played by digital platforms offering farming advice, stakeholder profit, stakeholder coordination, and market information in enhancing the efficiency of the agricultural business e-business. This research aims to correct the lack of information regarding the influence of integrated digital platforms on the Performance of Agricultural E-Business. It was also examined how these platforms can assist stakeholders to collaborate and provide agricultural information, earn money, and have improved access to market information. In order to develop agricultural systems that are not only efficient, environmental-friendly and just, but also dynamic enough to address the needs of the Tanzanian farming communities, one should bridge this gap in information. This study will help through digital media to reduce fragmentation and socio-technical challenges by provide substantial information on how to formulate inclusive, viable, and sustainable solutions for the agricultural stakeholders in the area.

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1.2 Research Objective

To investigate the impact of digital platforms (e-Kilimo, M-Kilimo) on the Profitability and market access of agricultural stakeholders in e-business performance.

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Technology Acceptance Model (TAM).

The Technology Acceptance Model (TAM) (Davis, 1989) attempts to explain the acceptance of information systems by users, who are more likely to accept and use a technology. Individuals use technology due to a behavioural intention (BI) influenced by their attitude (A). According to Fred Davi's model, the number of factors that influence users' decisions about how and when they use technology after being presented with a new technology is suggested. TAM identifies two critical factors influencing technology adoption those are Perceived usefulness (PU) and Perceived ease-of-use (PEOU).

Fred Davis defined perceived usefulness (PU) as "the degree to which a person believes that using a particular system would enhance their job performance". It means whether someone perceives technology as useful for what they want to do. Moreover, Perceived ease-of-use (PEOU) Davis defined this as "the degree to which a person believes that using a particular system would be free from effort". If the technology is easy to use, then the barrier is conquered. If it is not easy to use and the interface is complicated, people tend to have a negative attitude towards it. This theory is very important in this study because it helps the researcher to understand why agriculture stakeholders, such as farmers and buyers, adopt or reject new technology. It enables researchers to identify potential barriers to adaptation and provide different strategies to remove those barriers by evaluating the perceived usefulness and ease of use of a product or service. Moreover, TAM is also useful to researchers in the adaptation of new technology over time.

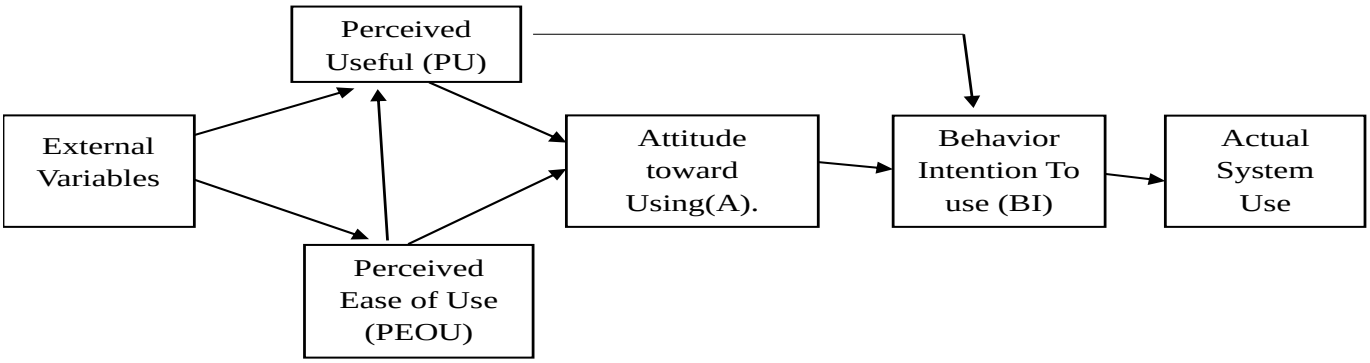

Figure 1
Technological Acceptance Model

2.2 Empirical Review

Around the world, online platforms are playing a crucial role in helping farmers broaden their markets and generate more income by bridging information divides and facilitating direct sales. Research conducted in India has indicated that mobile applications are enhancing farmers' ability to negotiate better deals and ultimately increasing their earnings (Mittal & Mehar, 2016). Thiele et al (2011) stated that value chains linked to urban markets and agro-industry present new opportunities for adding value and raising rural incomes. Small farmers, who produce small volumes, struggle to enter these markets. A lack of trust among value chain actors increases transaction costs and short-circuits innovation. The report explores how multi-stakeholder platforms have been used to address these problems in potato-based value chains in Bolivia, Peru, and Ecuador

Digital platforms like M-shamba in Kenya combine financial services, advice, and access to markets. These have helped farmers increase their income. Maina (2024) conducted the study and recommends that development partners and policymakers, including the government, NGOs, and private investors, establish digital marketing platforms tailored for older farmers and invest in extension services to educate and train farmers on utilising digital platforms, thereby enhancing ICT literacy. Furthermore, encouraging farmers to participate in collective marketing through digital platforms is essential, as these platforms offer better prices and can lead to higher incomes. Digital platform developers should incorporate aspects of traditional markets to attract farmers with extensive experience in farming.

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Mushi et al. (2022) conducted research in Tanzania that examines the current state of digital technology and services in agriculture, their role in making agriculture more sustainable, and their impact on smallholder farmers. Digital technology ranges from simple mobile and web-based applications, mostly for smallholders, to complex autonomous, information, and cyber-physical systems used by large-scale farmers. Digital transformation appears promising and is changing all aspects of life across various disciplines, leading to new business models, services, and products. The use of digital technology in agriculture may help address the challenge of food insecurity in a rapidly growing global population. The literature analysis has shown that sustainable agriculture is a reality through digital technology and services. However, the cutting-edge digital technology in agriculture (smart farming) is not accessible to smallholder farmers who, despite their small size, produce over 70% of the world's food.

Various researchers and authors, including Mushi et al. (2022), have examined digital transformation in Tanzania's agriculture, primarily addressing overarching challenges without thoroughly investigating the integration of advanced digital services among diverse stakeholders. Additionally, other researchers have analysed the adoption of digital technologies in agriculture. However, their conclusions predominantly reflect general trends and fail to concentrate on the specific effect of digital platforms on Tanzanian agricultural e-business ecosystems specifically in Coast Region (Sargani et al., 2025). The primary knowledge gap in this research, in contrast to existing literature, is the examination of a comprehensive and integrated digital platform for the Tanzanian agricultural sector. Most studies focus on only one aspect, such as weather forecasts, market information, or agricultural advice. They do not look at how combining these parts into one comprehensive platform that connects all agricultural stakeholders (farmers, suppliers, buyers, government agencies, and agricultural advisors) affects the whole system. Existing literature often addresses isolated solutions and their benefits; however, there is a lack of research on the synergistic effects of combining these services on a single platform to enhance overall agricultural productivity, resilience, and market competitiveness.

III. METHODOLOGY

3.1 Research Design

According to Asenahabi (2019), research design is defined as the plan or scheme that comes up with solutions for different challenges in research. With regard to the relationship between Digital platforms (e-Kilimo, M-Kilimo) and the Profitability and market access of agricultural stakeholders in e-business performance, the study employs a descriptive research design since it enables the researcher to collect data that are of interest in the current situation in the field, and no variables were changed (Cooksey, 2020).

3.2 Research Approach

The study employs a quantitative research approach to investigate the effect of digital platforms on the performance of agricultural e-business. This approach was appropriate as it enables the systematic measurement and analysis of numerical data concerning agricultural stakeholders' skills, engagement levels, and performance outcomes. In adopting a quantitative approach, the research provided empirical evidence that may be utilized to inform decision-making in using digital platforms in agricultural e-business. (Dubey & Kothari, 2022). The Likert-scaled questionnaire was able to quantify the correlation between integration of agricultural stakeholders, profitability and market access, dissemination of agricultural information, and measurable performance indicators, which enabled the testing of hypotheses. Through the quantitative method, it was easy to make comparisons across different agricultural stakeholders, which enhanced reliability as well as permitted the use of correlation statistics in assessing the strength and significance of these relationships.

3.3 Study Area

This study was carried out in the Coastal Region of Tanzania. The reasons for the selection of the study area were due to assurance of data availability, proximity of the researcher to the areas that have an impact on cost effectiveness in terms of transport, and life affordability (Creswell, 2024). Therefore, this study intends to take a study at investigate the effect of Platform platforms (e-Kilimo, M-Kilimo) on the agricultural e-business in Tanzania.

3.4 Population of the Study

A population is a clearly defined group of people or things that are known to share a particular quality or attribute that the researcher is interested in studying (Shetty, et al., 2024). This research focuses on the Coastal Region of Tanzania, where a variety of stakeholders support agriculture. According to official records from the Embassy of Tanzania of 2021, the M-Kilimo platform had enrolled 14,784 farmers in the region, which was the lowest subscription rate in the country at that time. In addition to farmers, the agricultural system includes other groups such as 2,000 input suppliers, nearly 8,000 produce buyers (including wholesalers and retailers), approximately 10 digital platform operators like e-Kilimo and M-Kilimo, an estimated 6,840 government agricultural officers at different levels, around 50

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cooperative representatives from CORECU and AMCOS, and five agricultural advisors. Together, these various groups account for a total population of 31,689 individuals.

3.5 Sampling Frame

This study was focused on a sample frame of 395 individuals selected from the target population. Key informants were included in the sample to provide valuable information. This study's sample distribution is described in detail below.

Table 1

Sampling frame

Category	Population Group	Area	Sampling Technique	Target Population	Sample Size	Justification
Farmers	Farmers	Coastal Region	Random Sampling	14,784	127	The sample frame was derived from a list of registered farmers in the region.
Suppliers	Agricultural Input Suppliers	Coastal Region (Regional Agro-dealers)	Stratified Sampling	2,000	70	Suppliers provide insights into how digital platforms influence input distribution and transactions.
Buyers	Produce Buyers (Wholesalers/Retailers)	Coastal Region (Markets and traders)	Stratified Sampling	8,000	120	Buyers' perspectives are essential to understand market access and digital trade interactions.
Digital Platforms	Platform Operators (e-Kilimo, M-Kilimo)	Government-backed platforms	Random Sampling	10	4	These platforms were selected because they meet specific criteria and provide relevant data.
Government	Agricultural Officials	District & Regional Agricultural Offices; Village/Ward Extension Officers	Random Sampling	6,840	50	Government perspectives on policy, support, and rural digital infrastructure are critical.
Cooperatives	Representatives from Farmer Cooperatives	CORECU & AMCOS	Random Sampling	50	20	Cooperatives provide insights on local adoption, farmer engagement, and platform effectiveness.
Advisors	Agricultural Advisors	Coastal Region	Random Sampling	5	4	Advisors offer practical knowledge and direct experience with farmer training and digital tools.
TOTAL				31,689	395	

3.6 Sampling Technique and Sample Size

3.6.1 Sampling Technique

Sampling procedures are methods for choosing the members of a sample or unit (person, organization, etc.) from the population to be studied (Creswell & Hirose, 2019). A propionate stratified random sampling technique was employed to select respondents in this research for the data collection with regard to the effect of Digital platforms (e-Kilimo, M-Kilimo) on the Profitability and market access of agricultural stakeholders in e-business performance because it involves a population that has clear, distinct subgroups based on sharing characteristics such as location, age, gender, and income, by ensuring that each stratum is well represented and minimizing variability, and improving accuracy.

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3.6.2 Sample Size

The sample size is the number of people or units chosen from the population to be the subject of the study (Creswell & Hirose, 2019). For this study, the sample size was calculated using Yamane's formula specific for the data collection with regard to the effect of Digital platforms (e-Kilimo, M-Kilimo) and the Profitability and market access of agricultural stakeholders in e-business performance as follows: For a population (N) of 31,689 and a margin of error (e) of 0.05, the sample size (n) is calculated as follows:

$$n = \frac{N}{1 + (e2)}$$

Where:
n = Sample size
N = Total population (31,689)
e = Margin of error (0.05 for 95% confidence level)
Then substitute the values:

$$n = \frac{31.689}{1 + 31,689\ (0.052)}$$

n≈ 395

3.7 Data Collection Instruments

The methods of Data Collection are a systematized way to collect the required data and information from the desired sources (Bryman, 2016). In the study, both primary and secondary data have been used to conduct the research. Primary data was obtained by administering structured questionnaires containing closed-ended questions, and secondary data was collected by reviewing different publications from the Ministry of Agriculture, specifically on digital platforms

3.7.1 Primary Data Collection

The primary data for this study were collected using structured questionnaires. The questionnaire was of Likert scale-type closed-ended questions evaluating respondents' views on examining the effect of digital platforms (e-Kilimo, M-Kilimo) on the profitability and market access, integration, and timely and reliable dissemination of agricultural information to all agricultural stakeholders in e-business performance. (Creswell & Hirose, 2019). This is desirable since it presents quantifiable responses that are easy to analyse using statistical techniques. The questionnaire was administered to digital platforms (e-Kilimo, M-Kilimo) usage using a self-administered format to enable anonymity and open response. To increase the validity and reliability of the findings, a pilot test was carried out before the survey.

3.7.2 Secondary Data Collection

Secondary data were also gathered from governmental reports, research journals, books, and government documents, most importantly Ministry of Agriculture reports, and previous studies of digital platforms on agriculture. Utilising these resources enabled us to gain a deeper understanding of the sector's current policies, market reach, and technological framework. These additional insights allow the study to contextualise its findings within broader local and global trends in digital agriculture, promoting a comprehensive understanding of the current situation.

3.8 Data Reliability and Validity

3.8.1 Data Validity

The supervisor and panel reviewed the research questions to ensure they align with the study's objectives and remain valid (Kothari, 2022). Additionally, the researcher distributed all questionnaires to the designated participants. The questions were written in simple English for clarity. Respondents received clear directions, and the researcher was available to assist with any questions during the surveys (Mugenda & Mugenda, 2019).

3.8.2 Reliability of the Study

Reliability is how stable and consistent a test or measurement is over time. This means that the results can be trusted and used in different situations. making the findings reproducible and trustworthy under varying instances or conditions (Andigema et al., 2025). In case the reliability of the research is measured using Cronbach's Alpha coefficient, a value of 0.7 and above indicates that the research instrument is consistent and reliable in measuring the study variables (Kothari, 2022).

3.9 Data Analysis

The analysis of data involved several closely related operations for the purpose of summarizing the data that was expected to be collected and to be organized in a manner that would answer research questions (Huyler & McGill,

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2019). Data was analyzed using a quantitative technique. Descriptive analysis was used for quantitative data that was presented in the form of percentages and frequency through the formulation of tables and figures, and this was after the compilation, coding, and processing of numerical data, which involved the utilization of Statistical Package for Social Studies (SPSS) as a tool for data analysis.

In addition, regression analysis was used to identify the factors that have the greatest effect on the success of farmers and other agricultural stakeholders. We built a regression model to predict the amount of money farmers earn by examining factors such as the frequency of their platform usage, the size of their farm, and the ease with which they can access other resources. This helped us determine how each digital platform actually affects the farmer's income. In this research, a regression equation was applied to examine relationships between variables and allow comparisons of responses in inferential statistics, such as analysis of variance (ANOVA) and correlation coefficient.

$Y = \beta o + \beta 1X1 + e$

Whereby;

Y = Digital platforms (e-Kilimo, M-Kilimo)

X1= The profitability and market access of agricultural stakeholders in e-business performanceCapacity

βo = Intercept/Slope

e = Error Term

β1= Regression coefficient

3.10 Ethical Considerations

It is essential to properly credit all sources of information gathered from various sources to uphold ethical standards (Cooper & Schindler, 2023). Before data collection began with regard to the effect of digital platforms (e-Kilimo, M-Kilimo) and the Profitability and market access of agricultural stakeholders in e-business performance, the College of Business Education was requested to provide permission. The researcher implemented requisite measures to avert any harm to individuals or groups during the study's duration.

IV. FINDINGS & DISCUSSION

4.1 Demographic Characteristics of Respondents

This section presents findings about the demographic characteristics of respondents who involved in data collection with regard to the effect of Digital platforms (e-Kilimo, M-Kilimo) and the Profitability and market access of agricultural stakeholders in e-business performance. These demographic characteristics of respondents are gender, education, and working experience. The findings for these background characteristics of respondents are illustrated in Table 2 below.

Table 2

Demographic Characteristics of Respondents

Gender	**Frequency**	**Percentage**
Male	147	37
Female	248	63
Education Level	Frequency	Percentage
Secondary and certificate	124	31.4
Diploma	139	35.3
Degree	85	21.5
Masters & PhD	47	11.8
Experience	Frequency	Percentage
Less than 1years	31	7.8%
1-5 years	171	43.3%
6-10 years	124	31.3%
Over 10 years	70	17.6%

Table 1 show the demographic profile of the respondents in the study with regard to the effect of Digital platforms (e-Kilimo, M-Kilimo) and the Profitability and market access of agricultural stakeholders in e-business performance revealed that the majority of the respondents were male (62.7%) and female were (19.3%). Although the results show some disparities between the male and female respondents, the study was gender representative since both groups were part of the study. The majority of the respondents were diploma holders making a total percentage of 35.3%, the respondents with bachelor qualifications were 21.5%, and the masters were 11.8%. These results indicate that the

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respondents had reasonably good education qualifications and the desired skills and knowledge to deliver in agricultural activities. But secondary and certificate education holders should be given further education to higher level of education as well masters holders. Besides, the respondents were deemed to be able to read, understand the questionnaire and gave appropriate responses. The result indicated that majority of respondents about 70 out of 395 equivalents to 17.6% of all respondents have over 10 years working experience while the other majority of respondents about 124 out of 395 equivalents to 31.3% of all respondents have between 6-10 years working experience while 171 (43.3%) respondents have period between 1-5 years working experience and the remaining 31(7.8%) respondents have less than one (1) years working experience. This implies that majority of respondents have been employed to add power of crops production. An average of work experience is notified here.

4.2 Reliability Test

The reliability of the effect of Digital platforms (e-Kilimo, M-Kilimo) on the Profitability and market access of agricultural stakeholders in e-business performance was assessed using Cronbach's alpha, as presented in Table 3 below.

Table 3

Reliability Test Results

Variable	Items	Cronbach Alpha Coefficient
Digital platforms (e-Kilimo, M-Kilimo)	25	.772

The average value of the Cronbach alpha coefficient for the five variables is 0.879. A Cronbach alpha coefficient of 0.7 or greater signifies reliability. Consequently, it can be inferred that this research employed a reliable questionnaire for data collection with regard to the effect of Digital platforms (e-Kilimo, M-Kilimo) on the Profitability and market access of agricultural stakeholders in e-business performance.

4.3. Descriptive Statistics

4.3.1 Digital Platforms (E-Kilimo, M-Kilimo) and the Profitability and Market Access of Agricultural Stakeholders in E-Business Performance

The study investigate the impact of digital platforms (e-Kilimo, M-Kilimo) on the Profitability and market access of agricultural stakeholders in e-business performance performance. It uses a Likert scale of 1–5, where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree, as presented in Table 4.

Table 4

Digital platforms (e-Kilimo, M-Kilimo) and the Profitability and market access of agricultural stakeholders in e-business performance

No	Statement	1	2	3	4	5	Mean
1	Digital platforms (e-Kilimo or M-Kilimo) improved profitability in agricultural activities.	46.0%	14.1%	13.3%	15%	11.6%	3.990
2	Digital platforms have helped to reach markets beyond usual or local buyers.	21.6%	30.8%	6.6%	20.8%	20.2%	2.84
3	Digital platforms give access to competitive and updated price information.	52.4%	16.2%	10.1%	11.1%	10.2%	4.78
4	Using digital platforms has reduced the cost and time of searching for markets.	54.6%	16.4%	9.1%	10.8%	9.1%	4.04

Regarding the effect of Digital platforms (e-Kilimo, M-Kilimo) on the Profitability and market access of agricultural stakeholders in e-business performance, the study revealed that, cumulatively the majority of (46%) of the respondents strong agreed while 15% disagreed and 14.1% agree. The mean = 3.990 suggested that digital platforms (e-Kilimo or M-Kilimo) have improved profitability in agricultural activities. As to whether digital platforms have helped to reach markets beyond usual or local buyers, responses showed that cumulatively the majority percentage (30.8%) of the respondents agreed while 21.6% strong agreed and 20.2% strong disagreed. The mean = 2.84 suggested that digital platforms have helped to reach markets beyond usual or local buyers. As to whether platforms give access to competitive and updated price information, responses showed that cumulatively the majority percentage (52.4%) of the respondents strong agreed while 16.2% agreed and 11.1% disagree while 10.2% strong disagree. The mean = 1.78 suggested that platforms give access to competitive and updated price information. As to whether using platforms has reduced the cost and time of searching for markets, responses showed that cumulatively the majority (54.6%) of the respondents strong agree while 16.4% agree and 10.8% strong disagree while 9.1% disagree. Therefore, with a average score of 4.04, the

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study found that Digital platforms (e-Kilimo, M-Kilimo) has an influence on the Profitability and market access of agricultural stakeholders in e-business performance.

4.3.2 E-Business Performance

The study assess the e-business performance. It uses a Likert scale of 1–5, where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree, as presented in Table 5

Table 5

E-Business Performance

No	Statement	1	2	3	4	5	Mean
1	Profitability in agricultural activities influences agricultural stakeholders in e-business performance	22.5	35.8	6.6	18.1	20.0	3.34
2	Spread markets beyond usual or local buyers influences agricultural stakeholders in e-business performance	37.5	29.3	4.1	12.5	16.6	3.96
3	Access to competitive and updated price informationinfluences agricultural stakeholders in e-business performance	34.1	30.8	3.4	14.2	17.5	3.70
4	Cost reduction and time of searching for markets influences agricultural stakeholders in e-business performance	21.6	30.8	6.6	20.8	20.2	3.84

Regarding the Profitability and market access of agricultural stakeholders in e-business performance, the study revealed that, Basing on findings, it was established from the respondents in relation to statement profitability in agricultural activities influences agricultural stakeholders in e-business performance, cumulatively the majority percentage (35.8%) of the respondents agreed with 22.5% strong agreed and 20.0% strong disagree. The mean = 3.34 of the responses was close to which corresponded to agree. This suggested that profitability in agricultural activities influences agricultural stakeholders in e-business performance. As to whether spread markets beyond usual or local buyers influences agricultural stakeholders in e-business performance, cumulatively the majority percentage (37.5%) of the respondents strong agreed with 29.3% agreed and 4.1% were neutral and 16.6% strong disagree. The mean = 3.96 was close to meaning that the majority of the respondents agreed with the statement hence this suggested that spread markets beyond usual or local buyers influences agricultural stakeholders in e-business performance. As to whether access to competitive and updated price information influences agricultural stakeholders in e-business performance, cumulatively the majority percentage (34.1%) of the respondents strong agreed with 30.8% agreed and 17.5% strong disagree. The mean = 3.70 was close to meaning that the majority of the respondents strong agreed with the statement hence this suggested that access to competitive and updated price information influences agricultural stakeholders in e-business performance. As to whether cost reduction and time of searching for markets influences agricultural stakeholders in e-business performance, responses showed that cumulatively the majority percentage (30.8%) of the respondents agreed while 21.6% strong agreed and 20.2% strong disagreed. The mean = 3.70 was close to meaning that the majority of the respondents strong agreed with the statement hence this suggested that cost reduction and time of searching for markets influences agricultural stakeholders in e-business performance. Therefore, with a average score of 3.84, the study found that the Profitability and market access in agriculture enhance farmers'stakeholders in e-business performance.

4.4 Inferential Statistics

Correlation Matrix: The study evaluate the correlation between Digital platforms (e-Kilimo, M-Kilimo) and the Profitability and market access of agricultural stakeholders in e-business performance. To answer this question, regression analysis and the Pearson correlation coefficient were used. The findings are presented in Table 6.

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Table 6

Correlation matrix for Digital platforms (e-Kilimo, M-Kilimo) and the Profitability and market access of agricultural stakeholders in e-business performance

		Digital platforms (e-Kilimo, M-Kilimo)	Profitability and market access of agricultural stakeholders in e-business performance
Digital platforms (e-Kilimo, M-Kilimo)	Pearson Correlation Sig. (2-tailed)	1	.812
			.000
	N	395	395
Profitability and market access of agricultural stakeholders in e-business performance	Pearson Correlation	.812	1
	Sig. (2-tailed)	.000	
	N	395	395

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

The results show that the correlation coefficient is 0.812 and its significance level 0.000. This implied that digital platforms (e-Kilimo, M-Kilimo) has a positive significance on the profitability and market access of agricultural stakeholders in e-business performance. According to the results there is a positive significant effect of digital platforms (e-Kilimo, M-Kilimo) on the profitability and market access of agricultural stakeholders in e-business performance. Therefore, the alternative hypothesis that was earlier postulated is accepted.

Regressiion Model for Digital platforms (e-Kilimo, M-Kilimo) have an effect on the Profitability and market access of agricultural stakeholders in e-business performance. The findings are presented in model summary in Table 7.

Table 7

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.812 [a]	.659	.654	.048939

a. Predictors: (Constant), digital platforms (e-Kilimo, M-Kilimo)

Table 7 provides the R and R2 value. The R value is 0.812, which represents the simple correlation and, therefore, indicates a moderate degree of correlation. The R2 value 0.659 correspondeds to 65.9% indicates how much of the dependent variable profitability and market access of agricultural stakeholders in e-business performance can be explained by the independent variable digital platforms (e-Kilimo, M-Kilimo). The standard error of the estimate is .048939 and the adjusted R square value is 0.654. Therefore, the adjusted square value of 0.654 correspondeds to 65.4% implied that the digital platforms (e-Kilimo, M-Kilimo) predict the profitability and market access of agricultural stakeholders in e-business performance; in other words, the profitability and market access of agricultural stakeholders in e-business performance is dependent on digital platforms (e-Kilimo, M-Kilimo) by 65.4%.

Analysis of Variance for Digital platforms (e-Kilimo, M-Kilimo) have an effect on the Profitability and market access of agricultural stakeholders in e-business performance. The findings are presented in Table 8.

Table 8

ANOVA [b]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	1.784	1	1.784	7.450	.007 [a]
Residual	27.303	394	.240		
Total	29.087	395			

a. Predictors: (Constant), Digital platforms (e-Kilimo, M-Kilimo)

b. Dependent Variable: Profitability and market access of agricultural stakeholders in e-business performance

These are the degrees of freedom associated with the sources of variance. The total variance has N-1 degrees of freedom. The Regression degrees of freedom correspond to the number of coefficients estimated minus 1. Including the intercept, there are 1 coefficients, so the model has 395-1=394 degrees of freedom. The error degree of freedom is the DF total minus the DF model, 395-1=394. Mean Square are the Mean Squares, the Sum of Squares divided by their respective DF. The F-statistic is the Mean Square (Regression) divided by the Mean Square (Residual) 1.784/.240= 7.450. The p-value is compared to some alpha level in testing the null hypothesis that all of the model coefficients are

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0. The full model is not statistically significant (F = 7.450, df = 395, 1, sig.= .007), even though profitability and market access of agricultural stakeholders in e-business performance was statistically significant (p>.05) by itself. The value for this table had total degrees of freedom of 395 because four observations had missing data and were not included in the analysis. The other degree of freedom corresponds to the intercept (constant) of the regression line. F-Statistics is 7.450, given the strength of the correlation; our model is statistically significant (p > .0005). In summary, the respondents were asked to give their summary opinions about digital platforms (e-Kilimo, M-Kilimo). Several responses indicated that the digital platforms (e-Kilimo, M-Kilimo) are of challenges in use for profitability and market access of agricultural stakeholders in e-business performance.

Correlation matrix: The study evaluate the Profitability and market access of agricultural stakeholders mediates the relationship between digital platforms and e-business performance. To answer this question, regression analysis and the Pearson correlation coefficient were used. The findings are presented in Table 9.

Table 9

Correlation Matrix for Profitability and Market Access of Agricultural Stakeholders mediates the relationship Between Digital Platforms and E-Business Performance

		Profitability and market access of agricultural stakeholders	**The relationship between digital platforms and e-business performance**
Profitability and market access of agricultural stakeholders	Pearson Correlation Sig. (2-tailed)	1	.812
			.000
	N	395	395
The relationship between digital platforms and e-business performance	Pearson Correlation	.812	1
	Sig. (2-tailed)	.000	
	N	395	395

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

The results show that the correlation coefficient is 0.812 and its significance level is 0.000. This implies that profitability and market access of agricultural stakeholders mediates the relationship between digital platforms and e-business performance.

Rgression Model: Model Summary for profitability and market access of agricultural stakeholders mediates the relationship between digital platforms and e-business performance. The findings are presented in model summary as in Table 10.

Table 10

Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.812 [a]	.659	.654	.048939

a. Predictors: (Constant), Profitability and market access of agricultural stakeholders

Table 10 provides the R and R2 values. The R value is 0.812, representing a moderate degree of correlation in the simple correlation. The R2 value of 0.659 indicates how much of the dependent variable, the relationship between digital platforms and e-business performance, can be explained by the independent variables of profitability and market access of agricultural stakeholders in e-business performance. The standard error of the estimate is 0.048939, and the adjusted R square value is 0.654 corresponds to 65.4% implies that profitability and market access of agricultural stakeholders mediates the relationship between digital platforms and e-business performance. In other words, the relationship between digital platforms and e-business performance is mediated by the dependent variables of profitability and market access of agricultural stakeholders in e-business performance.

Analysis of Variance for Profitability and market access of agricultural stakeholders mediates the relationship between digital platforms and e-business performance. The findings are presented in model summary as in Table 11.

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Table 11
ANOVA [b]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	1.784	1	1.784	7.450	.007 [a]
Residual	27.303	55	.240		
Total	29.087	56			

a. Predictors: (Constant), Profitability and market access of agricultural stakeholders
b. Dependent Variable: The relationship between digital platforms and e-business performance

These are the degrees of freedom associated with the sources of variance. The total variance has N-1 degrees of freedom. The Regression degrees of freedom correspond to the number of coefficients estimated minus 1. Including the intercept, there are 1 coefficients, so the model has 395-1=394 degrees of freedom. The error degree of freedom is the DF total minus the DF model, 395-1=394. Mean Squares are the Sum of Squares divided by their respective DF. The F-statistic is the Mean Square (Regression) divided by the Mean Square (Residual) 1.784/0.240=7.450. The p-value is compared to some alpha level in testing the null hypothesis that all of the model coefficients are 0. The full model is not mediated by profitability and market access of agricultural stakeholders in e-business performance (F=7.450, df=395, 1, sig.=0.007), even though the relationship between digital platforms and e-business performance was mediated by profitability and market access of agricultural stakeholders in e-business performance by ($p>0.05$). The value for this table had total degrees of freedom of 395 because four observations had missing data and were not included in the analysis. The other degree of freedom corresponds to the intercept (constant) of the regression line. F-Statistics is 7.450, given the strength of the correlation; our model is mediated by profitability and market access of agricultural stakeholders in e-business performance ($p>0.05$). Responses indicated that the profitability and market access of agricultural stakeholders mediates the relationship between digital platforms and e-business performance.

The researchers determined that a proficient exchange of knowledge among various stakeholders in the application of digital platforms enhance the profitability and market access of agricultural stakeholders in e-business performance, ultimately leading to increased productivity within the farming community. Digital transformation appears promising and is changing all aspects of life across various disciplines, leading to new business models, services, and products. The use of digital technology in agriculture helps address the challenge of food insecurity in a rapidly growing global population while smallholder farmers were mainly observed in the aspect of reduction in post-harvest losses of which the application of farmers with extensive experience in traditional markets farming is exist. The literature analysis has shown that sustainable agriculture is a reality through digital technology and services.

4.5 Discusion

Digital platforms are now crucial for connecting various players in the global agricultural sector. In Europe and Asia, e-marketplaces and farm management systems play a significant role in enhancing performance of farmers (Hrustek et al., 2022). Digital platforms with agro-food supply chain integration (ASCI) plays a growingly important role in the stable and sustainable development of agriculture. However, it is challenging for core firms to integrate the small-scale and scattered farmers due to complex digital transaction processes and volatile relationships in agricultural product and service (Toepfer et al., 2020).

These kinds of platforms help agricultural players work together more effectively and make better decisions. Platforms like M-Farm demonstrate the potential for mobile technology to connect farmers directly with buyers and service providers, eliminating the need for intermediaries and enhancing efficiency. Nevertheless, a common limitation of these platforms is their narrow focus on particular issues, such as price alerts or input supply, which hinders their ability to fully integrate all stakeholders (Choruma et al., 2024) Th online platforms in agricultural operation, mobile applications are enhancing farmers' ability to negotiate better deals and ultimately increasing their earnings (Mittal & Mehar, 2016). Thiele et al (2011) stated that value chains linked to urban markets and agro-industry present new opportunities for adding value and raising rural incomes. The report explores how multi-stakeholder platforms have been used to address these problems in potato-based value chains by combine financial services, advice, and access to markets. These have helped farmers increase their income.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

The study concluded that digital platforms (e-Kilimo or M-Kilimo) have improved profitability in agricultural activities, digital platforms have helped to reach markets beyond usual or local buyers. Digital platforms give access to competitive and updated price information and using platforms has not reduced the cost and time of searching for markets. The study also concludes that the digital platforms (e-Kilimo, M-Kilimo) with correlation coefficient 0.812

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and its significance level 0.007, the standard error of the estimate .048939 and the adjusted R square value 0.654 has a positive significance on the profitability and market access of agricultural stakeholders in e-business performance. The profitability and market access of agricultural stakeholders in e-business performance is dependent on digital platforms (e-Kilimo, M-Kilimo) in agricultural activies.

5.2 Recomendations

The study recommends that company/organization management and stakeholders should observe undertake proper digital platforms (e-Kilimo or M-Kilimo) that improve profitability in agricultural activities which helps to reach markets beyond my usual or local buyers. There is need to take into consideration of platforms that give access to competitive and updated price information which reduced the cost and time of searching for markets. This action should take the timely market price updates from platforms which are share reliable and accurate information to farmers, suppliers, buyers, and other actors.This facilitate better collaboration and knowledge sharing within my agricultural cooperative or farmer group and create an integrated and interconnected agricultural value chain in a country.

Declaration of Interest

The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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