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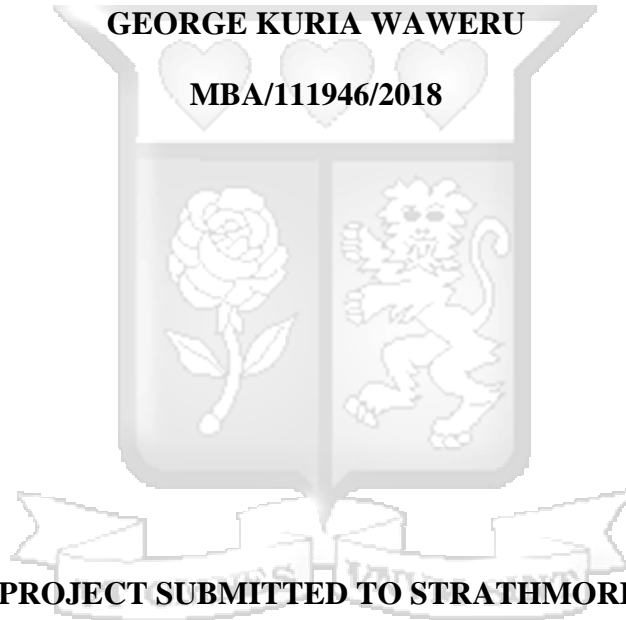
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**FACTORS INFLUENCING THE UPTAKE OF ONLINE DISTRIBUTION  
PLATFORMS AMONG HORTICULTURE PRODUCERS AND EXPORTERS IN  
KENYA**

**GEORGE KURIA WAWERU**

**MBA/111946/2018**



**A RESEARCH PROJECT SUBMITTED TO STRATHMORE UNIVERSITY  
BUSINESS SCHOOL IN THE PARTIAL FULFILMENT OF THE REQUIREMENTS  
FOR THE AWARD OF A MASTER OF BUSINESS ADMINISTRATION (MBA)  
DEGREE**

**MARCH 2023**

## DECLARATION

### Declaration

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the dissertation contains no material previously published or written by another person except where due reference is made in the dissertation itself.

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George Kuria Waweru

March 2023

### Approval

The dissertation of George Kuria Waweru was approved by the following:

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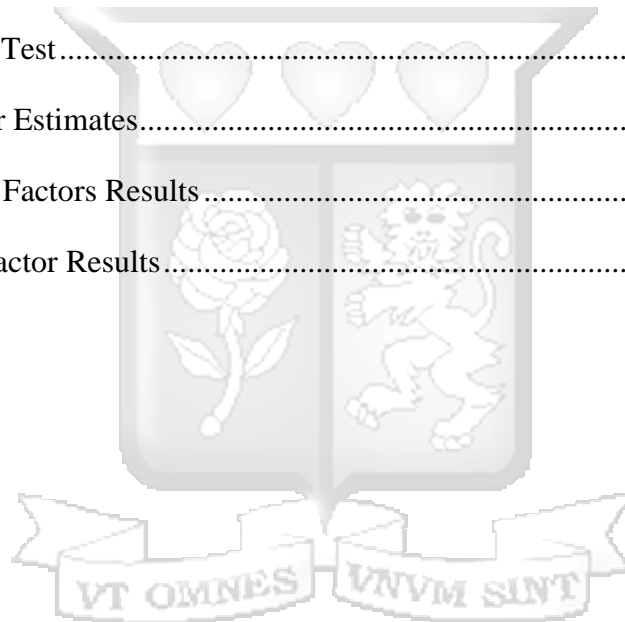
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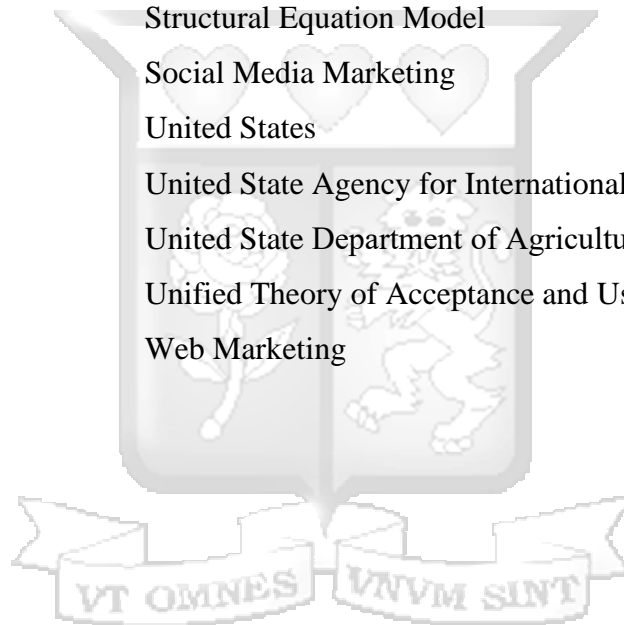
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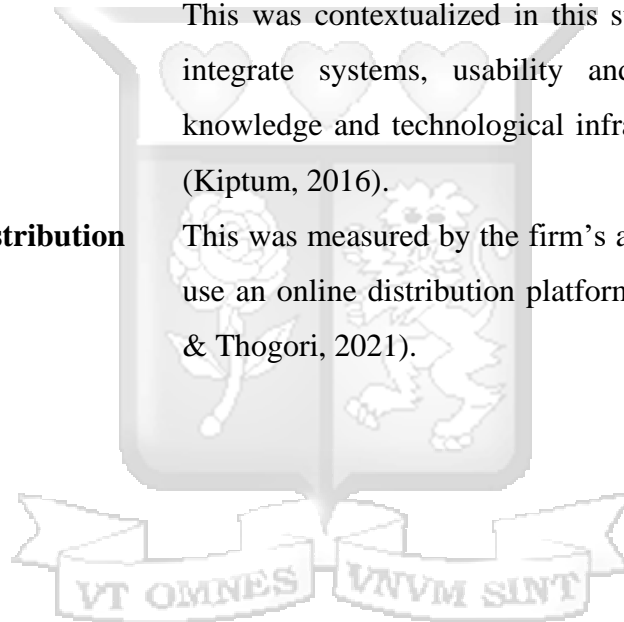
## LIST OF ABBREVIATIONS

<b>B2B</b>	Business to Business
<b>COLEACP</b>	Europe-Africa-Caribbean-Pacific Liaison Committee
<b>EC</b>	Environment Context
<b>EU</b>	European Union
<b>FFP</b>	Fresh Fruits and Vegetables
<b>ICT</b>	Information Communication Technology
<b>IV</b>	Instrument Variable
<b>LFMPS</b>	Local Food Marketing Practices Survey
<b>OC</b>	Organizational Context
<b>PSM</b>	Propensity Score Matching
<b>SEM</b>	Structural Equation Model
<b>SMM</b>	Social Media Marketing
<b>US</b>	United States
<b>USAID</b>	United State Agency for International Development
<b>USDA</b>	United State Department of Agriculture's
<b>UTAUT</b>	Unified Theory of Acceptance and Use of Technology
<b>WM</b>	Web Marketing



## DEFINITION OF TERMS

<b>Market factors</b>	This was assessed in the research as the access to new markets, market information, extension services and supplier network (Mengistu, Simane, Eshete, & Workneh, 2016).
<b>Online distribution platforms</b>	Online distribution platforms form part of a group of technologies that facilitate efficient business transactions over the internet (Eid & Trueman, 2014).
<b>Resource factors</b>	This refers to the firm's financial capacity, access to credit, physical resources and human resources (Penttinen, Halme, Lyytinen, & Myllynen, 2018).
<b>Technology factors</b>	This was contextualized in this study as the ability to integrate systems, usability and support, technical knowledge and technological infrastructure of the firm (Kiptum, 2016).
<b>Uptake of online distribution platforms</b>	This was measured by the firm's ability to use or not to use an online distribution platform (Muigai, Gathungu, & Thogori, 2021).



## ABSTRACT

In Kenya, the agricultural value chain has been negatively affected by the low digital literacy levels among small-scale farmers which have resulted in low adaptation and integration of modern technologies. Despite several studies focussing on the adoption of technology in agricultural activities, there has been minimal investigation of the uptake of distribution platforms such as Twiga foods which link farmers to the consumer thus eliminating the middlemen which is key to enhancing the benefits to farmers. This study focused on conducting an analysis of the factors affecting the uptake of online distribution platforms among horticulture producers and exporters in Kenya. The study specific objectives evaluated the effect of technological factors, market factors and resource factors on the uptake of online distribution platforms among horticulture producers and exporters in Kenya. The study was grounded on the technology acceptance model. The research adopted a positivist philosophy with a quantitative research design utilized in guiding the examination of the relationship between the research variables. The study population was the 36 operating in the Flower Member Company and 136 firms in the Fruits & Vegetables Company. The study conducted a survey among a sample of 122 firms that are currently registered by horticulture producers and exporters in Kenya. The research obtained a response rate of 85% which was considered adequate representation for the overall research; hence was used in the current survey. The findings revealed that 54% (n= 56) were using the platforms with 46% not using any online distribution platforms. The results showed that 28% very often used the platforms, 43% used the platform sometimes. The regression findings led to the conclusion that the uptake of online distribution platforms among horticulture producers and exporters is determined by technological, market and resource factors. Separately, market and resource factors have a significant and positive effect on the uptake of online distribution platforms among horticulture producers and exporters, while technological factors had a negative and insignificant effect. The study recommends increasing safety measures to ensure that customers data is protected and secure. With assured safety of their personal information, farmers uptake into online distribution systems will increase. The study recommended that the online distribution platforms should diversify their services offering to increase the uptake levels. The study further recommended increased market training and integration for the users of the online distribution platforms. With focused training on the market and its characteristics, farmers will appreciate the use of the platform and increase their uptake.

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background to the Study

Digital technologies, including the mobile technologies, apps and devices connected to the internet, digitally-delivered services and data analytics are rapidly transforming business transactions and they can support agricultural trade by connecting farmers to new markets, suppliers and even international markets (Krell, et al., 2020). According to Petcho et al. (2019), they are also important sources of information on market demands, weather information as well as emerging agricultural practices and technologies. Nwafor, Ogundeji and van der Westhuizen (2020) provide evidence that where ICTs are utilized in farming, farmers can access important agricultural information, weather patterns, and price information, guaranteeing market participation among small-holder farmers-these have significant impacts on farmer productivity. However, small-scale farmers encounter significant challenges and barriers to adopting digital technology (Smidt & Jokonya, 2022).

Ravis and Notkin (2020) reveal that agribusiness technologies such as online distribution platforms contribute to the agribusiness value chain by boosting connectivity of all actors across the agrifood system. In the United States, for instance, marketing platforms do not just serve to facilitate productivity, but are also key to enabling transparency through real-time, automated data collection and analysis (Kos & Kloppenburg, 2019). According to Han, Xiong, and Zhao (2021), digital agriculture was key to increasing the resilience of farmers in developing economies amid the under the public health crisis created by the COVID-19 pandemic, facilitating contact-less transactions and agri-extension services. Farmer-specialized platforms and applications promise to increase farmer's productivity and returns by significantly reducing farming as well as marketing costs (Dormido & Malicdem, 2019). Ejemeyovwi and Osabuohien (2020) aver that in India and, West Africa and Sub-Sahara Africa, the transmission of agricultural information through mobile technologies has seen yields increase by 4%.

Despite its clear benefits, digitalization has previously been associated with a "digital divide", and in agriculture, this may emerge between large farms and small farms which may be unable to obtain and utilize modern agricultural technology effectively. According to Awotide, et al. (2016), small-scale farmers are outcompeted as they cannot make large investments in digital

agricultural technology. Further, the study by Kondratieva, et al. (2020) also shows limited adoption of digital technologies by small-scale farmers in developing economies, despite industry 4.0 tools being utilized extensively in agricultural production in developed countries. Research on technology uptake shows while farmers in developed economies rely on complex interconnected technologies (eg big data), small scale farmers in developing economies use communication tools to mainly access market and seed information. Kos and Kloppenburg (2019) identify challenges associated with limited access to these technologies and new power relations around access, use and control of data.

The horticultural sub-sector is made up of vegetable, flower, fruit, nut and medicinal and aromatic plant farming (Jaskani & Khan, 2021), contribution to 3.9 percent of China's agriculture GDP and 3 percent of US GDP. In India, although accounting for only 8.5 percent of cropped land, the horticultural subsector contributes to 30 percent of the country's GDP (World Bank, 2022). African horticulture industry grew nine-fold from US\$ 1.26 billion (2.5% share of world fruit and vegetable trade) in 2001 to US\$ 12.36 billion (8.3% share of world trade) in 2012 (International Trade Centre, 2017). Van den Broeck, et al. (2018) showed how increased horticulture exports contribute to the capacity to import food and reduces the probability of self-reported food insecurity, improves the quality of food consumption, and shortens the hunger season in Ghana.

In Kenya, the horticultural subsector is the largest agriculture sub-sector, contributing 33% of the country's agricultural GDP (Samoei & Kipchoge, 2021). Aside from creating direct and indirect employment to more than 8 million Kenyans, the horticultural sub-sector contributes significantly to food security, nutrition and health. Growth in the subsector has been associated with improved livelihoods in rural areas and empowerment of women, especially in marginalized areas (Ochilo, et al., 2019). Hoang (2020) avers that utilizing mobile phone innovations to provide customized agricultural information and services in sub-Saharan Africa (SSA) remains largely untapped. Van den Broeck and Maertens (2016) affirm that adoption is especially slow in rural Africa.

Research on online distribution platforms is especially lacking, despite their rise in development in the last decade (Omulo & Kumeh, 2020). Exploration into the drivers of adoption of agricultural marketing technologies are limited, despite products' marketing being as essential to farmers as the production and harvesting stage (Beriya, 2020). This dearth of information on agricultural technologies' adoption extends to the horticultural subsector; one of the key subsectors under the 'agriculture sector' umbrella. Elijah, et al. (2018) researched

on the challenges in the deployment of Internet of Things (IoT) in agriculture and reported business, technical, and sectoral in addition to cost and social issues. Identified challenges were related to cost, technical knowhow, lack of ICT information, inter-operability challenges, security and regulatory challenges. Hoang (2020) found high cost, lack of knowledge and poor internet connectivity was hindering the adoption of mobile marketing applications by fruit farmers in Vietnam. In Kenya, Omulo and Kumeh (2020) assert that despite the cost-saving and efficiency promise offered by mobile-based extension, relative to traditional extension approaches, there is little information on their contribution.

### **1.1.1 Factors Affecting Uptake of Online Platforms**

In the modern economy, information technologies (ITs) are widely regarded as essential tools in the pursuit for competitiveness, whether in the context of a country, a business or individual level. However, according to Hartmann, Nduru and Dannenberg (2021), IT effectiveness can only be realized when the technologies become widely spread and utilized. In the agricultural sector, ITs are not only useful as tools for information dissemination, they also increase knowledge by providing for newer, more effective ways to provide extension services (Adebayo, Olagunju, & Ogundipe, 2016); and according to Skare and Soriano (2021) are playing a key role in the integration of small scale farmers into international markets. However, the uptake of information technologies in Africa has been slow. Wyche and Steinfield (2016) confirm these findings, asserting that farmers in rural Kenya rarely use cell phones to carry out simple tasks such as access market prices. Moreso, Hartmann, et al. (2021) aver that most arrangements between smallholders and exporters occur through analogue channels.

There is a significant body of literature study models and determinants of technology adoption, and one thing seems certain, the motivating factors for consumers vary significantly from those of firms (Forman, Goldfarb & Greenstein, 2018). Skare and Soriano (2021) note that for individuals, technology adoption is a complex social and developmental process that is influenced by a host of individual as well as external constructs. Miranda, Farias, de Araújo Schwartz and de Almeida (2016) add that technology adoption decision is highly influenced by diffusion factors such as channels of communication and other market pressures. In Greece, the lack of awareness of mobile agricultural apps was the reason for low adoption (Costopoulou, Ntaliani, & Karetsos, 2016). According to Straub (2009), understanding technology adoption requires one to address emotional, cognitive as well as contextual concerns.

Various theories have been proposed to explain technology adoption decisions including Davis's (1986; 1989) technology acceptance model (TAM), Ajzen's (1985) theory of planned behaviour (TPB), Venkatesh et al.'s (2003) unified theory of acceptance and use of technology (UTAUT), Rogers' (1995) diffusion of innovations (DOI) and Tornatzky and Fleischer's (1990) TOE framework. However, while the DOI and TOE theories explain firms' adoption decisions, the TAM, TPB and UTAUT explain adoption decisions at the individual level.

According to Davis (1989) TAM, the intention to use technologies is influenced by the technologies' perceived usefulness and its ease of use. The theory asserts that acceptance is dependent on the potential user's evaluation of the technology and their perceptions of its functionality after use. This theory fails to explain why certain technologies get accepted prior to their introduction into the market. Ajzen's (1985) TPB builds upon this theory and explains that behavioural intention is a function of the users' attitude towards the behaviour, subjective norms and the user's perceived level of control. Ajzen's (1985) incorporates self-conceived perception as well as external influences. Arzen (1985) thus attribute adoption intentions to the individual's perception of the ease of use and importance of a new technologies, pressures from like-minded people, social support as well as the ease of continuing to engage in the identified behaviour.

While these theories have been extensively used to explain individual adoption decisions (Swani, 2021; Giampietri & Trestini, 2020), they fail to advance adoption decisions for individuals engaging in business. Rogers (1995) built upon these theories and incorporates the competitive advantage offered by technologies. According to Rogers (1995), the degree of acceptance of new innovations is influenced by the technologies' relative advantage, compatibility, complexity, trialability and observability. Empirical evidence points to factors such as the influence of top management support, perceived usefulness, and competitive pressure (Swani, 2021), ease of use and competitive advantage (Ritz, Wolf, & McQuitty, 2019), technology readiness (Hallikainen & Laukkanen, 2016). Vilas, et al. (2020) associated digital platform adoption with awareness, past experience, and access to complementary services such as internet connectivity.

In an assessment of regulatory environment, Fabregas, Kremer and Schilbach (2019) showed increased adoption of marketing applications after regulatory developments surrounding user data sharing and security. Dhaygude and Chakraborty (2020) links mobile application adoption with access to smart phones, digital literacy levels, trust, peer and family influence, in addition to the platforms' accessibility features. Kumar, Engle and Tucker (2018) assert that an

individuals' propensity to embrace and use new technologies can be condensed into technology, market, and economic factors while Gunathilaka (2017) revealed that the degree of government support, perceived benefits the user's computer literacy and technology infrastructure impact mobile technology adoption. Diaz et al. (2021) report that market factors (extension services, information awareness), technology factors (complexity, ease of access) as well as resource factors (financial, compatibility) all influence farmers' willingness to adopt a mobile app in the marketing of bamboo products. This study will rely on these metrics in examining the factors that influence uptake of online distribution platforms among horticultural farmers.

### **1.1.2 Online Distribution Platforms**

A distribution channel refers to a set of intermediaries through which a good or service passes before reaching the final buyer or end consumer. Online distribution platforms are part of a group of technologies that facilitate efficient business transactions over the internet (Eid & Trueman, 2014), and they enable businesses to buy and sell goods electronically using the internet and other digital telecommunication technologies such as mobile phones (Ocloo, et al., 2020). Okon and Ezike (2017) defines online distribution platforms as interactive platforms that allow or provide individuals with the convenience of making selections and purchases through the internet. They enable clients to place orders, request for trades, receive price information, market related news as well as evaluate bids in real-time through the internet, and sellers to view market information, user bids and to accept payments (Costopoulou, Ntaliani, & Karetos, 2016). Online distribution platforms can be in the form of websites, mobile or computer applications and they facilitate consumer interaction through content creation and sharing .

Online platforms have transformed how businesses carry out transactions by enabling consumers and businesses to visit online stores, locate and select products or services, pay for them through cash transfer, credit cards, or cash on delivery options (Langat & Gachunga, 2014). Platforms such as Facebook, Amazon, Netflix, WhatsApp, Uber, and Airbnb have fundamentally reshaped markets, and subsequently become some of the most valuable companies in history. Distribution platforms have three typical characteristics; they connect multiple types of users (B2B software solutions and B2C and B2B2C digital service solutions), they generate value through network effects, and depend on varying degrees of digitization (Gawer, 2021). Hsieh and Wu (2019) opine that digital platforms can be categorized into transaction and innovation platforms. Transaction platforms act as intermediaries for direct

exchange of goods or services, while innovation platforms provide the technological foundation on which third parties can develop their own digital products and services (Hsieh & Wu, 2019).

Shakhovskoy, Saab and Colina (2021) show that despite significant acceptance of similar platforms in other industries, the agricultural sector lags behind that in other sectors by up to two decades in terms of digital technologies' adoption. This study seeks to assess transaction platforms and the factors that influence farmers to adopt them in marketing horticultural produce. Digital platforms such as m-Kulima, izyshop, BigHaat, weFarm, Twiga Foods and Tulaa and others enable farmers and buyers to connect, formalizing agricultural value chains (Rishi, 2019). Previous research on adoption of digital platforms measured platform utilization by inquiring respondents on the frequency of the use of platforms to advertise their products; communicate with end-consumers; and accept payments (Park, Kim, Jeong, & Minshall, 2021). Similarly, in assessing factors affecting consumer's use of mobile banking services, Khraim, Al Shoubaki and Khraim (2011) sought after the frequency of use of mobile phones to carry out financial transactions and mobile banking. This study will adopt similar measures and enquire about farmers' willingness and frequency of using digital platforms to access market information, market their products and complete financial transactions.

### **1.1.3 Horticulture Producers and Exporters in Kenya**

The Horticulture industry trades in five main commodities; vegetables, flowers, fruits, nuts and medicinal and aromatic plants (Dormido & Malicdem, 2019). Kenya's horticultural sector (defined here to include fruit and vegetable production and marketing, but not flowers) has received a great deal of attention over the past decade due to the rapid and sustained growth of its exports to Europe (Krishnan & Foster, 2018). In Kenya, horticulture plays a vital role in development given the adaptability of a wide range of crops to many agro-ecological zones in the country (Dijkstra, 2018). It is an important source of livelihood (including, income and employment) for over 2.5 million people either directly or indirectly (Kanyua, 2020). The European Union- EU is Kenya's most important trading partner for horticultural produce and accounts for over 75 percent of horticultural exports (Koech, 2015). Over 90% of smallholders in Kenya produce horticultural commodities in all regions of Kenya (apart from arid regions) but only fewer than 2% do so directly for export (Koech, 2015).

Horticulture is among the largest contributors of foreign exchange earnings in Kenya topping to around 150 billion in the last financial year. The industry also directly contributes to 0.35

million jobs and supports the livelihoods of more than 6 million Kenyan households (Fresh Produce Exporters Association of Kenya , 2021). In Kenya, only 4% of all the horticultural produce (Fruits and Vegetables) is being exported while 96% is being consumed locally. Among horticultural producers, flowers are the most exported, followed by fruits then vegetables. Export has fluctuated in recent years, with the Fresh Produce Exporters Association of Kenya (2021) reporting a decrease in exports in 2019 and 2020. More so, with the Covid pandemic, the industry has faced a drastic change in their performance with exports standing at 151 billion Kenyan shillings with flowers earning 108 billion, Fruits 18 billion, and vegetables earning 24 billion, lower than the previous years.

Research establishes a positive relationship between the use of digital platforms, agricultural outcomes and farmers' income. Gruchmann, et al. (2019) study concluded that b2b distribution platforms had improved supply chain coordination and professionalized food distribution. India's Fu and Akter (2016) report that upon extending agricultural services to mobile phones, the amount, quality and speed of produce delivery improved significantly and farmers were more knowledgeable and aware of new agricultural practices and were more inspired to utilize new technologies in the future and access credit. Issahaku, Abu and Nkegbe (2018) showed how phone ownership and usage impacts productivity of Ghanaian farmers, reporting phones facilitated farmers' to access extension services, marketing platforms, and market participation. Adebayo, Olagunju and Ogundipe (2016) provide evidence that agricultural innovations significantly improve farmers' livelihoods and quality of agricultural produce. In Kenya, Rademaker, et al. (2016) reported that distribution platforms create business-to-business value chains which have improved productivity and returns in the dairy market.

However, according to Goedde, Ooko-Ombaka and Pais (2019), Africa is yet to realize the full potential of its agricultural sector, arguing for private sector involvement to find practical solutions to enter and grow in the continent's agricultural sector. Limited access to capital, lack of information on available technologies, lack of technical competency, low availability of associated infrastructure and lack of awareness on internet marketing and internet marketing business models are among the challenges facing adoption of online marketing platforms. Krone, Dannenberg and Nduru (2016) determined that incorporating emerging technologies has significantly improved access to simple and complex knowledge on farm management and led to development of business linkages. This study analysed the factors that influence uptake of online distribution platforms among horticulture farmers registered under the Fresh Produce Exporters Association of Kenya (2021). The institution has registered 173 firms up to date.

## 1.2 Statement of the Problem

Innovation and adoption of technological inventions are inevitable among farmers (Mgendi, Shipping, & Xiang, 2019). The adoption of emerging technologies in the agricultural sector is key to addressing the challenges of linking the producers and consumers within the market (Kinai, 2018). Online distribution platforms are a relatively new concept in the Kenyan agricultural market and many farmers are considering their adoption due to the competitiveness it offers the farmers (Channa, et al., 2019). In Kenya, the agricultural value chain has been negatively affected by the low digital literacy levels among small-scale farmers which have resulted in low adaptation and integration of modern technologies (Koyi & Wakhungu, 2018). Despite several studies focussing on the adoption of technology in agricultural activities, there has been minimal investigation of the uptake of distribution platforms such as Twiga foods which link farmers to the consumer thus eliminating the middle-men which is key to enhancing the benefits to farmers (Bright, 2019). This study focused on the factors affecting the uptake of online distribution platforms with a specific interest in horticulture producers and exporters in Kenya.

In Italy, Vecchio, De Rosa, Adinolfi, Bartoli and Masi (2020) determined that farmer adoption was dependent on awareness, knowledge and product factors. Thileepan and Sundararajan (2014) examined the application of E-Marketing for Self Help Group's agricultural products in India and revealed that utilization of e-marketing has fostered the level of market accessibility, income for the farmers, and increased trust among all parties in the agriculture industry. This study looked at SHG involvement in agriculture while our study reviewed on individual farmers. Waghulkar, et al., (2017) conducted a feasibility study for online marketing of Agricultural Greenhouse Products and found out that online marketing was affordable to most farmers. Further, they indicated that operational capability and resource availability affected the online marketing of agricultural products. Mwangi, Cheron, and Kanyaru (2021) revealed that the formation of Tea farmer groups improved the utilization of social capital and digital technologies which improved access to marketing information and enhanced marketing channel selection. Koech (2015) indicated that the utilization of influencers in marketing had a significant impact on farmer's knowledge and market access.

Rishi (2019) noted that in Kenya, despite the volume of farm and farmer data generated by digital agriculture tools, data sharing for farmer financial inclusion generally remains fragmented and limited. Further, Krone, Dannenberg and Nduru (2016) provide evidence that most small scale farmers were not involved in digital platforms designed to support their

productivity. Due to their potential to influence small scale farmer productivity, there is a need to explore the factors affecting the adoption of these digital agricultural tools. The above studies have not focussed directly on the adoption of distribution platforms such as Twiga foods among horticulture producers and exporters in Kenya. To bridge this gap the current study analysed the factors affecting the uptake of online distribution platforms among horticulture producers and exporters in Kenya.

### **1.3 General Objective**

The main objective of this study was to analyse the factors affecting the uptake of online distribution platforms among horticulture producers and exporters in Kenya.

#### **1.3.1 Specific Objectives**

- i. To determine the influence of technology factors on the uptake of online distribution platforms among horticulture producers and exporters in Kenya.
- ii. To analyse the effect of resource factors on the uptake of online distribution platforms among horticulture producers and exporters in Kenya.
- iii. To determine the influence of market factors on the uptake of online distribution platforms among horticulture producers and exporters in Kenya.

#### **1.4 Research Questions**

- i. To what extent do technology factors influence the uptake of online distribution platforms among horticulture producers and exporters in Kenya?
- ii. What is the effect of resource factors on the uptake of online distribution platforms among horticulture producers and exporters in Kenya?
- iii. To what extent do market factors influence the uptake of online distribution platforms among horticulture producers and exporters in Kenya?

#### **1.5 Scope of the Study**

The conceptual scope of the study sought to identify the influence of technological factors, market factors, and resource factors on the uptake of online distribution platforms among farmers in Kenya. The theoretical scope of the study was grounded on the diffusion of innovation theory. The methodological scope was quantitative in nature with the population of the study drawn from the firms registered Fresh Produce Exporters Association of Kenya who is the main horticulture producers and exporters in Kenya. The time scope of the research was between August to September 2021.

## **1.6 Significance of the Study**

### **1.6.1 To Policy Makers**

The results of this study will also be important to policy makers and regulators in the agricultural and telecommunications' sector. Its recommendations will enable the management to formulate better policies that would guide the development of a stable regulatory system that would increase farmer's confidence in utilizing emerging business-to-business technologies. The study results will provide the government and relevant policymakers with information that will enable the establishment of legislation and systems that support the incorporation and use of online distribution platforms by small scale farmers to enhance their market base. Policies encouraging platforms development and marketing would be key to increasing farmer involvement in online distribution platforms.

### **1.6.2 To horticulture farmers**

The findings of this study were beneficial to horticulture producers and exporters in Kenya as it will help the management in identifying the various factors the firm can take into consideration to drive increased uptake of their distribution platform. The findings will also provide information to farmers on the various ways they can incorporate technology in order to improve their operations. Further, the study will provide more knowledge on the factors that affect the uptake of online distribution platforms among farmers.

### **1.6.3 To Scholars**

This study will investigate the factors that influence uptake of online distribution platforms. It will add to the empirical research on the determinants of new products' uptake by farmers, a variable that has rarely been investigated in relation to the agricultural sector. It will also make theoretical contributions by expanding components in the TAM framework.

## **1.7 Chapter summary**

This chapter introduced the study's main concepts which include the factors affecting digital platforms' uptake, the concept of digital platforms and horticultural farming in Kenya. The chapter also includes the study's problem statement, research questions, scope of the study as well as the study's significance to various stakeholders.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Introduction

The second chapter of the research focused on the review of the theory informing the study as well as the empirical literature. Further, the chapter presented the research gaps and the conceptual framework.

#### 2.2 Theoretical Review

This study was grounded on Davis (1989) Technology Acceptance Model (TAM) and complemented by components in Venkatesh and Davis (2000) to TAM 2 model. The model will test multiple constructs that fall under the umbrella of technology, resource and market factors, and their influence on the uptake of online distribution platforms.

The Technology Acceptance Model (TAM) was designed by Fred Davis (1989) to assess the adoption of new technology based on user attitudes. This theory was formulated to provide a way for innovators to predict whether or not targeted individuals would accept a new technology (Kabbiri et al. 2018). Previous theories seeking to examine the drivers of technology uptake were Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA) which explained adoption behavior from a social psychology point of view, identifying attitude and social pressure as the main drivers of behavioral intent. Ajzen (1991) expanded the TRA in 1991 to the Theory of Planned Behavior to address the limitations of TRA which did not address situations in which individuals have no control over, adding perceived behavioral control as another determinant of actual behavior. Davis's (1986) TAM has explained technology adoption behavior across a variety of workplace situations, and its main constructs are perceived usefulness, and perceived ease of use.

The TAM was extended in 2000 by Venkatesh and Davis (2000) to TAM 2 to expand the model's application to private users and for personal reasons such as entertainment, information access as well as digital commerce. TAM 2 included Fishbein and Ajzen's (1975) TRA components, social influence processes and cognitive instrumental processes. This study will utilize the elements in these models to examine the resource, technology and market factors that determine uptake of online distribution platforms among horticulture producers and exporters in Kenya.

Davis (1989) defined perceived usefulness as the degree to which an individual believes that using a particular system would enhance his or her job performance and perceived ease of use

or use simplicity as the degree to which the potential user expects to control the system effortlessly. Accordingly, Davis (1989) asserts that individuals will be comfortable taking up new technologies that are easy to use and offer significant advantages over existing systems. The TAM incorporated psychological aspects to address the aspect of effectiveness of new technologies in meeting the needs from specific environments. Attitude and social factors were incorporated and they encompass individuals' perceptions towards new technologies based on social constructs and previous experience. Fishbein and Ajzen's (1975) assert that new technologies that an individual's perception of other people's opinions will influence intentions to repeat a behavior. In the agriculture context, farmer groups, friends and actions of government institutions are expected to influence whether farmers will adopt online distribution platforms.

Diaz, Sasaki, Tsusaka and Szabo (2021) used a blend of perceived usefulness, ease of use, information access, perceived risk and perceived cost factors in examining farmer's willingness to adopt Bamboost app. Chuang, Wang and Liou (2020) acknowledges that alongside TAM constructs, farmers' knowledge regarding the existing market products is an important construct in an extended TAM model. Costopoulou et al. (2016) found that 95% of Greek farmers do not use mobile agricultural apps because they are not aware about their existence. According to Michels et al. (2020), farmers' socio-demographic factors such as age, education level and ownership of land and its size influence the decision to adopt new marketing channels. An empirical investigation on drivers of mobile applications adoption by farmers found a positive relationship between social influence, perceived usefulness, information awareness and perceived ease of use and mobile application adoption, while perceived risk and perceived cost had a negative impact on their adoption (Victor, Nic, & Xiaomeng, 2021). This study will use these constructs in identifying the factors that influence the uptake of online distribution platforms.

### **2.3 Conceptual review**

The digital economy has led to the proliferation of e-commerce market places and online platforms which are considered multi-sided markets that enable interactions between users located on different sides of a given transaction (Abrams & Sackmann, 2014). These researchers asserts that digital platforms offer a wide range of advantages associated with cost, improved matching between possible business partners and reduced information accessing efforts. Online platforms represent a wide scope of online activities and services ranging from internet websites, app stores, mobile applications or online advertising platforms (Akuku,

Haaksma, & Derksen, 2019). Online platforms enable users to upload information, access information, request quotes, receive price, place orders, and receive market-related news. Bright (2019) avers that most of the services offered by digital platforms such as winner determination and declaration in auctions, as well as dissemination of price information are automated, improving market competition, price, transparency and farmers' income. Since online platforms serve as digital marketplaces, a higher number of players would see increased value generation to players in the agri-value chain (Dormido & Malicdem, 2019).

Agri-business platforms' use has exploded in recent years and multiple countries have launched digital trading platforms such as India's eNational Agriculture Market (eNAM) and the Unified Market Platform (UMP), Ethiopia's Lersha Digital Agriculture Platform and Uganda's E-Voucher (Levi, Rajan, Singhvi, & Zheng, 2020). Currently, Kenya is setting up a Big Data Infrastructure to spur growth in agricultural production as well as address existing challenges such as poor agri-IT awareness and competence, lack of access to finance and associated infrastructure such as internet and extension services among others (Akuku, Haaksma, & Derksen, 2019). However, despite these efforts, a World Bank Survey Report (2020) indicates that in addition to existing the platforms being unable to offer a wide range of products and services, they also lack effective mechanisms to track their users as well as address the demand for real-time and intelligent data.

Theoretically, new technologies will be widely accepted if they can demonstrate their usefulness and ease of use (Davis, 1989). According to Walter, et al. (2017), expansion of markets through globalization required smart farming through digital channels. In Portugal, Borges and Costa (2021) provided evidence that a platform's usability and experience significantly influences intentions to reuse. Eze et al. (2019) noted that responsive technologies are more likely to be adopted. Williams, Crespo and Abu (2020) are adamant that the availability of digital devices is key to the expansion of digitization in sub-Saharan Africa. Dijkstra (2018) on the other hand recognizes the role of the regulatory environment and extension services in facilitating digital services' uptake. The section below presents a more detailed review of the factors that influence digital products' uptake.

## **2.4 Empirical Review**

This section presented a review of previous researcher's findings on the research variables. This section presented the technological, resource, and market drivers or impediments of successful adoption of online distribution platforms by farmers.

### **2.4.1 Technological Factors and Uptake of Online Distribution Platforms**

Technological factors refer to the production techniques, information and communication resources, knowledge and infrastructure that affect how businesses operate, sell their products, interact with, and gather intelligence on customers, suppliers, and competitors. Trinugroho, Pamungkas, Wiwoho, Damayanti and Pramono (2022) determined that new technologies' adoption requires the existence of support services such as internet connectivity and ownership of smart mobile devices. Morreale, Moro, Chamberlain, Benford and McPherson (2017) reported that the design and ease of use of online marketing platforms influences their adoption. This section presents findings on the impact of technological factors on uptake of online distribution platforms.

Han, Xiong and Zhao (2021) sought after the motivators for adoption of social media marketing (SMM) tools among farmers in rural China. The study adopted an exploratory survey method in selection of 106 Chinese farmers and was guided by the Unified Theory of Acceptance and Use of Technology (UTAUT). The study sought to investigate the performance expectancy variables, social influence, effort expectancy and facilitating conditions. The study determined that perceived lack of technical knowledge was a major deterrent that could be countered by providing support, assistance, and ensure adequate services are available to facilitate their adoption efforts. The study determined that farmers were adopting SMM for its low cost, its ability to improve communications and relationships, and ability to provide customers with a personalized experience. The study determined social influence as a major driver of e-commerce adoption. Farmers with produce that requires high SMM suitability technical capabilities such as flowers, vegetables, and poultry are less likely to adopt SMM tools due to need for adequate corresponding technical skills to promote online. Such products are more reliant on the facilitating conditions to encourage SMM usage.

Giampietri and Trestini (2020) explored determinants of web marketing (WM) adoption at farm level in Italy. The TOE framework served as a guide. Interview schedules were used in the data collection. A structural equation model (SEM) was performed to measure the simultaneous effects of security concerns, privacy concerns, perceived ease of use, attitude of

top management (farmer), technological and financial readiness, perceived lack of resources normative pressure coercive pressure and firm size on farmers' intention to adopt web marketing technologies. The findings showed that perceived usefulness was the strongest determinant of intention to adopt. This was followed by perceived ease of use, reliability and profitability, farmer support, normative pressure and coercive pressure respectively. Technological and financial readiness had no significant impact on intention to adopt web marketing tools. Farmers with bigger farms exhibited less inclination to adopt web marketing tools. Female farmers were also more likely to adopt web marketing due to its ability to increase product visibility. The study recommended further investigation into funding needs to promote support for the introduction of specific digital assets at farm level to facilitate effective WM adoption.

Balkrishna and Deshmukh (2017) adopted a descriptive research design in investigating how social media use impacts online marketing behaviour. Specifically, the study investigated the use of blogs, microblogs (Twitter), conversational threads, social photos, social networking (Facebook, LinkedIn) and video Sharing (YouTube) in agricultural marketing. The study was grounded on the gratification theory since it sought to determine the factors determining platform choice to market. The analysis reported social media as a useful marketing tool form agricultural produce. It provides a cheap source of agricultural information, saves time and ensures provision of appropriate data at the appropriate time, which is key for determining price factors. Facebook and YouTube were the go-to online tools used among young farmers. WhatsApp was determined to be the most used platform for communication between buyer and seller due to its low cost and ease of accessibility.

Awotide, Karimov and Diagne (2016) assessed the drivers of use of Improved Rice Varieties (IRVs) and the effect of market participation on welfare of farming households in Nigeria. The Tobit and Heckman two-stage models were adopted and random multistage sampling applied in collection of data from 600 rice farmers selected randomly from three states that predominantly grow rice. Primary data was sourced from reports by the Africa Rice Centre (AfricaRice) which in financed by United State Agency for International Development (USAID). The analysis showed that the amount of income from rice production, membership to farmers' associations, distance to marketplace and training capacity significantly impact farmer's decisions to adapt new farming and marketing technologies. Surplus production, gender of household head, access to better seed quality, formal education and market training significantly increase market participation by farmers. While households headed by women

were more involved in alternative marketing, men were more involved in farmers' associations. The study advocated for increased participation in farmers' association, increased access to credit services, seeds and information about the new seed varieties are also essential to increasing adoption. E-market participation was dependent on the farmer's ability to produce surplus products of high quality; therefore, programs should be instituted to promote the quality of farm produce.

Kiptum (2016) adopted descriptive research in investigating the role played by ICT technologies in improving access to, and dissemination of information for Kenyan farmers. The Yamane formula was used in determination of the sample. The study sought to determine the challenges in information sharing, storage and knowledge transfer that exist within the produce supply chain. The study noted that lack of adequate technical skills was the main barrier to technologies' adoption since most farmers frequently interacted with extension agents. The study also revealed that most farmers lacked adequate e-marketing skills, funds and incentives to adapt new technologies. Further, unfamiliarity with the online marketing space meant that most farmers lack social mobilization techniques which is one of the key deterrents to online distribution platforms' adoption. The study did not specifically focus on digital marketing platforms, this study reviewed this gap.

Nzozzo and Mogambi (2017) adopted a cross-sectional survey research design in investigating the drivers of technology adoption among rice farmers in Mwea Irrigation Scheme, Kenya. The study collected data from questionnaires and key informant interviews. The study was able to determine those new technologies were adopted to enhance information gathering to determine input prices, record keeping, communicating work arrangement, marketing and to increase awareness about emergent technologies that can enhance farm productivity. The study noted that lack of technical competency in ICT skills, inadequate infrastructure (internet and electricity), ignorance/ lack of trust/ inadequate knowledge about ICT technologies, high cost of ICTS and over reliance on traditional farming methods of farming and marketing channels were the most significant barriers to technology adoption. The study highlighted the need for policies and support systems to encourage farmers participation in online sale of rice produce.

#### **2.4.2 Market Factors and Uptake of Online Distribution Platforms**

Market factors refer to the elements that determine consumer trends. Market factors determine product demand and supply and range significantly. In the context of farmers, market factors

focus on the features of the market that determine their intention to utilize digital marketing platforms. According to Eze, Chinedu-Eze, Okike and Bello (2020), collective understanding, availability of market consumption data, access to training services and competition significantly influence the adoption of digital marketing technologies among service-oriented farmers in Nigeria. Gia Hung (2020) showed how farmers were motivated to utilize digital marketing platforms when they presumed, they would result in increased market outreach. This study examined how access to new markets, market information, extension services and supplier network influence uptake of distribution platforms.

O' Hara and Low (2020) analysed online marketing as a tool for direct marketing among rural farmers in the United States. The study sought to determine which firm-specific characteristics impact operators to adopt direct-to-consumer marketing tools. The study utilized data reported by the U.S. Department of Agriculture's (USDA) 2015 Local Food Marketing Practices Survey (LFMPS) in determining farms that had participated in online marketing of their produce. Logit regressions were used in assessing whether rural-urban county classification, socioeconomic attributes of its proximate customer base (income, education, and connectivity levels); and attributes of the farm operator, such as age and experience level impact the intention to adopt online marketing. The study determined distance from a metropolitan area, foreign operators and veteran farm operators pushed adoption of online marketing tools. Younger operators were noted to be involved in multiple marketing tools while operators in larger firms also exhibited high affinity to online marketing strategies. Farmers with value added produce such as bottled milk, wine, cheese, and meat were also more likely to adopt online marketing tools than low added value produce such as cereals. The study established direct linkage between broadband expansion policies and online marketplace use by DTC farms.

Gebremariam, et al. (2021) assessed farmers' involvement in agricultural agents in Ethiopia. Cross-sectional farm household-level data was sourced from 300 household heads and triangulated with data collected from farmers' workshops and extension agents. A multi-stage sampling technique that involved three stages of random sampling, based on the structure of natural clusters in the population, was used to obtain a representative sample for the analysis. Analysis involved use of Spearman's correlation coefficient, Kruskal–Wallis analysis of variance and the ordered Probit models. Farmers' socio-economic characteristics in terms of credit access, household assets, and availability of extension agents determined intention to get involved. Households headed by males had high social capital, hence were better placed to interact with cooperatives. Cultural factors put women-led households at a disadvantage; they

had difficulty accessing finance, lack assets and adequate farming land. Older farmers were less adaptable to new marketing channels. Education levels, resource availability (water for crop irrigation), financial resources to lease land and distance to agricultural support offices influenced farmers intention to use agricultural agents. The study focused on intention to use agricultural extension agents while the current focused on farmer's intention to adopt marketing technologies.

Gia Hung (2020) investigated factors that shape the Vietnamese smallholders' adoption of mobile phones as marketing tools. A sample size of 161 cereal smallholders was randomly selected from a total population of 275 cereal smallholder farmers in Quang Dien district. A two-section structured interview schedule was adopted to facilitate data collection. Analysis involved the use of a binary logistic regression model to determine the relationship between the variables adopted in the study. Mobile technologies were determined to be key facilitators of ICT adoption for cereals marketing. Mobile technologies adoption was associated with gender profile, participation in credit programs, technical knowledge inferred through training courses, income, and distance to the market, and resources availability such electricity and internet. This study reported that the longer the distance to the electricity grid and the older the farmer the less the likelihood to participate in mobile marketing. Participation in community-based cooperatives and credit programs also encouraged mobile technologies' marketing. Identified impediments to technology adoption were lack of knowledge/skills, ignorance of mobile phones capability, high cost of acquiring appropriate mobile devices for marketing purposes, cost of continued use of these devices, language barrier since most are designed in English and mobile phone network problems. This can be controlled by increasing infrastructural and structural setups to promote credit access, increasing depth of market training through agricultural extension department and sensitizing farmers about online marketing possibilities.

Abrams and Sackmann (2014) investigated the relationship between farmers' use of alternative sources of marketing and outcomes on agriculture productivity. The study investigated the effect of internet use, social media use, and email newsletters in generation of social capital and farm business viability. The study adopted an online survey methodology since the farmers were already familiar with the alternative marketing methods. The study determined that a farmer's inclination to use social media for personal use predicted their tendency to use social media an online marketing tool. Online interactions with other farmers translated to increased online bridging, farmer-to-farmer bonding, and is a source of online bonding social capital.

The number of blogs followed and Facebook friends were also associated with increased social capital, which improves the quality of marketing among farmers.

Ogbeide, Ben and Ebhote (2020) examined the role of digital marketing in transforming rural areas in Nigeria. The study adopted ordinary least square in estimation of the relationship between digital marketing technologies adoption among farmers and rural transformation. Analysis also involved use of the Cobb-Douglas production function. The study established a strong relationship between the variables, with e-marketing adoption significantly improving lifestyles in rural areas. These findings suggest an inverse relationship could exist; that, increase in use of mobile phones, internet availability, education level, credit and labour accessibility, and rainfall availability significantly increase technologies adoption among farmers in rural areas. The study concluded that marketing technologies can be vital tools for improving agricultural production.

Imaita (2013) adopted a descriptive survey design to investigate the effect of marketing skills in adoption of innovations in the mango supply chain in Kenya. A baseline survey was applied on a population consisting of mango farmers, traders and exporters in Meru County. The study applied stratified random sampling technique and used both qualitative and quantitative data in the analysis. Secondary data was sourced from the Ministry of Agriculture Offices. Logit analyses was used to determine the extent to which entrepreneurial, financial, marketing and training skills influence innovation adoption in the supply chain. The study determined that most of the traders had received some formal marketing training, while most farmers had not. Further, they had price knowledge, product knowledge and promotion knowledge, which made them more adaptive of new innovations. The farmers lacked this knowledge and as a result were less inclined to adopt innovations in marketing and creating value to the supply chain. In the buyer-trader interlinkage along the mango value chain, the study reported that innovation was influenced by marketing skills and level of training. Farmers were advised to participate in training programs to enhance their market skills and encourage participation in the mango value chain members.

#### **2.4.3 Resource Factors and Uptake of Online Distribution Platforms**

Resource factors refer to the inputs needed to produce goods and services and they include land, labour, capital, and entrepreneurial capacity. These factors determine how businesses meet organizational goals. Financial resources are key to technologies' adoption and according to Seyed, et al (2016), internet costs significantly determine usage of digital platforms. study Michael, and Silahs (2016) determined that the cheap cost of accessing information online had

influenced use of social media in accessing agricultural information. The study by Fabregas, Kremer and Schilbach (2019) showed how farmer's digital literacy influence their intentions to adopt digital systems of marketing. This study investigated how human resources, financial resources and physical resources influence farmers' uptake of digital distribution platforms.

Su et al., (2021) sought to determine how online purchases and sales impact farmers' participation in the digital financial market. This included participation in digital payments, digital wealth management, and digital credit in rural areas of China. The study adopted multi-stage cluster sampling procedures in selection of 832 entrepreneurial farmers. The propensity score matching (PSM) method and instrument variable (IV) approach was utilized. Findings showed high use of online purchase and sales technology to reduce information asymmetry and promote production and operation efficiency. Farmers who had high education levels, pursuing skills training, running new agricultural operation entities, and engaging in agricultural entrepreneurship were more successful in pushing online product sales and more open to participating in the digital finance sphere. Recommendations were for the institution of professional and systematic digital education relating to online purchases, online sales, online management, and other related content. Further, information support systems, such as internet infrastructure, logistics facilities, and e-commerce service platforms optimization is necessary to promote participation in digital financial products and services.

Seyed, et al (2016) investigated agricultural e-marketing among rural populations. In applying the rural economic geography, the study formulated a combined Geographic Model of Planned Behaviour to assess approximately 1000 villages with ICT offices in Iranian provinces. Structural equation modelling was adopted and the villages categorized into groups based off economic and behavioural factors using K-means clustering. The Model of Planned Behaviour includes three variables; behavioural beliefs (individual attitude/perceptions towards the e-marketing practice); normative beliefs (factors that reinforce behaviour such as competitors, government); control beliefs (self-efficacy and 'facilitating conditions). Results of k-means clustering showed that an increased economic factor leads to an increase in the behavioural factor. Rural access in terms of better road and communication access had an indirect effect on villagers' intention to adopt e-marketing. Positive attitude towards e-commerce, computer and internet mastery, pressure from family members all predicated villagers' intent to adopt e-commerce tools. Increased support from the government in terms of better infrastructure and policies was also related to an increase in e-commerce participation.

Zeng et al., (2017) carried out a systematic literature review on e-commerce practices in agricultural sector. The study review involved 64 papers; 41 journal articles and 23 conference papers. The paper sought to develop an integrated conceptual model for technologies adoption in the Agri-sector both at local and regional level. The review classified firm-level adoption factors into internal and external dimensions. Internal drivers that were identified include technology competence, financial capability, perceived environment e-readiness, the size of farm under cultivation, farmer's attitude towards technologies, perceived benefits, availability of resources, both financial and technical, availability of resources, target market segments, market scope, the nature of farm produce, and the organization structure and culture. External drivers include supply network pressure and reliability, strategic partners' influence, competitor's influence, market trends, and government-led initiatives.

Ninsiima (2015) used a combination of practical and theoretical approaches in identification of factors that affect adoption and diffusion of communication technologies in agriculture. A mobile-based information system dubbed the Buuza Omulimisa was developed. Data collection involved a pretest-post-test research design and scheduled interviews. Data analysis involved mixed research methods. The study noted that gender differences, high cost of data and lack of familiarity with text messaging were the most significant barriers to innovations adoption. Language barrier impacted the system's ease of use, and suitability. Further, lack of adequate financial resources to purchase high-end mobile devices, poor internet connectivity, high rate of electricity interruptions and lack of support services discouraged communication technologies' adoption. Infrastructural availability, categorized as a facilitating condition mediated technologies' adoption. It would be paramount for developers to design platforms with high compatibility rate across multiple devices in accordance with the inefficiencies of markets in developing economies.

Katunyo et al (2018) carried out a household survey to investigate the factors that influence ICT use by youth along agricultural value chains. The study used purposive sampling in selection of 3 sub counties in Busia County. Data was collected from 213 young farmers aged between 18 and 35 years. A Poisson regression model was used in examining the extent of use of ICTs. The study determined that more than 90% of the respondents had adopted ICT tools in marketing. From the sample, farmers in the younger age demography were more absorptive, adopting multiple technology means of marketing. Married couples showed less tendency to adopt new ICTs. Distance from the market, number of agricultural value chain stages (input delivery, production, transportation and trading) a youth participates in, access to extension

services, and the size of land under cultivation also influenced intensity of ICT use in agriculture.

In a study on the effect of social media use on agricultural extension in Kenya, Thomas, Michael, and Silahs (2016) adopted a descriptive survey of farmers in Kesses District, Kenya. Purposive sampling was adopted in selection of farmers who had participated in social media use to enhance agricultural production capacity. The study reported urgent need for important agricultural information dissemination skills among the farmers. The study determined that the cheap cost of accessing information online, perceived benefits and ease of use were among the drivers of social media use. However, the farmers were deterred from consistent use due to availability of alternative means of advancing agricultural production, inadequate complementary infrastructure, frequent power outages and high cost of internet subscription.

## **2.5 Research Gaps in Literature**

The above studies have explored different researcher's findings on the relationship between different aspects of the study variables. During the review, various gaps were identified, and this study sought to address them. Despite focussing on social media marketing tools among farmers, the study by Han, Xiong and Zhao (2021) presented a gap since it adopted an explanatory survey research design while the current study assesses technologies adoption using a descriptive research design. Although Giampietri and Trestini (2020) carried out their study on web marketing (WM) adoption, the study investigated Italian farmers and used interviews schedules in the data collection; the current study reviewed on Kenyan farmers and used questionnaires in data collection. The study by Nzonzo and Mogambi (2017) adopted a cross-sectional survey research design and specifically sought to address technology adoption factors among rice farmers, the current study examined adoption drivers among all farmers. Gia Hung (2020) specifically sought after the drivers of adoption of mobile phones for marketing purposes while the current study examines adoption of a specific online marketing platform. Despite Imita (2013) investigating marketing innovations adoption among farmers, the study specifically sought to determine how marketing skills influence innovations adoption, the current study assess all drivers of new marketing platform's adoption.

The various gaps were identified in the reviewed empirical literature are summarized in the table 2.1 as shown below.

**Table 2.1 Summary of Research Gaps**

<b>Author</b>	<b>Title</b>	<b>Findings</b>	<b>Gaps</b>
Giampietri and Trestini (2020)	Analysing Farmer's intention to adopt web marketing under a technology-organization-environment perspective	The findings showed that perceived usefulness perceived ease of use, reliability and ROI, farmer attitude, normative pressure and coercive pressure respectively influence web marketing adoption	The study analyzed web marketing adoption in Italy while the current analysed platform marketing adoption among Kenyan farmers
Balkrishna and Deshmukh (2017)	A Study on Role of Social Media in Agriculture Marketing and its Scope.	The study determined that low cost of adoption, ease of use, age and familiarity are significant determinants of adoption of social media marketing.	The study focussed on social media marketing while the current study assessed agricultural platform marketing
Nzozzo and Mogambi (2017)	An Analysis of Communication and Information Technologies Adoption in Irrigated Rice Production in Kenya.	The study reported technical skills, IT familiarity, availability of associated infrastructure and availability of alternative methods of marketing were the main determinants of ICT adoption.	The study focussed on rice farmers while the current investigated marketing technologies adoption among all farmers.

Awotide, Karimov and Diagne (2016)	Agricultural Technology adoption, commercialization and smallholder rice farmers' welfare in rural Nigeria.	The findings showed that income level, membership in a farmers' association, distance to marketplace and level of training significantly impact farmer's decisions to adapt new farming and marketing technologies.	The study applied random multistage sampling, while the current employed stratified samplings
Imaita (2013)	Marketing skills as a factor influencing adoption of innovations along the mango supply chain in Merru County, Kenya.	The study determined that entrepreneurial, financial, and marketing skills are predeterminants of adoption of innovations in the mango supply chain.	The study focussed on marketing skills as determinants of adoption, the current study examined market and technology factors.
Ninsiima (2015)	Factors affecting adoption of Information Communication Technology Systems for Agriculture in Uganda.	The study noted that gender differences, high cost of data, language barrier and lack of familiarity with text messaging were the most significant barriers to innovations adoption.	The study utilized a pretest-post-test research design and used interview schedules while the current employed a descriptive research design.
Katunyo et al (2018)	Factors influencing the intensity of use of ICT tools by youth along agricultural value chains: Evidence	The study determined that participation in stages of agricultural value production, access to extension services, and size of land under	The study focused on youth farmers while the current focused on horticulture firms in the country.

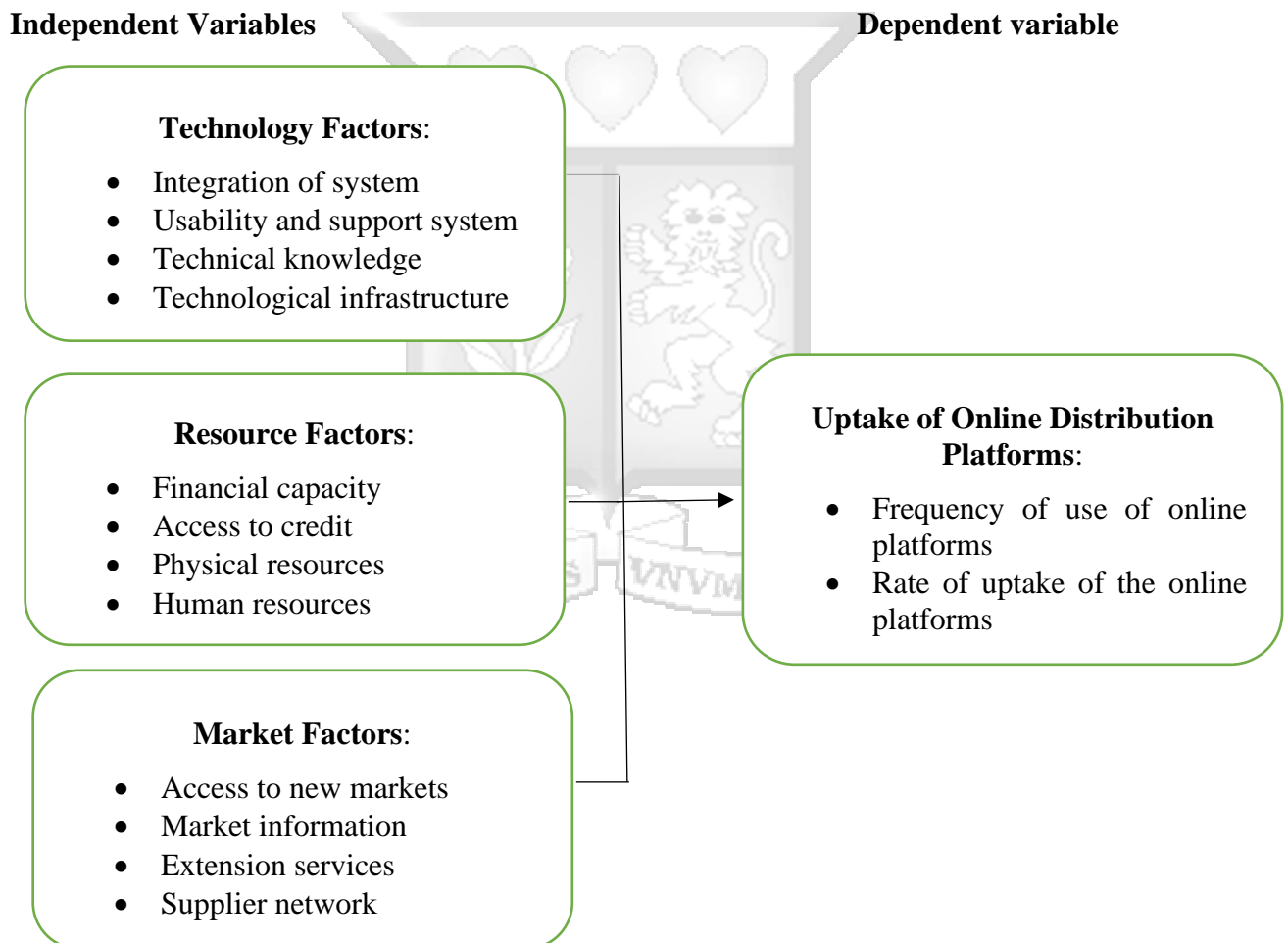
from Busia County, cultivation influenced  
Kenya. adoption intensity

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Source: Researcher (2022)

## 2.6 Conceptual Framework

The conceptual framework was a graphical representation of the association between the independent and dependent variables of the study. The conceptual framework below showed the association hypothesized in this study;



**Figure 2.1 Conceptual Framework**

Source: Researcher (2020)

The above conceptual framework identifies the relationship between the selected technology, market and resource factors and how they influence the uptake of the online distribution platforms among farmers. These constructs used in the framework are identified in Davis’

(1989) Technology Acceptance Model (TAM) as the factors that influence ease of use and accessibility of digital technologies. According to the theory, the technology's integration capability and usability as well as associated infrastructure, the farmer's access to credit and extension services and market information should all make it less complicated for farmers seeking to adopt online platforms hence inspire their uptake.

The variables are operationalized as shown in the table below.

**Table 2.2 Operationalization of Study Variables**

Variable	Type	Indicators	Measurement	Source
Technology factors	Independent	<ul style="list-style-type: none"> <li>Integration of system</li> <li>Usability and support system</li> </ul>	5-point Likert Quantitative analysis	Nzonzo and Mogambi (2017)
Market factors	Independent	<ul style="list-style-type: none"> <li>Technical knowledge</li> <li>Technological infrastructure</li> <li>Access to new markets</li> <li>Market information</li> <li>Extension services</li> <li>Supplier network</li> </ul>	5-point Likert Quantitative analysis	Eze, Chinedu-Eze, Okike and Bello (2020)
Resource factors	Independent	<ul style="list-style-type: none"> <li>Financial capacity</li> <li>Physical resources</li> <li>Human resources</li> </ul>	5-point Likert Quantitative analysis	Zeng et al., (2017)
Controls factors		<ul style="list-style-type: none"> <li>Land size under horticulture cultivation</li> <li>Age of the horticultural producer/exporter</li> </ul>	Nominal scale (numeric values)	Masuka, Chipomho, Mapope, Mupeti and Tatsvarei (2016)
Uptake of online distribution platforms	Dependent	<ul style="list-style-type: none"> <li>Frequency of use of online platforms</li> <li>Rate of uptake of the online platforms</li> </ul>	Binary	Nyabola (2021)

## 2.7 Chapter Summary

This chapter presents the theoretical and empirical review sections. The theoretical review section presents the study's theoretical foundation and the empirical review section presents previous researchers' findings on the factors that influence uptake of digital technologies. The section will include the study's authors, methodologies, findings as well as gaps. The section then presents a summary of gaps emerging from the studies and concludes with a table operationalizing the study variables.



## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

Chapter three of the study presented the methodology that was applied in the course of this investigation. The chapter reviewed on the philosophy, design and the population of the study. Further, the data collection instruments, procedures, pilot study and the data analysis and presentation were contained in this chapter.

#### **3.2 Research Philosophy**

A research paradigm can be defined as a philosophical position that describes the basic set of beliefs that guide and dictates which scientist in a particular discipline influence the nature of the study, how it should be conducted and how the results are interpreted (Cooper & Schindler, 2014). Therefore, a research paradigm philosophically brings an understanding of social phenomena by examining and attempting to offer an explanation and how data from such phenomena should be gathered, analyzed and used (Antwi & Hamza, 2015). The study employed a positivism research philosophy that identified causes which influence outcome while the positivity methodology aims at explaining the relationships hence positivistic statements are descriptive and factual.

#### **3.3 Research Design**

The research design constitutes the blueprint for data collection, measuring and data analysis. Research design is a critical phase that focuses on the approaches that the researcher used to achieve a set of objectives (Cooper & Schindler, 2014). Three common types of research designs are descriptive, exploratory and explanatory. Descriptive research design refers to a scientific method that describes characteristics or behaviours of the population being studied (Walliman, 2010). On the other hand, exploratory research design, on the other hand, refers to unstructured research that is conducted with an attempt of gaining background information about the research problem and usually (Fellows & Liu, 2015). This study was grounded on a descriptive research design. This was appropriate for this study since the technique is desirable when the researcher wishes to project findings to a larger population being under investigation from a representative sample, hence, justification of its selection (Patten & Newhart, 2017).

### 3.4 Target Population

According to Fellows and Liu (2015), the population is the entire collection of elements or items on which inferences can be drawn. Cooper and Schindler (2014), on the other hand, define a population as a total targeted pool of individuals that a researcher plans to study to make an inevitable inference. The population for this research was drawn from the farmers/vendors registered by horticulture producers and exporters in Kenya. The population for the study was drawn from the horticulture producers and exporters in Kenya registered under the association body, 36 operating in the Flower Member Company and 136 firms in the Fruits & Vegetables Company (Fresh Produce Exporters Association of Kenya , 2021). The study targeted the managing director within each of the firms.

**Table 3.1 Target Population**

Category	Number of Firms	Population (MD)
Flower Member Company	36	36
Fruits & Vegetables Company	136	136
<b>Target Population</b>		<b>172</b>

Source: (Fresh Produce Exporters Association of Kenya , 2021)

### 3.5 Sampling Design and Sample Size

Sampling frame refers to the list or device of items from which a sample size to represent the entire population is drawn (Bryman, 2016). The sampling frame for this particular study was obtained through stratified sampling, which is the division of a population into subgroups (or strata), who share similar characteristics (Sekaran & Bougie, 2016). The sampling frame was drawn from the supplier farmers registered by horticulture producers and exporters in Kenya. The sample size is defined as the smallest unit of collection from an entire population used in determining inferences to effectively address the research problem (Cooper & Schindler, 2014). The research employed the Yamane formula in calculating the sample size from the firm registered under the horticulture producers and exporters in Kenya as shown below

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

Where; n is the sample size, N is the total population, and e is the level of precision.

$$\text{Thus; } n = \frac{172}{1+172 (.05 \times .05)} = 122 \text{ firms}$$

The study conducted a survey among 122 firms that are currently registered by horticulture producers and exporters in Kenya.

### **3.6 Data Collection Instruments**

Cooper and Schindler (2014), define data collection as the process through which the researcher gathers data from the target respondents to address the research questions or objectives. According to Patten and Newhart, (2017), data collection is the procedure deployed in getting together and measuring data on the study variables in a manner that is systematic and essential in helping one to answer declared research questions or objectives and weighing the outcomes. The research developed a questionnaire in the collection of the research data based on the conceptualization of the variables. The questionnaire employed a structured format with a Likert scale statement being applied in the collection of research data. The main variables of the study focused on how technological factors, market factors and resource factors influence the uptake of online distribution platforms. The research instrument was developed using a 4-point Likert scale; 4 = very great extent, 3 = to a great extent, 2 = moderate extent and 1 = to no extent at all.

### **3.7 Data Collection Procedures**

According to Cooper and Schindler (2014), research procedure is a systematic and detailed framework describing step by step strategy that the researcher employed in conducting the study. The study utilized Google forms and Microsoft teams in the data collection. This study ascertained that access to the sample respondents is successful owing to the various counties that farmers have been recruited from and the ongoing Covid-19 restriction.

### **3.8 Research Quality**

The research ensured the research instrument is pretested among 10% (n=17) of farmers to ensure the quality and veracity of the instrument can be upheld. The data collected from the pilot was used in testing the reliability and validity of the study respondents. The reliability tests focus on checking the internal consistency of the study instrument. The survey conducted reliability testing using Cronbach alpha score assessment. The score evaluates the internal consistency using the Alpha values. A standard value of 0.7 is considered to be acceptable in ensuring there is internal consistency in the instrument. The findings on the table below show the decision criteria on the various variables adopted in the examination. The results indicated that the variables met the required threshold for internal consistency of the instrument.

#### **Table 3.2 Reliability Statistics**

<b>Variable</b>	<b>Cronbach's Alpha</b>	<b>N of Items</b>	<b>Decision</b>
Technology factors	.739	7	Accepted
Market factors	.758	8	Accepted
Resource factors	.752	6	Accepted
<b>Overall</b>	<b>.777</b>	<b>21</b>	<b>Accepted</b>

The validity of the study instrument is conducted to determine whether the instrument is able to measure what is proposed. Content validity was conducted with the help of the supervisor in reviewing the study instrument content to ensure it has captured all the operationalized indicators of the variables under review. The study utilized face validity in assessing the study instrument to ensure that all the objectives of the research are covered in the questionnaire.

### 3.9 Data Analysis and Presentation

According to Cooper and Schindler (2014), data analysis includes the process of putting together the information collected into an order and structure in order for the findings to be well communicated and understood by the users of the data. The data collected was analyzed using quantitative analysis. This used both descriptive and inferential analysis approach. The descriptive analysis was conducted using measures of central tendency (percentages, means and standard deviations). Inferential analysis involved correlation and regression analysis. The analyzed research data was presented using charts, graphs and tables. The study employed the following Probit regression model.

$$UpODP = \alpha + \beta_1TF_i + \beta_2MF_i + \beta_3RF_i + \beta_4\sum Controls_i + \varepsilon \text{ ----- Equation 1}$$

Where;

$UpODP$  = Dependent variable (uptake of online distribution platforms)

$\alpha$  = the model intercept

$\beta_{1-4}$  = Coefficient of predictor variables

**TF** – technological factors

**MF** – market factors

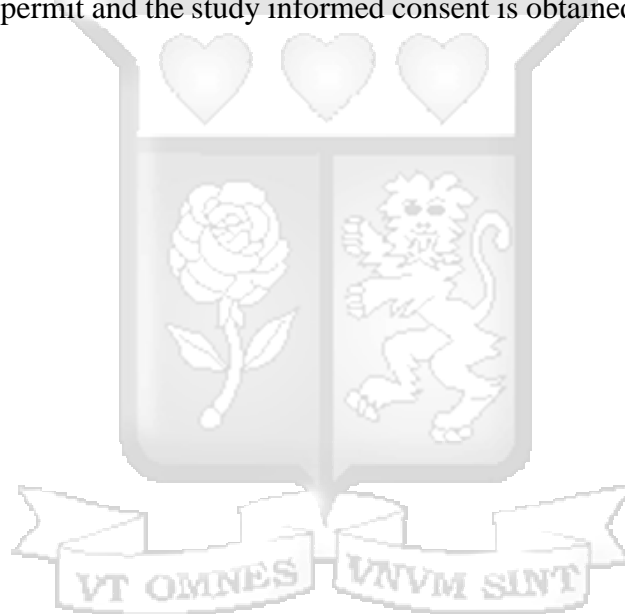
**RF** – resource factors

**Controls** – land size under horticulture farming, number of firm workers, age of firm, annual revenue

$\epsilon$  = Error Term

### **3.10 Ethical Considerations**

The study created an informed participant consent form that informed the respondents what are the aims of the study, the rights of the participants and the usage of the data that was obtained. Further, the study sought the permit of horticulture producers and exporters in Kenya in accessing their registered farmer contact details. The research made sure that the collected research data is utilized purely for academic reasons and confidentiality of the respondents is upheld. The study sought relevant approvals from SU-IERC. The study made sure that ethical approvals, NACOSTI permit and the study informed consent is obtained before data collection commences.



## CHAPTER FOUR

### PRESENTATION OF RESEARCH FINDINGS

#### 4.1 Introduction

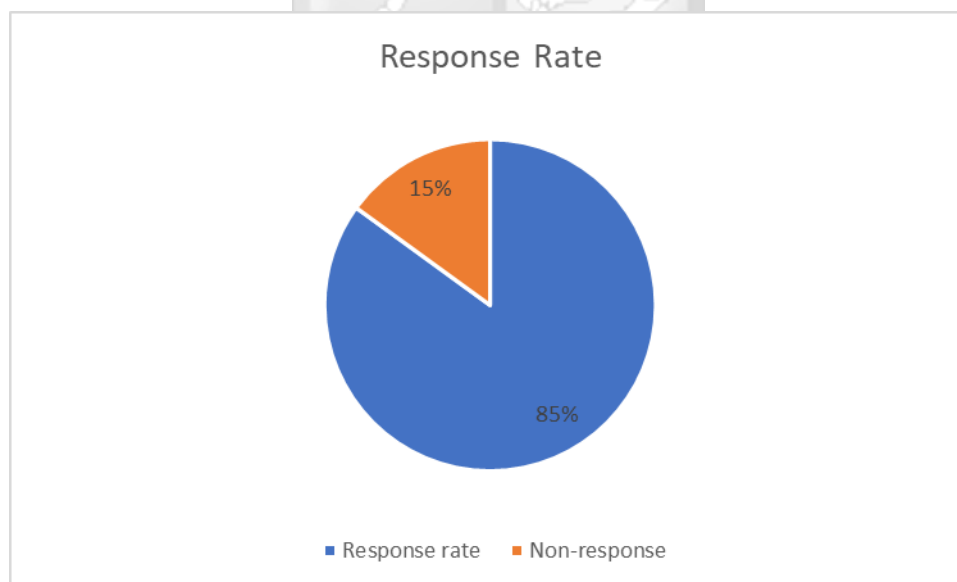
This chapter of the study focused on the presentation of the findings of the research from the collected research data. The chapter presented in detail the background information on the sampled horticulture firms in Kenya, the descriptive results and correlation analysis. Further, the results of the Probit regression were presented and a chapter summary detailing the main items captured.

#### 4.2 Demographic Analysis

The analysis of the demographic information contained results on the response rate obtained and the background data on the firms considered in the study.

##### 4.2.1 Research Response

The research collected study data from the horticulture producers and exporters in Kenya. The study relied on the register of members published by Fresh Produce Exporters Association of Kenya. Within the course of the data collection between May – July 2022; the study was able to obtain 104 responses from a sample size of 122 firms. This represented a response rate of 85% which was considered adequate representation for the overall research; hence was used in the current survey.



**Figure 4.1 Study Response Rate**

##### 4.2.2 Summary of Horticulture Producers and Exporters

The research was interested in understanding the characteristics of the various firms classified as horticulture producers and exporters on the basis of the period (number of years), annual

revenue, number of employees, size of the land and number of directors they have. The summary of the descriptive analysis is presented in the Table 4.1 below.

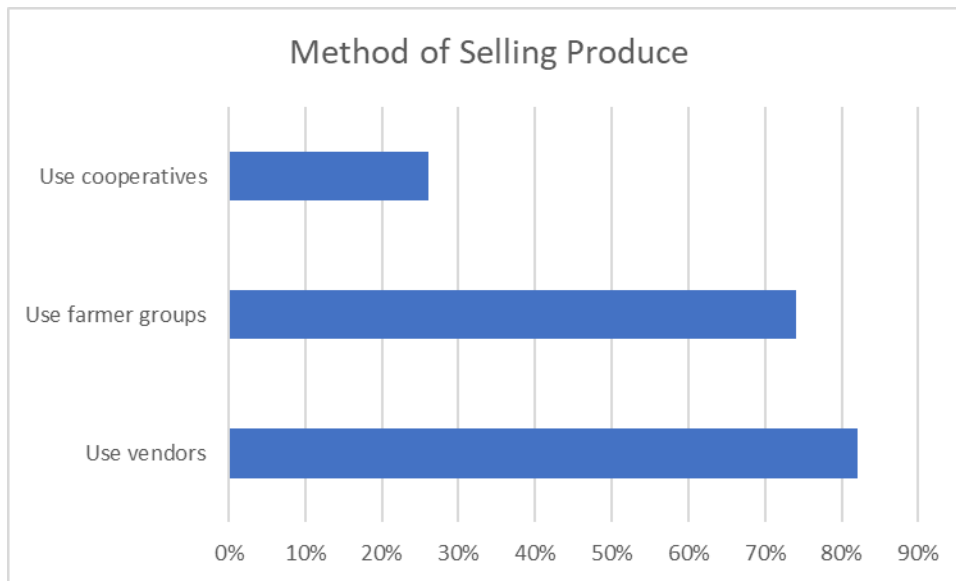
The results pointed out that on average the firms that participated in the survey have been involved in the horticulture production and exporter business for at least 7.75 years with the oldest firm at 20 years. The respondents established that annually the firms had a return of 290,048 in average with a high of 50m shillings and a low of 50,000 Kshs. The minimum revenue could be attributed to the operational challenges in the industry that were exacerbated by the pandemic. Findings demonstrated on average the firms had 13 employees with the least number of staff recorded within the firms at 5 and a high of 50 employees. This signified that firms in the horticulture business are able to maintain reasonable workforce to support the operations. Analysis showed the average land under horticulture cultivation was 5.887 hectares and a maximum of 300 hectares; further the review indicated the average directors within the firm were 2 and a maximum of 3 directors in the firms

**Table 4.1 Summary of Profile of Horticulture Producers and Exporters**

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Sum</b>	<b>Mean</b>
Length of Time in years	104	2.00	20.00	419.00	7.7593
Annual revenue in Kshs.	104	50,000.00	50,000,000.00	111,892,000.00	290,048.7805
Number of staff members	104	5.00	50.00	639.00	13.5957
Size of land (ha)	104	5.50	300.00	288.50	5.8878
Number of directors	104	1.00	3.00	94.00	1.8431

#### **4.2.3 Method of Selling Produce**

The results revealed that among the horticulture producing and exporting firms; 82% (n = 85) utilized vendors in selling their produce, 74% (n = 77) utilized farmer groups and 26% used cooperatives in the selling of their produce. The analysis signified there was no uniformity among the horticulture producers and exporters in the method they applied in selling there produce.



**Figure 4.2 Method of Selling among Horticulture Producers and Exporters**

### **4.3 Analysis of Research Data**

The results are presented in this section in line with the objectives of the study. The study further adopted correlation and regression analysis approaches to determine the direction of effect and strength of the relationship between the variables.

#### **4.3.1 Descriptive Analysis of Uptake of Online Distribution Platforms**

The dependent variable analysed the extent of uptake of online distribution platforms among the horticulture producers and exporters. The findings revealed that 54% (n= 56) were using the platforms with 46% not using any online distribution platforms. The results showed that 28% very often used the platforms, 43% used the platform sometimes, 14% used them sometimes and only 14% used them very often. The study results also showed that the most preferred platforms; 59% was Twiga foods, 16% was farmers market Kenya, 11% Mkulima Young and 14% was Tulaa.

**Table 4.2 Uptake of Online Distribution Platforms Results**

		Frequency	Percent
Uptake	No	48	46.2
	Yes	56	53.8
	Total	56	100.0
		Frequency	Percent
How many times do you use platform	Very often	16	28.5
	Sometimes	24	42.9
	Rarely	8	14.3
	Very rarely	8	14.3
	Total	56	100.0
		Frequency	Percent
Platform used	Twiga foods	33	58.9
	Tulaa	8	14.3
	Farmers Market Kenya	9	16.1
	Mkulima Young	6	10.7
	Total	56	100.0

#### **4.4 Effect of Technology Factors on the Uptake of Online Distribution Platforms among Horticulture Producers and Exporters In Kenya**

##### **4.4.1 Descriptive Analysis of Technology Factors**

The study analysed technology factors in the horticulture producers and exporters and how they influence the uptake of online distribution platforms. Analysis revealed that 96% of the firms had access to internet services, 94% had laptop/computers in their premises, 100% had smartphones and only 68% had digital farm appliances installed as part of their technology infrastructure. Regarding the aspects considered most vital among technology factors; 91% of the firms considered cost as most influential, 86% considered usability, 87% integration and 79% the reliability of the technology.

Further analysis of technology factors is shown in Table 4.3 below. The mean values will be interpreted as follows; over 3.5 = very great extent, 2.51-3.49 = to a great extent, 1.51-2.50 = to a moderate extent, less than 1.5 = to no extent at all. To a very great extent (mean = 3.365) the respondents noted that the support systems offered by the online platform owners is a key technical issue. Results showed to a great extent the firms consider the availability of the technological infrastructure such as computers to be key to uptake of online distribution platforms (mean = 3.337). Respondents agreed to a very great extent the firms consider the ability of the platform integration with the current distribution and marketing channel as a key factor (mean = 3.385). It was also established that to a great extent the firms review the reputation of the various platforms before considering their uptake (mean = 2.981).

**Table 4.3 Technology Factors Results**

	N	Min	Max	Sum	Mean	Dev
My ability to use the platform has been a factor to consider in the uptake of online distribution platforms	104	1.00	4.00	337.00	3.2404	.91900
I would review the reputation of the various platforms before considering their uptake	104	1.00	4.00	310.00	2.9808	1.00466
I consider the ability of the platform integration with my current distribution and marketing channel as a key factor	104	1.00	4.00	352.00	3.3846	.76714
I would consider the various costs associated with the new technologies before adopting an online distribution platform	104	2.00	4.00	342.00	3.2885	.64872
I believe the support systems offered by the online platform owners is a key technical issue for me	104	1.00	4.00	350.00	3.3654	.73811
My level of knowledge and technical expertise are key issue before adopting any online distribution platforms	104	2.00	4.00	345.00	3.3173	.70041
I consider the availability of the technological infrastructure such as computers to be key to uptake of online distribution platforms	104	1.00	4.00	347.00	3.3365	.75826

#### 4.4.2 Correlation between Technology Factors and Uptake of Online Distribution Platforms

The study sought to establish the relation between the selected factors and uptake of online distribution platforms. Highlights of the major results is key

Correlation analysis was conducted using Pearson correlation tests and the findings are shown in the Table 4.4 below. Findings showed that analysis of technology factors showed a weak positive relation between the technology factors and the uptake of online distribution platforms among horticulture producers and exporters ( $r = -.154^*$ ,  $\text{sig} = .041$ ).

**Table 4.4 Correlation Results**

	Uptake Distribution Platform	
Uptake Distribution Platform	Pearson Correlation	1
	Sig. (1-tailed)	
	N	104
Market Factors	Pearson Correlation	.434**
	Sig. (1-tailed)	.000
	N	104
Resource Factors	Pearson Correlation	.302**
	Sig. (1-tailed)	.001
	N	104
Technology factors	Pearson Correlation	-.154*
	Sig. (1-tailed)	.041
	N	104

\*\* . Correlation is significant at the 0.01 level (1-tailed).

\* . Correlation is significant at the 0.05 level (1-tailed).

#### 4.4.3 Regression Technology Factors and Uptake of Online Distribution Platforms

The research estimated a binary Probit regression analysis to determine the relationship between the selected factors and intervening variables on the uptake of online distribution platforms among horticulture producers and exporters. The binary model was selected since the dependent variable in this study was binary in nature (Yes/No). The test results of the regression are shown in this section.

The Omnibus test was conducted to examine whether the model with the intercept variables included was significantly differences than the baseline model. From the results above the Log-Likelihood ratio = 8.515, Sig = .036<.05 implying there was a significance of the several

parameters considered in the research model as compared to the base model without any predictors.

**Table 4.5 Omnibus Test**

Likelihood Ratio Chi-Square	df	Sig.
8.515	6	.036

Dependent Variable: Uptake Digital Platform

Model: (Intercept), Technology Factors, Market Factors, Resource Factors, Size of Land, Annual Revenue, Number of Years, Number of Staff

a. Compares the fitted model against the intercept-only model.

The intercept of the model  $\beta_0 = -3.403$ , sig = .026 < .05 which implies that the uptake of distribution platforms had a significantly negative coefficient. This implied that uptake of the various distribution platforms was poor low among the horticulture producer and exporter firms.

The findings above on technology factors indicated that variable was not significantly related to the uptake of online distribution platforms among horticulture producers and exporters. This is evidenced by the sig-value which is greater than the critical value of .05 ( $\beta_1 = -.084$ , sig = .133 > .05) implying technology factors are negatively and insignificantly related to the uptake of online digital platforms.

**Table 4.6 Parameter Estimates**

Parameter	B	Std. Error	95% Wald Confidence Interval		Hypothesis Test		
			Lower	Upper	Wald Chi-Square	df	Sig.
(Intercept)	-3.403	1.5263	-6.395	-.412	4.972	1	.026
Technology Factors	-.084	.0558	-.193	.026	2.251	1	.133
Market Factors	.104	.0615	-.017	.224	3.857	1	.041
Resource Factors	.129	.0582	.015	.243	4.922	1	.027
Size of Land	.055	.0523	-.048	.157	1.088	1	.297

Annual Revenue	-6.844e	8.817e	-2.413e	1.044e	.602	1	.438
Number of Years	.074	.0585	-.041	.188	1.593	1	.207
Number of Staff	.005	.0236	-.041	.051	.040	1	.841

Dependent Variable: Uptake Distribution Platform

Model: (Intercept), Technology Factors, Market Factors, Resource Factors, Size of Land, Annual Revenue, Number of Years, Number of Staff

a. Fixed at the displayed value.

#### **4.5 Effect of Resource Factors on the Uptake of Online Distribution Platforms Among Horticulture Producers and Exporters in Kenya**

##### **4.5.1 Descriptive Analysis of Resource Factors**

The second objective analysed the resource factors in the horticulture producers and exporters and how they influence the uptake of online distribution platforms. Concerning access to credit facilities; 57% of the firms indicated they have not accessed any in the last year, 29% had accessed one credit facility, 10% had accessed at least two credit facilities and 4% at least three facilities. These findings showed that access to credit was almost impossible within the current economic conditions revealing a hard time for firms to invest the limited resources to uptake of online distribution platforms. The mean values will be interpreted as follows; over 3.5 = very great extent, 2.51-3.49 = to a great extent, 1.51-2.50 = to a moderate extent, less than 1.5 = to no extent at all.

The analysis of the data showed the participants to a very great extent the firms consider the financial benefits accruing from the platform before uptake (mean = 3.596). To a very great extent the firms consider the costs of internet subscriptions as a determinant of uptake of new online distribution platforms (mean = 3.529). The results (mean = 3.481) the firms review the human resources required before considering the choice of an online distribution platform. To a very great extent (mean = 3.423) the firms consider the costs of any new physical resources that may be required before considering a new online distribution platform.

**Table 4.7 Resource Factors Results**

	N	Min	Max	Sum	Mean	Dev
I consider the financial benefits accruing from the platform before uptake	104	2.00	4.00	374.00	3.5962	.54895
The costs of utilizing the online distribution platform are a key consideration for adoption	104	2.00	4.00	350.00	3.3654	.68348
I view the ability of the platform to connect producers and exporters to the credit market as key factor	104	2.00	4.00	361.00	3.4712	.65295
I review the human resources required before considering the choice of an online distribution platform	104	1.00	4.00	362.00	3.4808	.72381
I consider the costs of any new physical resources that may be required before considering a new online distribution platform	104	2.00	4.00	356.00	3.4231	.64901
I consider the costs of internet subscriptions as a determinant of uptake of new online distribution platforms	104	2.00	4.00	367.00	3.5288	.55663

#### 4.5.2 Correlation between Resource Factors and Uptake of Online Distribution Platforms

The tests on Table 4.4 on resource factors revealed there was a weak positive relation between the resource factors and the uptake of online distribution platforms among horticulture producers and exporters ( $r = .302$ ,  $sig = .001$ ).

#### 4.5.3 Regression Resource Factors and Uptake of Online Distribution Platforms

The Probit model results in Table 4.6 showed the variable resource factors had a significant effect on the uptake of online distribution platforms among horticulture producers and exporters. This was supported by the sig-value that was less than the critical value of .05 ( $\beta_3 = .129$ ,  $sig = .027 < .05$ ) signifying that resource factors positively and significantly explained the uptake of the online distribution platforms by a factor of .129. The model further showed at a confidence interval of 95% the effect of resource factors can explain at a lower bound .015 (1.5%) and upper bound .243 (24.3%) of the uptake of online digital platforms.

### 4.6 Effect Market Factors on the Uptake of Online Distribution Platforms Among Horticulture Producers and Exporters in Kenya

#### 4.6.1 Descriptive Analysis of Market Factors

The third objective analysed market factors in the horticulture producers and exporters and how they influence the uptake of online distribution platforms. The findings demonstrated that 24% of the firms had not accessed any extension services, 49% had accessed the extension services four times over the last year, 38% at least 2 times and 24% only once over the last year. This

revealed that the various horticulture producers and exporters firms do leverage on the availability of extension services to obtain relevant market information. The analysis showed that 67% of the firms agreed the quality of extension services was very good with 33% showing they were moderately good.

Findings revealed that majority of the firm's 96% were involved in at least one farmer group or cooperative with 4% being a member of two groups. Concerning market training events attended, the respondents showed that 33% of the firms did not attend any market training event over the last year, 48% had attended at least two trainings and 29% at least 3 training events. This was an indication that horticulture producing and exporting firms were more involved in market events to improve the quality of their activities. Lastly, 91% of the firms obtained market information from traditional media (TV and newspaper), 62% from extension offices, 74% from social media sites, 86% from farmer groups and cooperatives and 48% from farmer forums within the country. The mean values will be interpreted as follows; over 3.5 = very great extent, 2.51-3.49 = to a great extent, 1.51-2.50 = to a moderate extent, less than 1.5 = to no extent at all.

The results show that to a very great extent the firms consider an online distribution platform that can advance the value of our supply chain within the horticulture market (mean = 3.509). Further, to a very great extent (mean = 3.385) the firms would consider adopting an online distribution platform based on their ability to connect to extension services. To a very great extent the respondents revealed the ability of the online distribution platforms to connect firms to new markets was a key determinant to uptake (mean = 3.337). Participants revealed to a very great extent they would adopt the platform if they conducted regular market training as shown by mean of 3.240. Analysis indicates to a great extent (mean = 3.029) the ability of the platform to offer promotional services was integral to uptake of the platform.

**Table 4.8 Market Factor Results**

	N	Min	Max	Sum	Mean	Dev
The ability of the online distribution platforms to connect me to new markets is a key determinant to uptake	104	2.00	4.00	347.00	3.3365	.64778
I consider the availability of adequate market information on the online distribution platforms	104	2.00	4.00	341.00	3.2788	.64547
I consider the ability of the platform to offer promotional services to be integral to uptake of the platform	104	2.00	4.00	315.00	3.0288	.78154
I would consider using online distribution platforms if they support my social media marketing activities	104	1.00	4.00	344.00	3.3077	.73837
I would adopt an online distribution platform if my local farmers marketing group are part of the program	104	1.00	4.00	334.00	3.2115	.80861
I would consider adopting an online distribution platform based on their ability to connect me to extension services	104	1.00	4.00	352.00	3.3846	.70101
I would adopt the platform if they conduct regular market training	104	1.00	4.00	337.00	3.2404	.75678
I would consider an online distribution platform that can advance the value of our supply chain within the horticulture market	104	2.00	4.00	365.00	3.5096	.62310

#### **4.6.2 Correlation between Market Factors and Uptake of Online Distribution Platforms**

The analysis of market factors established there was a weak and positive effect of market factors on the uptake of online distribution platforms among horticulture producers and exporters ( $r = .434$ ,  $sig = .000$ ).

#### **4.6.3 Regression Market Factors and Uptake of Online Distribution Platforms**

The analysis showed the variable market factors was significantly related to the uptake of online distribution platforms among horticulture producers and exporters. The findings showed a sig-value that was less than the critical value of .05 ( $\beta_2 = .104$ ,  $sig = .041 < .05$ ) signifying that market factors positively and significantly explained the uptake of the online distribution platforms by a factor of .104. The model further showed at a confidence interval of 95% the effect of market factors can explain at a lower bound -.017 (-1.7%) and upper bound .224 (22.4%) of the uptake of online digital platforms.

#### **4.7 Effect of Firm Demographics on Uptake of Online Distribution Platforms**

The research further analyzed how the characteristics of the various firms classified as horticulture producers and exporters on the basis of the period (number of years), annual revenue, number of employees, size of the land influenced the uptake of the online distribution platforms and findings are shown in this section. The analysis of the intervening variables in Table 4.6 showed that size of land had a positive and insignificant effect ( $\beta_4 = .005$ ,  $sig = .297 > .05$ ), annual revenue was negative and insignificant ( $\beta_5 = -6.844$ ,  $sig = .438 > .05$ ), number of years was positive and insignificant ( $\beta_6 = .074$ ,  $sig = .207 > .05$ ) and number of employees/staff positive and insignificant as well ( $\beta_7 = .005$ ,  $sig = .841 > .05$ ) on the uptake of online digital platforms.

#### **4.8 Chapter Summary**

This chapter presented the findings of the research drawn from the analysis of the collected study data. The survey obtained a response rate of 85% which was considered adequate representation for the overall research. The study showed on average the firms have been involved in the horticulture production and exporter business for at least 7.75 years. The correlation established that the three variables market, technology and resource factors positively affected the uptake of the online distribution platforms. The Probit regression showed there was a statistically significant difference in the adopted research model Log-Likelihood ratio = 8.515, Sig = .036 < .05; showing that variables included in the model had a significant joint positive effect on uptake of online distribution platforms. The parameter coefficients indicated that technology factors had an insignificant effect while market and resource factors positively and significantly determined uptake of the distribution platforms.

## CHAPTER FIVE

### DISCUSSION, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Introduction

The fifth chapter of the study focused on presenting the summary of the findings in line with the objectives of the research. The chapter presented the conclusions and recommendations of the study as guided by the results. Lastly, the study limitations and areas for further research work were presented.

#### 5.2 Discussion

The findings are presented in line with the objectives of the study. From the analysis, it was determined that two out of three objectives under review had a positive and significant effect on the uptake of online distribution platforms among horticulture producers and exporters in Kenya while only one showcasing a negative and insignificant effect. The study was informed by the TOE framework which was instrumental in helping the researcher understand factors that prompt farmers to adopt online marketing tools, as it has been used extensively in explaining technologies' adoption among small and medium enterprises. The research collected study data from register of members published by Fresh Produce Exporters Association of Kenya achieving an 85% collection rate from the 122 firms.

##### 5.2.1 Technology Factors and Uptake of Online Distribution Platforms

The study explored the influence of technology factors on the uptake of online distribution platforms among horticulture producers and exporters in Kenya. The study established that technology factors had a negative and insignificant effect on the uptake of the online distribution platforms. Trinugroho, Pamungkas, Wiwoho, Damayanti and Pramono (2022) determined that new technologies' adoption requires the existence of support services such as internet connectivity and ownership of smart mobile devices. The study was mirrored by the Technology-Organization-Environment model which categorizes farmer's technology adoption drivers into the technological dimension which encompasses both internal and external technology factors that can influence adoption (Oliveira & Martins, 2011).

The study findings were collaborated by Han, Xiong and Zhao (2021) who determined that perceived lack of technical knowledge was a major deterrent that could be countered by providing support, assistance, and ensure adequate services are available to facilitate their adoption efforts. The study further determined that farmers with produce that requires high SMM suitability technical capabilities such as flowers, vegetables, and poultry are less likely

to adopt SMM tools due to need for adequate corresponding technical skills to promote online. Giampietri and Trestini (2020) findings showed that technological and financial readiness had no significant impact on intention to adopt web marketing tools.

Balkrishna and Deshmukh (2017) however derived different results when investigating how social media use impacts online marketing behaviour. The analysis reported social media as a useful marketing tool for agricultural produce. It provides a cheap source of agricultural information, saves time and ensures provision of appropriate data at the appropriate time, which is key for determining price factors. Awotide, Karimov and Diagne (2016) showed that the amount of income from rice production, membership to farmers' associations, distance to marketplace and training capacity significantly impact farmer's decisions to adopt new farming and marketing technologies. The study further revealed that households headed by women were more involved in alternative marketing while men were more involved in farmers' associations.

In Kenya, Kiptum (2016) noted that lack of adequate technical skills was the main barrier to technologies' adoption since most farmers frequently interacted with extension agents. Nzonzo and Mogambi (2017) revealed that lack of technical competency in ICT skills, inadequate infrastructure (internet and electricity), ignorance/ lack of trust/ inadequate knowledge about ICT technologies, high cost of ICTS and over reliance on traditional farming methods of farming and marketing channels were the most significant barriers to technology adoption.

### **5.2.2 Market Factors and Uptake of Online Distribution Platforms**

The study investigated the effect of market factors on the uptake of online distribution platforms among horticulture producers and exporters in Kenya. The study found out that market factors positively and significantly explained the uptake of the online distribution platforms. In the context of farmers, market factors focus on the features of the market that determine their intention to utilize digital marketing platforms.

These study findings were supported by O' Hara and Low (2020) concluded which firm-specific characteristics impact operators to adopt direct-to-consumer marketing tools and established direct linkage between broadband expansion policies and online marketplace use by DTC farms. Gebremariam, et al. (2021) revealed that farmers' socio-economic characteristics in terms of Education levels, resource availability (water for crop irrigation), financial resources to lease land and distance to agricultural support offices influenced farmers intention to use agricultural agents. The study was further supported by Gia Hung (2020) who opined that the key facilitators of ICT adoption for cereals marketing. Mobile technologies

adoption was associated with gender profile, participation in credit programs, technical knowledge inferred through training courses, income, and distance to the market, and resources availability such electricity and internet. This study reported that the longer the distance to the electricity grid and the older the farmer the less the likelihood to participate in mobile marketing.

Abrams and Sackmann (2014) revealed that a farmer's inclination to use social media for personal use predicted their tendency to use social media as an online marketing tool. The study further indicated that the number of blogs followed and Facebook friends were also associated with increased social capital, which improves the quality of marketing among farmers. Ogbuide, Ben and Ebhote (2020) findings further suggest that increase in use of mobile phones, internet availability, education level, credit and labour accessibility, and rainfall availability significantly increase technologies adoption among farmers in rural areas. Imita (2013) study determined that most of the traders had received some formal marketing training, had price knowledge, product knowledge and promotion knowledge, which made them more adaptive of new innovations. The farmers however lacked this knowledge and as a result were less inclined to adopt innovations in marketing and creating value to the supply chain.

### **5.2.3 Resource Factors and Uptake of Online Distribution Platforms**

The study sought to find out the influence of resource factors on the uptake of online distribution platforms among horticulture producers and exporters in Kenya. The study established that resource factors positively and significantly explained the uptake of the online distribution platforms. Financial resources are key to technologies' adoption and according to Seyed, et al (2016), internet costs significantly determine usage of digital platforms. The findings were in line with the Technology-Organization-Environment (TOE) framework which looked at the financial capability of the farmers, and factors determining access that have a significant impact on farmer's commitment to marketing platform's adoption. This incorporated aspects such as firm size and perceived resource availability.

Findings from the study were echoed by Su et al., (2021) findings showed that Farmers who had high education levels, pursuing skills training, running new agricultural operation entities, and engaging in agricultural entrepreneurship were more successful in pushing online product sales and more open to participating in the digital finance sphere. Seyed, et al (2016) concluded that Rural access in terms of better road and communication access had an indirect effect on villagers' intention to adopt e-marketing. Increased support from the government in terms of better infrastructure and policies was also related to an increase in e-commerce participation.

Zeng et al., (2017) identified drivers that included technology competence, financial capability, perceived environment e-readiness, the size of farm under cultivation, farmer's attitude towards technologies, perceived benefits and availability of resources, both financial and technical.

Studies in Kenya further corroborated the study results including a study by Ninsiima (2015) who noted that gender differences, high cost of data and lack of familiarity with text messaging were the most significant barriers to innovations adoption. The study further indicated that lack of adequate financial resources to purchase high-end mobile devices, poor internet connectivity, high rate of electricity interruptions and lack of support services discouraged communication technologies' adoption. Infrastructural availability, categorized as a facilitating condition mediated technologies' adoption. Katunyo et al (2018) revealed that distance from the market, number of agricultural value chain stages (input delivery, production, transportation and trading) a youth participates in, access to extension services, and the size of land under cultivation also influenced intensity of ICT use in agriculture. In a study on the effect of social media use on agricultural extension in Kenya, Thomas, Michael, and Silahs (2016) opined that the cheap cost of accessing information online, perceived benefits and ease of use were among the drivers of social media use.

### **5.3 Conclusions**

The study findings led to the conclusion that the uptake of online distribution platforms among horticulture producers and exporters is determined by technological, market and resource factors. Separately, market and resource factors have a significant and positive effect on the uptake of online distribution platforms among horticulture producers and exporters, while technological factors had a negative and insignificant effect. Further, factors such as land size, number of directors, number of employees, annual revenue and years involved in the industry did not have a significant impact on the uptake of online distribution platforms.

The study results on the first objective informed the conclusion that technological factors presented a negative and insignificant effect on the uptake of online distribution platforms among horticulture producers and exporters. The study concluded that many farmers did not possess the ability to use the digital platform and were also challenged by the ability to integrate the platform to their current marketing channels. The study also established that the level of knowledge and technical expertise was a major hindrance in adopting online digital platforms.

Findings on the second objective formed the basis of the conclusion that market factors had a positive and significant effect on the uptake of online distribution platforms among horticulture

producers and exporters. The study further revealed that the availability of adequate market information on the online platforms is vital to the increased uptake of the platforms. Further, it was revealed that online digital platforms that support the farmers' social media activities while also connecting them to extension services have a higher pull to the farmers to increase their uptake. Market training was also considered an integral role of the online digital uptake in influencing the farmers to partake. This together with the ability to influence the local farmers marketing group was key in increasing the uptake of online digital platforms.

The research further concluded that resource factors established a positive and significant effect on the uptake of online distribution platforms among horticulture producers and exporters. The study also concluded that financial benefit was a major motivation for use of the platform. It was further established that access to credit for both producers and exporters is also a key factor that influences them to be part of the platform. Farmers will also consider the costs of utilizing the online platform and the costs of any other physical resources that will be required before a decision is made with the objective of minimizing expenses. Since the internet is a requirement for uptake of the online distribution platforms, the cost of internet subscriptions is also a very essential determinant to consider. The study further concluded that the human resource required for uptake of the online distribution platform is also a vital consideration point.

#### **5.4 Recommendations**

The study research established a negative and insignificant effect between technological factors and uptake of online distribution platforms among horticulture producers and exporters. In line with this conclusion, the study recommended that the online distribution channel owners should invest and allocate more resources for training and client sensitization to reach out to more farmers. The extra push in training and client sensitization should enable the farmers understand more about the technology and increase their level of knowledge and expertise. Further, it calls for the online distribution platforms staff to engage more farmers directly to be able to register more of them thereby increasing uptake levels of the platform. The study also recommends increasing safety measures to ensure that customers data is protected and secure. With assured safety of their personal information, farmers uptake into online distribution systems will increase.

Market factors were established to have a positive and significant effect on uptake of online distribution platforms among horticulture producers and exporters. The study thus concluded that the online distribution platforms should diversify their services offering to increase the

uptake levels. This can be achieved by conducting market research on the farmers and what they prefer and utilize this feedback and integrate their suggestions to the already existing online platforms. The study further recommended increased market training and integration for the users of the online distribution platforms. With focused training on the market and its characteristics, farmers will appreciate the use of the platform and increase their uptake.

Findings concluded that resource factors are an essential factor in ensuring uptake of online distribution platforms among horticulture producers and exporters. The study therefore recommended that the online distribution platform owners should develop a cost differentiation strategy to accommodate those who cannot afford to use the online platforms and those who can. This will ensure absorption of farmers of all production and income levels. This can be achieved through provision of incentives to provide a better and friendly avenue for the farmers to get involved in the online distribution platforms. Further they can develop systems that do not require internet subscriptions to operate or provide free Wi-Fi to users thereby increasing the online distribution platforms uptake.

### **5.5 Limitations of Study**

The research was severely limited by several factors that were beyond the control of the researcher. The study covered horticulture producers and exporters who are distributed all over the country mostly in rural area. This raised a geographical limitation since Kenya has a wide geographical scope and it was not possible to access all the horticulture farmers and get their input. The study was also limited by the willingness to participate and availability of some managers who were absent from their offices which affected accessibility at some periods. This was mitigated by including phone calls and email data collection approaches during the research.

### **5.6 Suggestion for Further Study**

The study was only focused on farmers and other stakeholders in the horticulture industry. However, the online distribution platforms framework is essential to almost all sectors including the agriculture sector. The study therefore suggests further studies on the wider agriculture sector with a focus of farmers of different products. The study only considered internal factors in the review hence more study work should be considered evaluating how external environmental factors such as regulation and market competition affects the uptake of online distribution platforms in the country. Lastly, this study only utilized primary data in

interpretation and analysis; therefore, further studies should adopt secondary data as this will be vital for verifying this study's findings.



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## APPENDICES

### Appendix I: Introduction Letter

Ole Sangale Rd, Madaraka Estate,  
P.O. Box 59857 00200, Nairobi, Kenya.  
Cell: +254 703 41416/7, Twitter: @SBSKenya  
Email: info@sbs.ac.ke or visit www.sbs.strathmore.edu



21<sup>st</sup> February 2022

To Whom It May Concern.

Dear Sir/ Madam.

**RE: FACILITATION OF RESEARCH – GEORGE KURIA WAWERU**

This is to introduce George Waweru who is a Master of Business Administration student at Strathmore University Business School, admission number MBA/111946/18. As part of our MBA Program, George is expected to do applied research and undertake a project. This is in partial fulfilment of the requirements of the MBA course. To this effect, he would like to request for appropriate data from your organisation.

George is undertaking a research paper on “**Factors Affecting the Uptake of Online Distribution Platforms among Horticulture Producers and Exporters in Kenya**” The information obtained from your organization shall be treated confidentially and shall be used for academic purposes only.

Our MBA seeks to establish links with industry, and one of these ways is by directing our research to areas that would be of direct use to industry. We would be glad to share our findings with you after the research, and we trust that you will find them of great interest and of practical value to your organization.

We appreciate your support and shall be willing to provide any further information if required.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Caroline Tiara".

Caroline Tiara.  
Manager – Graduate Programs.  
Strathmore University Business School.

Association of African  
Business Schools



Strathmore Business School is a Proud member of



**AACSB**

## Appendix II: Questionnaire

This questionnaire is an attempt to assess the “*analyse the factors affecting the uptake of online distribution platforms among horticulture producers and exporters in Kenya*” Please answer the questions honestly and diligently, following the instructions given. The answers you give were used for the research purpose only, and your identity was treated with uttermost confidentiality.

### FIRM LEVEL DEMOGRAPHIC PROFILE

Kindly fill the below according to the levels within your firm.

1. How long have you been involved in the horticulture producers and exporters business in Kenya?  
-----

2. What was the annual revenue of your horticulture producers and exporters business in Kenya in the least year?  
-----

3. What is your current number of staff members in your horticulture producers and exporters in Kenya?  
-----

4. What is the current size of land under horticulture production within your firm in Kenya?  
-----

5. How many directors do you have within your horticulture production and export firm?  
.....

6. How do you sell your produce?

Through vendors ( )

Through farmer groups ( )

Through Co-operatives ( )

**PART B: ANALYZE THE FACTORS AFFECTING THE UPTAKE OF ONLINE DISTRIBUTION PLATFORMS AMONG HORTICULTURE PRODUCERS AND EXPORTERS IN KENYA**

**1. Which of the following technological infrastructure do you have access to within your firm?**

- Internet services ( )
- Laptop/Computer ( )
- Smartphones ( )
- Digital farm appliances ( )

**2. Which of the following aspects related to technology factors do you consider most essential?**

- Usability ( )
- Reliability ( )
- Costs ( )
- Integration ( )

**Kindly fill your agreement with the following statements using the key 1-4 which conforms to the following level of agreement; 4 = very great extent, 3 = to a great extent, 2 = moderate extent and 1 = to no extent at all.**

No	Technological factors	1	2	3	4
3.	My ability to use the platform has been a factor to consider in the uptake of online distribution platforms.				
4.	I would review the reputation of the various platforms before considering their uptake.				
5.	I consider the ability of the platform integration with my current distribution and marketing channel as a key factor.				
6.	I would consider the various costs associated with the new technologies before adopting an online distribution platform.				
7.	I believe the support systems offered by the online platform owners is a key technical issue for me.				

8.	My level of knowledge and technical expertise are key issue before adopting any online distribution platforms				
9.	I consider the availability of the technological infrastructure such as computers to be key to uptake of online distribution platforms				

**Kindly fill your agreement with the following statements using the key 1-4 which conforms to the following level of agreement; 4 = very great extent, 3 = to a great extent, 2 = moderate extent and 1 = to no extent at all.**

No	Market factors	1	2	3	4
10.	The ability of the online distribution platforms to connect me to new markets is a key determinant to uptake				
11.	I consider the availability of adequate market information on the online distribution platforms				
12.	I consider the ability of the platform to offer promotional services to be integral to uptake of the platform				
13.	I would consider using online distribution platforms if they support my social media marketing activities				
14.	I would adopt an online distribution platform if my local farmers marketing group are part of the program				
15.	I would consider adopting an online distribution platform based on their ability to connect me to extension services.				
16.	I would adopt the platform if they conduct regular market training				
17.	I would consider an online distribution platform that can advance the value of our supply chain within the horticulture market				

**18. How many times have you accessed extension services in the last one year?**

.....

**19. How would you rate the quality of extension services in leading to adoption of online distribution platforms?**

Very Good ( )

Moderately Good ( )

Not good at all ( )

**20. How many farmer groups/cooperatives are you involved in?**

.....

**21. How many market training events have you attended within the last year?**

.....

**22. What channels do you think would be most effective for obtaining market information on the various online distribution platforms?**

Extension services ( )

Social media ( )

Traditional media i.e. TV, Newspaper ( )

Farmer groups i.e. cooperatives ( )

Marketing companies ( )

Farmer forums ( )

**Kindly fill your agreement with the following statements using the key 1-4 which conforms to the following level of agreement; 4 = very great extent, 3 = to a great extent, 2 = moderate extent and 1 = to no extent at all.**

No	Resource factors	1	2	3	4
23.	I consider the financial benefits accruing from the platform before uptake				
24.	The costs of utilizing the online distribution platform are a key consideration for adoption				
25.	I view the ability of the platform to connect producers and exporters to the credit market as key factor				
26.	I review the human resources required before considering the choice of an online distribution platform				

27.	I consider the costs of any new physical resources that may be required before considering a new online distribution platform				
28.	I consider the costs of internet subscriptions as a determinant of uptake of new online distribution platforms				

**29. How many credit facilities have you obtained within the last year?**

.....

**PART C: UPTAKE OF ONLINE DISTRIBUTION PLATFORMS AMONG HORTICULTURE PRODUCERS AND EXPORTERS IN KENYA**

**30. Do you currently use any online distribution platforms in your Horticulture Producers and Exporters Business?**

Yes ( )

No ( )

**31. If yes; how many times do you use the online distribution platforms in your Horticulture Producers and Exporters Business?**

Very often ( )

Sometimes ( )

Rarely ( )

Very rarely ( )

**32. Which of the following online distribution platforms in Kenya do you use?**

Twiga Foods ( )

Tulaa ( )

Farmers Market Kenya ( )

Mkulima Young ( )

*Thank you for time*



### Appendix III: Normality Test Results

Descriptive Statistics					
	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Technology Factors	104	-.809	.237	2.501	.469
Market Factors	104	-.152	.237	.620	.469
Resource Factors	104	-.388	.237	-.720	.469
Uptake Of Platform	104	-.439	.237	-1.843	.469
Valid N (listwise)	104				



## Appendix IV: NACOSTI Research Licence

 <p><b>REPUBLIC OF KENYA</b></p>	 <p><b>NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY &amp; INNOVATION</b></p>
Ref No: <b>143653</b>	Date of Issue: <b>18/March/2022</b>
<b>RESEARCH LICENSE</b>	
	
<b>This is to Certify that Mr.. George Waweru of Strathmore University, has been licensed to conduct research in Kiambu, Nairobi on the topic: FACTORS AFFECTING THE UPTAKE OF ONLINE DISTRIBUTION PLATFORMS AMONG HORTICULTURE PRODUCERS AND EXPORTERS IN KENYA for the period ending : 18/March/2023.</b>	
License No: <b>NACOSTI/P/22/16443</b>	
143653 Applicant Identification Number	 Director General <b>NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY &amp; INNOVATION</b>
	Verification QR Code 
<p>NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.</p>	

## Appendix V: Ethical Committee Approval



8<sup>th</sup> July 2022

Mr Waweru, George  
waweru.george@strathmore.edu

Dear Mr Waweru,

**RE: Factors Affecting the Uptake of Online Distribution Platforms Among Horticulture Producers and Exporters in Kenya.**

This is to inform you that SU-ISERC has reviewed and **approved** your above **SU Masters'** research proposal. Your application reference number is **SU-ISERC140722**. The approval period is **8<sup>th</sup> July 2022 to 7<sup>th</sup> July 2023**.

This approval is subject to compliance with the following requirements:

- i. Only approved documents including (informed consents, study instruments, MTA) will be used
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by SU-ISERC.
- iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to SU-ISERC within 48 hours of notification
- iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to SU-ISERC within 48 hours
- v. Clearance for export of biological specimens must be obtained from relevant institutions.
- vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- vii. Submission of an executive summary report within 90 days upon completion of the study to SU-ISERC.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology, and Innovation (NACOSTI) <https://research-portal.nacosti.go.ke/> and obtain other clearances needed.

Yours sincerely,

for: **Dr Ben Ngoye,**  
**Secretary; SU-ISERC**

**Cc: Prof Fred Were,**  
**Chairperson; SU-ISERC**



**Appendix VI: Registered Horticulture Producers and Exporters**

	<b>FLOWER MEMBER COMPANY</b>
1.	AAA Roses
2.	Balaji Flowers Ltd
3.	Big Flowers Ltd
4.	Delight Flora Ltd
5.	Dhamiri Ltd
6.	Enkasiti Flower Growers Ltd
7.	Everflora Ltd
8.	Fairy Flowers (K) Ltd
9.	Q-Star Farms Ltd
10.	Flora Delight Ltd
11.	Fontana Ltd
12.	Gatoka Ltd
13.	Gemstone Flowers Ltd
14.	Hadithi Plants Ltd
15.	Hub Imports & Exports Ltd
16.	Immediate Communications Ltd
17.	Jowa Blooms
18.	Karen Roses Ltd
19.	Kenfloraa Ltd
20.	Kensalt Ltd
21.	K-Net Flowers Ltd
22.	Manda Orchids
23.	Mau Flora Ltd
24.	Mwihoko Flowers
25.	Panocal International Ltd

26.	Selecta Kenya GmbH & Co.
27.	Shades Horticulture Ltd
28.	Shalimar K Ltd
29.	Synergy Gardens Ltd
30.	Timbari Flowers and horticulture
31.	Transebel Limited
32.	Van Den Berg (K) Ltd
33.	Wilmar Agro Ltd
34.	Thamani Flora Ltd
35.	Royal Flora Holland Kenya Ltd
36.	Airflo Ltd
<b>FRUITS &amp; VEGETABLES COMPANY</b>	
37.	AAA Growers Ltd
38.	Afrifresh Horticultures Ltd
39.	Afriherbs Kenya Ltd
40.	All Fresh Growers Ltd
41.	About Nutrifresh Kenya Ltd

42.	Apex Agroprocessing EPZ Ltd
43.	Biofarms Ltd
44.	Bloom Growers Ltd
45.	Brookveg Ltd
46.	Cisqo Developers Ltd
47.	Coast Prime Foods Ltd
48.	Del Monte Kenya Ltd
49.	EAG Fresh Produce Ltd
50.	Eatmo Worldwide Ltd
51.	EMG Biofields Ltd
52.	Emmay Commodities Ltd
53.	Envisage Ltd
54.	Equator Kenya Ltd
55.	Everest Enterprises Ltd
56.	Everfresh Produce Ltd
57.	Evergreen Crops Ltd
58.	Exotic Penina Fields Group
59.	Farmken Tratamiento Exporteren Ltd
60.	Flamingo Horticulture Kenya Ltd
61.	Forever Green Growers Ltd
62.	Fresh An Juici Ltd
63.	Freshpak Horticulture Ltd

64.	<b>Frigoken Ltd</b>
65.	<b>Fruitful Farms Ltd</b>
66.	<b>Fruve Produce Ltd</b>
67.	<b>Gardenveg Exporters Ltd</b>
68.	<b>Girrafe Exporters Ltd</b>
69.	<b>Go for Green Ltd</b>
70.	<b>Greenblade Growers Ltd</b>
71.	<b>Avocat Fresh Ltd</b>
72.	<b>Greengro International Ltd</b>
73.	<b>Greenlands Agro Producers Ltd</b>
74.	<b>Greenstep Exporters Fresh Ltd</b>
75.	<b>Grove Import &amp; Export Co. Ltd</b>
76.	<b>Hillside Fresh Ltd</b>
77.	<b>Horizon Trading Ltd</b>
78.	<b>International Safety &amp; Quality Group Ltd</b>
79.	<b>Interveg Exports Ltd</b>
80.	<b>Isinya Roses Ltd (Porini Farm)</b>
81.	<b>Jade Fresh Ltd</b>
82.	<b>Jefer Enterprises Ltd</b>
83.	<b>Jenny Fresh Point Ltd</b>
84.	<b>Jim's Fresh Veg Growers &amp; Exporters Ltd</b>
85.	<b>Jungle Nuts Ltd</b>

86.	<b>Kaiview Ecological Horticultures Ltd</b>
87.	<b>Kakuzi PLC</b>
88.	<b>Kanavo Ltd</b>
89.	<b>Kandia Fresh Produce Suppliers Ltd</b>
90.	<b>Keitt Exporters Ltd</b>
91.	<b>Keitt Fresh Ltd</b>
92.	<b>Kengrow Ventures</b>
93.	<b>Kenya Fresh Produce Exporters Ltd</b>
94.	<b>Kenya Horticultural Exporters (1977) Ltd</b>
95.	<b>Kenya Vineyards Ltd</b>
96.	<b>Keystone Farms Ltd</b>
97.	<b>Lama Fresh Produce Ltd</b>
98.	<b>Lowland Vegetable Growing Co.ltd</b>
99.	<b>Ludlow Solutions Ltd</b>
100.	<b>Makindu Growers &amp; Packers Ltd</b>
101.	<b>Persea Oils &amp; Orchards Ltd</b>
102.	<b>Marvel Greens Ltd</b>
103.	<b>Mavuno organics Ltd</b>
104.	<b>Mboga Tuu Ltd</b>
105.	<b>Zwei Enterprises</b>
106.	<b>Midlands Limited</b>
107.	<b>Millswood Ltd</b>

108.	Mirimo Imports and Exports
109.	Starteam International Ltd
110.	MJ Fresh Produce Ltd
111.	Mt. Elgon Orchards Ltd
112.	Mucho Mangoes Ltd
113.	Myner Exports Ltd
114.	NAS international Holdings Ltd
115.	New Holland Chips
116.	Ngong Veg Ltd
117.	Oasis Green Growers Ltd
118.	Oka Fresh Exports Ltd
119.	Olivado Fresh EPZ Ltd
120.	Phija Kenya Ltd
121.	Pino Agencies
122.	Plantation Herbs Ltd
123.	Profresh Ltd
124.	Raayan Exporters Ltd
125.	Reap Horticultural Exporters
126.	Romwa Ventures (K) Ltd
127.	Roypack Enterprises
128.	Rozzika Garden Centre Ltd
129.	Sacco Fresh Ltd

130.	Sahara Estates Ltd
131.	Sasini Avocado Ltd
132.	Seasons Orchards Ltd
133.	Sian Exports Kenya Ltd
134.	Simba Fresh Produce Ltd
135.	Six Square Ltd
136.	Spintex Enterprises Ltd
137.	Spring Green Ltd
138.	Stella Rasmussen GmbH
139.	Strive Global Recruitment Partner Co.
140.	Sunmango ltd
141.	Sutton Hoo Ltd
142.	Taste Kenya Exporters Ltd
143.	The Fresh Approach Ltd
144.	East African Growers Ltd
145.	Unitra Enterprises
146.	Veg Tech Ltd
147.	Vegpro Kenya Ltd
148.	Vert Ltd
149.	Victoria Import & Export Co. Ltd
150.	Vine Fresh E.A Ltd
151.	Wamu Investments Ltd

152.	Mwanzi Ltd
153.	Winfield Africa Ltd
154.	Eastern Greens & Livestock LTD
155.	Spisa Kenya Ltd
156.	El Darwash Fresh Produce Ltd
157.	Mara EPZ Ltd
158.	Mula Export Ltd
159.	Oasis Press Supplies Ltd
160.	Dubasia Trading Company Ltd
161.	Sigrut Farms International Ltd
162.	Saifat Trading Company Ltd
163.	Open Seas Logistics Ltd
164.	Chatikom Enterprises Ltd
165.	Green Plains Picks & Packs Ltd
166.	Instaveg Ltd
167.	Evergreen Herbs Ltd
168.	Cadogold Ltd
169.	Zanemu Vegetables & Fruits Growers & Packers
170.	Avocado Ranch
171.	P&M Investment Ltd
172.	Zuriel Fresh Farm Ltd
173.	Bella Speciality Farm Ltd