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ICT AND MARKETING FOR AGRICULTURAL PRODUCTS: DETERMINANTS OF MOBILE PHONE USAGE TO SMALL SCALE ORANGE FARMERS IN TANZANIA

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ABSTRACT

Recently the use of mobile phones has been a widespread phenomenon. Various services have been provided by mobile phones which delivers opportunities to reduce costs and incomplete information dissemination in the agricultural sector and ensure efficient functioning of markets. But in order to successfully use mobile phones for the optimal development of agricultural markets, understanding the determinants of mobile phone usage in marketing agricultural products is crucial. This study aims at assessing the determinants of mobile phone usage for marketing agricultural products of small-scale orange farmers in Muheza, Tanzania using the UTAUT model. The study applies a mixed method approach utilizing questionnaire and focus group discussion. Data were collected from 288 randomly selected small scale orange farmers. The data were analysed using structural equation modelling and content analysis techniques. Findings show that the determinants of mobile phone usage for marketing of agricultural products are Effort expectance, social influence and facilitating conditions. Regarding the usage patterns of mobile phones, results indicate that many farmers own normal mobile phones and use those frequently. Further, the findings indicate that orange farmer's use mobile phones for communication, money transaction and business purposes. Therefore, the study recommends that extension officers should be role models in using mobile phones in disseminating marketing information to farmers. In addition, technical facilities and support should be established in rural areas. Further, the government should ensure provision of infrastructure and equipment needed in the uptake of ICT by farmers. This study is important as the results provide insights on the determinants of mobile phone usage in marketing of farm produce which will help agricultural stakeholders to come up with strategies to help farmers make better use of mobile phone to enhance their marketing activities.

Key words: *ICT, Marketing, Small scale farmers, Mobile phone usage, UTAUT, Tanzania*

INTRODUCTION

Background Information

The agricultural sector is the main driver of the economy in many developing countries in Africa. The sector contributes greatly in the fight against poverty among the rural poor (Engotoit, Kituyi, & Moya, 2016). In Tanzania, agriculture contributes to about 24 percent of the gross domestic product, 30 percent of export earnings (Barakabitze, et al., 2015) and provides employment to over 82 percent of the population. The sector is very important in generating demand for industrial goods and services and ensuring national food security (Magesa, Michael, & Ko, 2015). In Africa, Tanzania being one, most people engaging in agriculture are small scale farmers living in rural areas whose income depends on selling of agricultural products. However, the selling of agricultural products by small scale farmers pause a challenge as their access to markets is limited (Magesa, et al., 2015). These farmers depend on the rural local markets (Torero, 2011) due to high access barriers to external markets, and the cost of information (Rogath & Mwidege, 2014). As a result, many farmers lack information about prices, demand in different markets, and contacts for potential buyers (Nyamba, 2017).

Access to timely and accurate agricultural information is crucial for enhancing productivity and market access to farmers. As Mohammadi and Najafabadi (2011) explain, having the right information at the right time will inform farmers' decisions about the on-demand products, the available markets and the prices charge for their products hence, avoiding being exploited by intermediaries. In addition, the availability of market information provides farmers' power to bargain and improve their income, make better plans for production, and use the information to make choices about product marketing (Asenso-Okyere & Mekonnen, 2012). Therefore, small-scale farmers need the up to date information and new technology to enhance productivity and explore opportunities available in the local, regional as well as international markets. Some of these opportunities include the regional integration and bilateral agreements like that of the East Africa Community (EAC), the Common Market for Eastern and Southern Africa (COMESA), and AGOA. The use of Information and Communication Technologies (ICTs) especially mobile phones has a significant role to play in this regard. According to Nyaga (2012) the use of ICT tools can improve business and networking among farmers, buyers and extension agents and facilitate access to hidden markets. More access to markets by small scale farmers is envisioned to translate to increased incomes, food security, more rural employment, and sustained agricultural growth (Magesa et al., 2015).

Previous studies show that ICTs is playing a great role in improving the performance of agriculture marketing activities. For example, the study by Irungu, Mbugua and Muia (2015) in Kenya indicate that commonly used mobile technology tools such as mobile phones, SMS, social media, voice messages, and internet can be used to engage in profitable agriculture targeting niche markets. Their results show that, farmers use these tools to acquire timely market information related to prices, reaching customers, sharing production information and money transaction. A study conducted in India indicates that the use of mobile phone through SMS has helped farmers to enhance their market visits thereby increasing market participation. The farmers were able to track better market prices, which led to increased profitability (Jairath & Yadav, 2012). On the other hand, a study conducted in Ghana by Owusu, Yankson and Frimpong (2018) found an increased ownership of mobile phones among small scale farmers, but these farmers had little knowledge on how to operate the devices to search for market information.

Another study conducted in Tanzania by (Barakabitze, et al., 2015) focusing on Agricultural Research Institutions (ARIs) also found that ICT devices were available in the ARIs' but their use was limited due to challenges such as inadequate computers, supporting technological infrastructure, lack of electricity, unreliable Internet connectivity, and lack of systematic ICTs investment. Lwoga (2010) looked at the public accessed telecentres' and rural radios in Tanzania as a means for knowledge acquisition to rural farmers and found that mobile phones are becoming popular for farmers to communicate with telephone operators enquiring for agricultural information.

Collectively, these studies highlight the increasing usage of mobile phones in developing countries, particularly Africa and Asia and their role in reducing information asymmetry and increasing market efficiencies. Various studies (Nyamba, 2017; Lwoga, 2010; Saidu et al., 2017) have identified some challenges in using ICT tools, including mobile phone usage to small scale farmers. Studies in Tanzania, however, have focused on ARIs', telecentres' and radios as providers of agricultural information and knowledge. Despite an increased adoption and positive effects of mobile phones by the rural population (Nyamba, 2017), there are still barriers to the use of these devices by small scale farmers for enhancing market access in Tanzania. This study aims at assessing the determinants of mobile phone usage for marketing agricultural products of small-scale orange farmers in Muheza Tanzania using the Unified Theory of Acceptance and Use of Technology (UTAUT) by (Venkatesh et al., 2003). The basic premise of this theory is related

to the assessment of experiences and the process which motivates individuals to accept a new information system (Saxena, 2017). In the present study, constructs from the UTAUT model are being used to formulate objectives and hypotheses.

ICT has a lot of benefits and potentials for improving marketing of agricultural products. However, many Tanzanian farmers are not fully utilizing the potentials of ICT. Nyamba, (2017) argued that there is a disparity between mobile phone subscriptions which is increasing and their uptake in the farming practices. This study is motivated to find out what determines ICT, particularly mobile phone uptake/use in marketing agricultural products. The results from this study will provide insights on the determinants of mobile phone usage of orange farmers in relation to the marketing of agricultural products, and the benefits obtained by these farmers, which will help agricultural stakeholders to come up with strategies to help farmers make better use of mobile phone to enhance their market participation. The study is guided by the following objectives:

To examine the relationship between Performance expectancy and behaviour intention to use mobile phones for agricultural market access of small-scale orange farmers in Muheza, Tanzania.

To establish the relationship between effort expectancy and behaviour intention to use mobile phones for agricultural market access of small-scale orange farmers in Muheza, Tanzania

To examine the link between social influence and behaviour intention to use mobile phones for agricultural market access of small-scale orange farmers in Muheza, Tanzania

To find out the link between facilitating conditions and behaviour intention to use mobile phones for agricultural market access of small-scale orange farmers in Muheza, Tanzania

To assess the connection between behaviour intention and use behaviour of mobile phones for agricultural market access of small -scale orange farmers in Muheza, Tanzania.

To find out mobile phone usage patterns of orange farmers in Muheza, Tanzania

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Mobile phone usage and Marketing of Agricultural Products

ICT has played an important role in various sectors including agriculture. Farmers can easily get latest information on weather through the internet or check the market information of different crops (Chhachhar et al., 2016). Nowadays farmers are aware of ICT tools like computer, internet and mobile phones. Mobile phones use is rapidly spreading in rural areas and farmers benefit from using it. Using mobile phones, farmers can communicate directly with their customers, sell their produce in good price, receive various information and share their experiences with each other (Chhachhar et al., 2016).

Various studies have been conducted worldwide to show the importance of ICT on marketing agricultural products. For example, Lashgarara et al. (2011) conducted a study in Iran and found that ICT has a moderate role in improving the agricultural product marketing. Among the improvements in agricultural marketing in Grasmsar township included; New methods of agricultural product advertising (via emails and mobile phones), delivering of information about selling of products, improving price of agricultural products (farmers find good markets to sell their products with the best price), developing local and international markets and identifying needs of the consumers (Lashgarara, et al., 2011).

Saidu et al. (2017) reviewed literatures in developing countries and the findings revealed improvement of marketing activities, exchange of relevant information, profit gain, networking agricultural sector globally, conducting research and strategizing economic growth for self-reliance are among the possible benefits of ICT in agricultural sector. Similarly, the review identified inadequate ICT facilities, lack of personnel, insufficient infrastructure, harmonization of knowledge and language, power supply and farmers' perception are some of the challenges and issues that obstruct successful implementation of ICT in agricultural growth.

Ojo and Oluwatusin (2017) conducted a research on the Determinants of ICT-based Market Information Services Utilization among Small-sized Agro-based Marketers in Nigeria. The findings revealed that; majority of the small sized agro-based marketers used mobile phone for Marketing Information Services. Similarly, the main determinants of

ICTs-based MIS were, age, monthly expenses on ICT, value of assets, marketing experience, years spent in formal school, association membership, and monthly income. On the other hand, the marketers were faced mainly with irregular power supply and financial problems.

Irungu et al. (2015) did a study on how ICTs attracts youth into profitable agriculture in Kenya. They used the internet and social media to obtain production technologies, market information and sharing information. In addition to that, voice messages and SMS assisted timely accessing of market prices, reaching clients, sharing production information and money transactions.

Tadesse and Bahiigwa (2015) conducted a study on Mobile Phones and Farmers' Marketing Decisions in Ethiopia. In general, the impact is not strong enough to believe that mobile phones are really helping farmers in marketing decisions. The empirical analyses on farm gate prices clearly indicate that the impact is almost always insignificant. These findings suggest that cell phones may be useful for certain farmers in certain types of circumstances, but in the study area mobile phone does not seem to be an important channel to access price information.
Based on the above-mentioned studies, there are inconclusive results on the usage of mobile phone in marketing agricultural products. Some researchers indicated significant results (Irungu et al. 2015; Ojo & Oluwatusin 2017), while others have reported insignificant results of mobile phone usage in marketing of agricultural products (Tadesse & Bahiigwa 2015). Such inconsistencies in findings prompt researchers to conduct a study on the determinants of mobile phone usage in marketing of agricultural products.

Unified Theory of Acceptance and Use of Technology (UTAUT) and hypotheses
The study will adopt the UTAUT model proposed by Venkatesh et al. (2003). This model has been widely used in predicting the behavioural intention to adopt technology. In this study, UTAUT model will be used to predict small scale orange farmers behavioural intention to adopt mobile phone in marketing agricultural products especially oranges. Venkatesh et al. (2003) and other researchers (Venkatesh et al., 2012; chhachhar, et al., 2016) established that usage intention is likely to be predicted by performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC).

Performance Expectancy (PE)
User's intention to adopt technology depends on the user's expectation on its performance (Sarfaraz, 2017). Previous research shows performance expectancy influences behavioural intention to adopt mobile phones use in accessing the market. For example, the study by (Engotoit et al., 2016) showed there is a significant positive relationship between performance expectancy and behavioural intention to use mobile phones for agricultural information access and dissemination. Researchers in different geographical locations considering various domains found that performance expectation are a vital factor to help users shape their behavioural intentions (Chhachhar et al., 2016; Alemu & Negash, 2015)

Thus, leading to the hypothesis
H1: Performance expectancy has a positive significant relationship with behaviour intention to use mobile phones for agricultural market access of small-scale orange farmers in Muheza, Tanzania.
2.2.2 Effort Expectancy

Effort expectancy is defined as the degree of ease of use of a system (Sin Tan et al., 2013). Technology adoption specialists stressed that user's perception of ease of use determines the acceptance of the technology (Sarfaraz, 2017). Easy to use and requirement of less effort is one of the key reasons the users of mobile phones adopt the technology. The concept has been explored in the past by many researchers proposing that effort expectancy has a unique significant and positive influence on behavioural intention to accept and use mobile phones in agricultural marketing (Engotoit et al., 2016; Sin Tan et al., 2013; Chhachhar et al., 2016). For example, Sin Tan et al. (2013) found that effort expectancy has a significant positive relationship with behaviour intention to use a mobile phone in marketing. In a study by Chhachhar et al. (2016) showed a positive, weak but highly significant correlation between effort expectancy and mobile phone usage intention on agriculture and price information among farmers. Based on these studies the following hypothesis is proposed
H2: Effort expectancy has a positive significant relationship with behaviour intention to use mobile phones for agricultural market access of small-scale orange farmers in Muheza, Tanzania.

Social Influence

Venkatesh et al. (2003: p.451) defines social influences as "the degree to which an individual perceives the importance of others' believes that he or she should use the new system". To understand how social influence shapes the mobile phone usage intentions. Chhachhar et al. (2016) demonstrated that the farmers' decision to adopt mobile phone usage for agricultural marketing activities is influenced by family members, close relatives and friends. Their findings showed a highly significant positive and weak correlation between social influence and mobile phone use in agricultural market access

H3: Social influence has a positive significant relationship with behaviour intention to use mobile phones for agricultural market access of small-scale orange farmers in Muheza, Tanzania.

Facilitating conditions

Facilitating conditions refer to the user's perceptions of the resources and support available to help the use of mobile phones (Venkatesh, Thong, & Xu, 2012). Alemu and Negashi (2015) explained that facilitating conditions include supporting the user while interacting with technologies such as learning the skills from a friend. The choice of mobile phone service provider is affected by facilitating conditions such as network coverage, service quality, easy availability of subscriptions and availability of recharge vouchers. Also, the access of users to internet services and users' proficiency results in high adoption rate. The study found that facilitating conditions was a significant construct on mobile phone usage behaviour in the context of agricultural products in Ethiopia. This leads to the following hypothesis:

H4: Facilitating conditions have a positive significant relationship with use behaviour of mobile phones for agricultural market access of small-scale orange farmers in Muheza Tanzania.

Behavioural Intention

Behavioural intention is defined as an indication of an individual's readiness to perform a given behaviour (Al-Mursalin, 2012). Behavioural intention is proposed to be a major determinant of use behaviour (Devis, Bagozzi, & Warshaw, 1989). The construct has been widely explored by past researchers and have found to have a positive and significant relationship with use behaviour (Al-Mursalin, 2012; Alhehri, Rutter, & Smith, 2019). For example, the study by Alhehri, Rutter, and Smith (2019) found that behavioural intention has a positive and significant relationship with use behaviour. Based on these findings the following hypothesis is proposed

H5: behavioural intention has a positive significant relationship with use behaviour of mobile phones for agricultural market access of small-scale orange farmers in Muheza, Tanzania.

Conceptual Framework

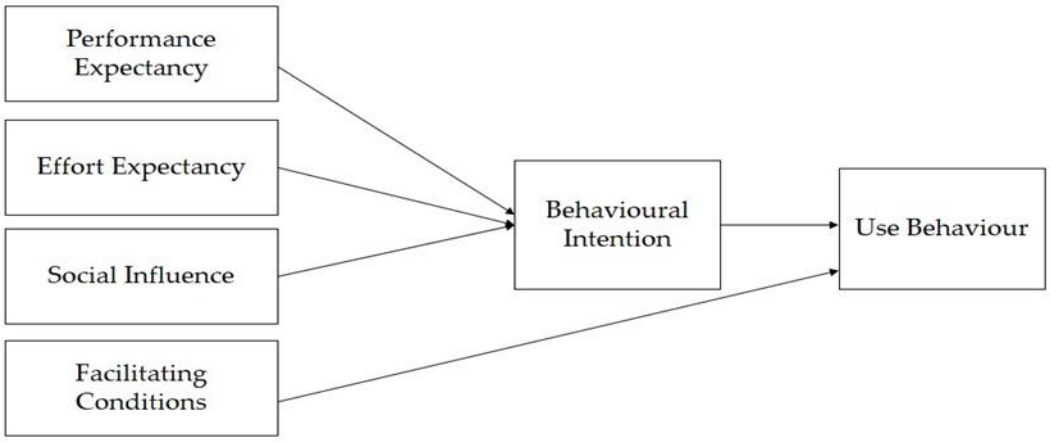

Figure 1: The Unified Theory of Acceptance and Use of Technology
Source: Venkatesh et al., 2003

METHODOLOGY

Research Area and sample

The study was carried out in Muheza District in Tanga region, Tanzania. The region has been selected due to the fact of being a major orange producer in Tanzania, and it is estimated that more than 80% of all oranges are produced in Muheza District (Mhando & Ikeno, 2018). Tanga has a total area of 1,974 km2 and a population of 204,461 people. The district is divided administratively into four divisions, 37 wards, and 135 villages. The district receives two rainfall seasons with an average annual rainfall of 1,100 to 1,400 mm. A reasonable amount of rainfall is important for the success of the agricultural industry, which is the backbone of the economy and the livelihood of many of the district's residents (Mhando & Ikeno, 2018).

A parallel convergent mixed research strategy was adopted. Both qualitative and quantitative methods were combined to achieve a comprehensive view of the problem at hand. These methods complement each other's weaknesses and strengths (Creswell, 2014). Cluster sampling technique was used to select the villages where data were collected. At first, two divisions out of four were selected from which 6 wards out of 11 and finally 28 villages from these wards were purposefully selected based on their location. From the twenty eight villages, 280 orange farmers were randomly selected to participate in the study.

Data collection process

Data were collected by means of the questionnaire and Focus group discussions. The questionnaire composed of seven-point Likert type items ranging from "1= strongly disagree" to "7 = strongly agree" for five constructs was adopted from Venkatesh et al., (2012). The five constructs include performance expectancy, effort expectancy, social influence, facilitating conditions, and Intention to use mobile phones. Use behaviour was measured as a formative composite index of both variety and frequency of mobile phone use. The list of popular mobile applications in Tanzania such as SMS, WhatsApp, Facebook, Instagram and others were used, and respondents were asked to indicate their usage frequency for each application. The 7-point scale ranging from "never" to "many times per day" was adopted. An English version of Venkatesh et al. (2012) was back translated from English to Swahili the commonly spoken language in Tanzania by two independent professional translators to ensure translation equivalence.

The questionnaire prepared was piloted to 10 small-scale orange farmers at Michungwani ward, Handeni District in Tanga region. At the end of the pilot study, exploratory Factor Analysis was tested to ensure construct validity and the reliability (Table 1) of the questionnaire. The results from the pilot study showed that Cronbach's Alpha reliability values for performance expectancy (0.812), effort expectancy (0.724), social influence (0.764), and use behaviour (0.628) were acceptable, but that of behavioural intention was not acceptable (< 0.05). After the pilot study items for behavioural intention were reviewed to enhance its reliability before the actual data collection.

Qualitative data were collected through focus group discussions with orange farmers from seven villages where one focus group discussion was conducted in each village. The choice of focus group dissuasion is motivated by the need to encourage the sharing of views and illuminate orange farmers different perspectives regarding mobile phone usage in agriculture marketing activities. Mkumbo (2012) opined that people's perspectives, experiences and feelings are more likely to be constructed through discussion and social interactions. The proceedings of focus group discussion were carried out in Kiswahili and audio recorded using smart phones. Data collected were transcribed verbatim in Kiswahili then text extracts to support findings were translated into English. Before commencing data collection, the research clearance was sought from the relevant authorities, including the regional, district, and village levels to conduct research in villages. Participant's consent, voluntary participation and anonymity were respected.

Data Analysis

Data gathered through focus group discussion were analysed through content analysis, in which themes were identified and illustrated using participants' quotes. Finally, response frequencies were generated and presented using tables. This method was used to respond to objective 6.

Data from the questionnaire were analysed through Structural Equation Modelling (SEM) using AMOS and assumptions were tested. Before the actual analysis, data were screened for missing values, outliers, normality, multicollinearity and homoscedasticity from the variables. In this dataset, 12 sets were found with missing data and excluded from the dataset using listwise deletion method. This method was appropriate due to the fewer number (2%) of missing data to influence the results. In addition, 33 extreme cases or outliers were also excluded from the analysis after calculating the Mahalanobis distance values. So, the number of responses was reduced to 243. Normality test was done using coefficients of skewness and kurtosis which fell within the acceptable range of +/-2 values as suggested by

Won et al. (2017). After ensuring that the data are clean, then, the model was developed and factors were tested through factor analysis. The factor loadings of the survey items were satisfactory as indicated in Table 1.

Table 1: The Factor Loadings of the survey items

Item	1	2	3	4	5	6
PE1	.382					
PE2	.849					
PE2	.777					
PE4	.694					
EE1		.661				
EE2		.766				
EE3		.803				
EE4		.757				
SI1			.499			
SI2			.673			
SI3			.521			
FC1				.643		
FC2				.721		
FC3				.709		
FC4				.864		
BI1					.805	
BI2					.798	
BI3					.716	
SMS						.407
WhatsApp						.886
Facebook						.831
Instagram						.934
Web sites						.927
Eigen Values	**6.698**	**3.506**	**1.544**	**1.481**	**1.110**	**1.039**
Variance Explained	**29.120**	**15.242**	**6.714**	**6.438**	**4.827**	**4.519**
Total Variance	**66.861**					
Reliability of factors	**.713**	**.837**	**.828**	**.416**	**.786**	**.850**
Reliability of the survey	**.791**					

RESULTS AND DISCUSSION

The demographic profile of farmers

The demographic profile described regarding the respondents' gender, age, education and farming experience. The results revealed that male respondents dominated in the survey. The study received a higher percent of males (71%) compared to females (29%). Although men and women are working in agriculture, but culturally and traditionally only a few women participated in this study. Concerning the age of the respondents, the data from the finding showed that, the heaviest concentration of surveyed respondents is clustered around 46 – 60 years (29.2%). In this survey, respondents with primary education level are overrepresented (52%). The majority of respondents contacted had primary education, since the agricultural sector is perceived to fit those with low or no education. The largest concentration of surveyed respondents' orange farming experience is clustered around 6 – 10 years (25.5%). These results imply that long time experience in orange farming might be the cause of orange farmers' rigidity in applying new technology like the use of mobile phone for marketing their agricultural products.

Model Development and Testing through Structural Equation Modelling (SEM)

The model was created based on the literature and tested using SEM via SPSS V. 25. The results of the model with standardized path coefficients are presented in Figure 1. The results of the model indicate that the most significant determinants of ICT usage in marketing agricultural products of orange farmers in Muheza are: social influence, facilitating condition and effort expectancy. In this study, performance expectancy was found not a significant determinant to small-scale orange farmers.

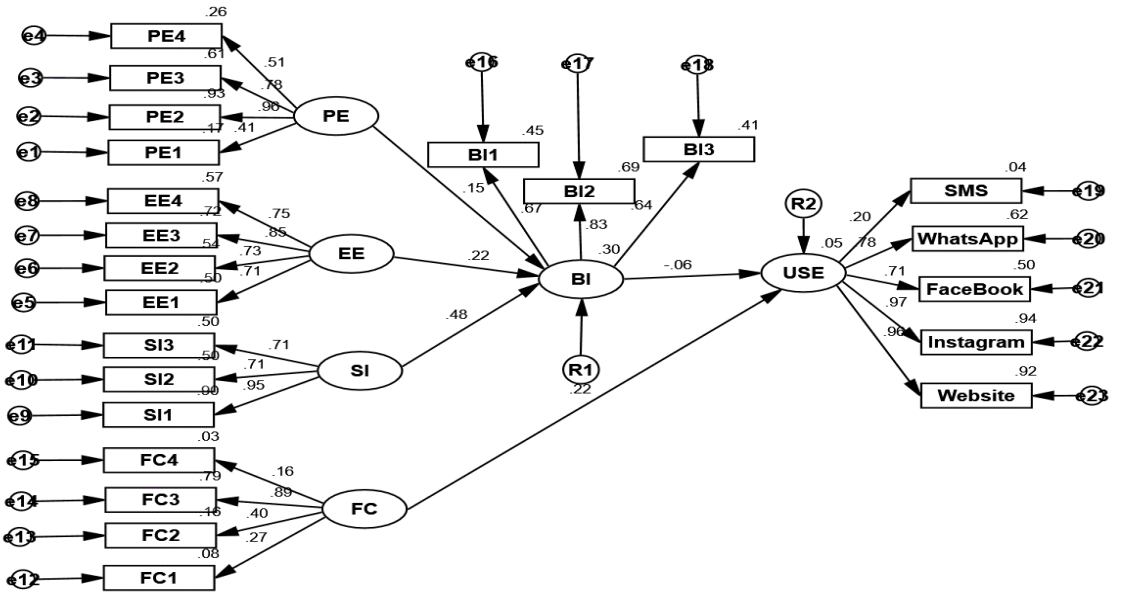

Figure 2 A Structural Equation Modelling of the Determinants of ICT Usage for Marketing Agricultural Products

The results of the model were checked in terms of goodness of fit. The findings reveal the chi-square value $\chi 2 = 587.258$ (df = 222, p <.05), which is insignificant according to the literatures. Nevertheless, this value is quite sensitive to sample size and becomes most significant when the sample size is large. Yet, despite its insignificance, generally the model was found to be acceptable and have a perfect fit according to its indices as shown in Table 2. The ranges of these indices were determined based on Civelek (2018).

Table 2 Fit Statistics Ranges and the Values of the Model

GoF index	Perfect	Acceptable	Values in the model	Results
Cmin/Df	≤ 2	≤ 3	1.691	Perfect
GFI	≥ . 95	≥ . 90	.904	Acceptable
NFI	≥ . 95	≥ . 90	.882	-
CFI	≥ . 97	≥ . 95	.954	Acceptable
AGFI	≥ . 90	≥ . 85	.894	Acceptable
RAMSEA	≤ . 05	≤ . 08	.053	Perfect

Hypothesis Testing

In this study a standardized path coefficient, critical value (C.R) and significant level (p) was used in the testing and evaluation of strength and the level of significance of the hypotheses (Hair et al., 2010; Hayes and Preacher, 2014) as indicated in Table 2. Hoe (2008) and Chin (1998) argued that a standardized path coefficient (γ) should be at least 0.2 in order to be considered significant and meaningful for discussion. Furthermore, Hox and Bechger (2014) suggest that a relationship which has yielded a critical ratio greater than 1.96 and p-value less than 0.05 is considered significant.

Table 3. The Relationships between the Constructs in the Model

Table 1. The Relationships between the Constructs in the Model

Hypothesis	Relationship			Estimate	S.E	C.R	p	Standardized Estimates	Results
1	BI	<---	PE	.072	.032	2.252	.024	.151	Not supported
2	BI	<---	EE	.111	.035	3.136	.002	.222	Supported
3	BI	<---	SI	.247	.038	6.523	***	.481	Supported
4	USE	<---	BI	-. 328	.384	-. 854	.393	-. 061	Not supported
5	USE	<---	FC	.200	.091	2.198	.028	.224	Supported

In hypothesis one we predicted that performance expectancy has a positive significant relationship with behaviour intention to use mobile phones for agricultural market access of small-scale orange farmers in Muheza, Tanzania. The results reveal a direct positive path coefficient (γ =. 151) with critical values (C.R = 2.252 which is >1. 96) and significance level of $p \leq 0.05$. From these results hypothesis one is not supported, with the paths linking performance expectancy to behaviour intention being positive but not significant. The

In hypothesis two we predicted that effort expectancy has a positive significant relationship with behaviour intention to use mobile phones for agricultural market access of small-scale orange farmers in Muheza, Tanzania. The results reveal a direct positive path coefficient (γ =. 222) with critical values (C.R = 3.136 which is >1. 96) and significance level of $p \leq 0.05$. From these results hypothesis two is supported, with the paths linking effort expectancy to behaviour intention being positive and significant. These outcomes substantiate the other finding (Engotoit, Kituyi, & Moya, 2016; Sin Tan, Chong, & Lin, 2013), which indicated a positive and significant relation between effort expectancy and behaviour intention.

In hypothesis three we predicted that social influence has a positive significant relationship with behaviour intention to use mobile phones for agricultural market access of small-scale orange farmers in Muheza, Tanzania. The results reveal a direct positive path coefficient (γ =. 481) with critical values (C.R = 6.523 which is >1. 96) and significance level of $p \leq 0.05$. From these results hypothesis three is supported, with the paths linking social influence to behaviour intention being positive and significant. The findings are consistent with the study of (Alemu & Negash, 2015; Chhachhar, Chen, & Jin, 2016) which indicate that social influence has a positive significant influence on behaviour intention to use mobile phone for marketing agricultural produce.

In hypothesis four we predicted that facilitating condition has a positive significant relationship with use behaviour of mobile phones for agricultural market access of small-scale orange farmers in Muheza, Tanzania. The results reveal a direct positive path coefficient (γ =. 224) with critical values (C.R = 2.198 which is >1. 96) and significance level of $p \leq 0.05$. From these results hypothesis four is supported, with the paths linking the facilitating condition to use behaviour being positive and significant. The finding is in line with that of Alemu and Negash (2015) which indicated a positive and significant relationship between facilitating conditions and behaviour intention to use a mobile information system for small scale rural farmers.

In hypothesis five we predicted that behaviour intention has a positive significant relationship with use behaviour of mobile phones for agricultural market access of small-scale orange farmers in Muheza, Tanzania. The results reveal a direct negative path coefficient (γ = -. 061) with critical values (C.R = -.854 which is >1. 96) and significance level of .393 which is p>0. 05. From these results hypothesis five is not supported, with the paths linking behaviour intention to use behaviour being negative and insignificant. The findings are similar to that of Alemu and Negash (2015) who showed a significant influence of behaviour intention and the actual use of a mobile based information system for small scale rural farmers.

Interview Results

Research Objective 5 - Mobile phone usage patterns of orange farmers in Muheza, Tanzania

Regarding the study, objective – to find out the mobile phone usage patterns of orange farmers in Muheza, Tanzania. We gathered information about the mobile phone(s) ownership, usage frequency, and context of use of mobile phone(s) by orange farmers.

Mobile phone ownership by orange farmers

We noticed that all 35 farmers who participated in the focus group discussion had mobile phones. To find out the types of mobile phones owned by farmers – they were asked to raise hands holding their phones. We discovered that the majority (32) equivalent to 84.2% had techno analogy phones and only three (8.57%) had smartphones. This shows that orange farmers had phones with limited functionality to reap benefits of technologies supporting marketing activities. However, such phone(s) can be efficiently used for calling and sending SMS to receive marketing information from various agricultural stakeholders.

Usage Frequency of mobile phone by orange farmers

When asked the question how many times per day do you use your mobile phone? We discovered that the majority use their mobile phones frequently (32) while a few (3) occasionally. During the interview one farmer had this to say "I use my phone many times a day" and another one said "I use it three or four times a day". It is therefore expected that orange farmers the knowledge and experience of using mobile phone orange farmers have will translate into its use in marketing activities.

Orange farmers' mobile phones context of use

When asked about the context of use for different mobile phones, their answers pointed to issues of communication, searching for information, using mobile money services, and business purposes as presented in Table 4

Orange farmers' mobile phone context of use

Theme	Aspect	Example Quotations
Communication	Personal communication	"*To communicate with relatives events such as tragedy, wedding, activities…"*
	Among farmers	"I contact my fellow farmers"
	Calling intermediaries	"*I communicate with businessmen who are intermediaries…."*
	Keeping in touch with customers	"*I use my phone for calling my customers to come pick up oranges*"
	Contacting extension officers	"*If I have a problem with my oranges in the field my contact extension officers*"
	Calling suppliers for agricultural input	"*To communicate with suppliers for agricultural input*"
Mobile money services	Sending and receiving money	"To send and receive money"
Business purposes	Business accounting	"*I use my phone to calculate the sells for my oranges*"
	Negotiate the price	" *I contact intermediaries regarding markets and negotiate the price*"
	Information searching (weather)	"*To monitor the weather forecast for when to plant crops*"

When asking about whether the farmers have used their mobile phone(s) for farming activities, majority (25) of respondents answered on the affirmative while a few (10) mentioned that they have not used their mobile phones for farming activities. As seen in Table 4 – farmers use their mobile phones for communicating with suppliers to check the availability and order agricultural input, to communicate with extension officers to explain problems with crops, receiving advice on how to improve their farm products. Other uses include communicating with intermediaries to check for market availability and orange prices, checking for weather information as well as sending and receiving money. Farmers use their mobile phones for marketing activities, but such use is far from transforming their marketing strategies as they are entrapped by intermediaries. The findings are consistent with (Chhachhar, Chen, & Jin, 2016) whose results showed that farmers own mobile phone use them for communication but rarely for marketing, weather and agricultural information.

CONCLUSION AND RECOMMENDATION

From the findings it can be concluded that the determinants of mobile phone usage for marketing agricultural products of small-scale orange farmers in Muheza Tanzania are effort expectancy, social influence and facilitating condition. Although the data were obtained in a few villages, the obtained data indicated that BI is highly and significantly related to SI and EE. On the other hand, PE was insignificantly related to BI. Interview results indicate that farmers own mobile phones mostly normal mobile phones. Their usage patterns vary from occasionally to most often and they mostly use them for personal communication and some aspects of farming but rarely for marketing purposes.

Based on these results the following recommendations are put forward:

- SI has the highest significant positive relationship on BI. In this regard extension officers have to stand as role models by using mobile phones in disseminating marketing information to farmers. In this way small-scale orange farmers' uptake of mobile phone adoption in marketing agricultural products will be improved.
- EE also revealed a positive and significant relation to BI. In this regard education on the usage of mobile phones for marketing purposes should be emphasised and provided to orange farmers to enhance their skills on how to operate a mobile phone.
- FC had a positive and significant relation to use behaviour. Therefore, technical facilities and support should be established in rural areas. The government should ensure provision of infrastructure and equipment needed in the uptake of ICT by farmers.

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