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ABSTRACT

This study determined the influence of socioeconomic factors to the adoption of mobile phones in the farming community of Tanzania. Currently, a series of well-established models (such as the TAM, UTAUT and the Social Capital Model) provide inadequate consideration toward socioeconomic factors, by ignoring them, or putting them under the same cluster, regardless of their differences in impacting the technology use. Methodologically, a survey strategy was adopted, with a sample of 116 respondents. The study involved farmers along the Pangani River Basin, found in Kilimanjaro and Tanga Regions of Tanzania. Data was analyzed using advanced quantitative methods such as the ANOVA, Multiple Regression and Chi-Square models. The following results were observed: the user experience and the peer influence determined the perception of farmers on benefits of mobile phones in agriculture; the perceived benefits, peer influence and the purchasing power determined the intention to use the mobile phones in agriculture; and the intention to use mobile phones determined the rate of use. The mobile use demands showed insignificant relationships with both the intention and the rate of use.

Keywords: e-agriculture, m-agriculture, ICT in agriculture, Tanzania, economically developing countries

INTRODUCTION

Scientific societies invest effort to develop innovative systems that simplify how agro-activities are accomplished (Nyamba and Malongo, 2012). This development is to support the performance of responsibilities among farmers (Muzari, Wirimayi, and Muvhunzi, 2012). Thus, it is necessary to understand the factors defining the behavior of technology use, to successfully map the benefits of a given technology in a subjected society (Venkatesh, Thong, and Xu, 2012; Muzari, Wirimayi, and Muvhunzi, 2012). Arguably, the literature presents numerous studies on the adoption of new technology. One of the factors known to determine user's behavior is the attitude of users toward the technology (Venkatesh and Bala, 2008). According to the Technology Acceptance Model (TAM 2) and the Unified Theory of

Acceptance and Use of Technology (UTAUT 2), this attitude defines how someone thinks and feels about something, and finally expresses himself/herself through a certain behavior. The new technology is adopted with difficulties when the attitude of the user toward the technology is negative (Thomas, Lenandlar, and Kemuel, 2013; Park, 2009). Moreover, the literature identifies the "ease of use" as another variable defining the attitude of the user toward the new technology (Venkatesh and Davis, 2000; Park, 2009).

Furthermore, the study by Yang, Zhiling, and Mu (2013), and that of Astrid, Mitra and David (2008) identified the perceived enjoyment among the factors defining the acceptance of the new technology. Observations by these studies reflect that of the UTAUT 2, reported by Venkatesh, Thong and Xu (2012). Therefore, in addition to completing a given task, the user must experience the acceptable level of comfortability with the technology (Kohnke, Cole, and Bush, 2014). If the technology accomplishes the required task, but the user is not enjoying the process, it is likely to be dropped for the one which provides both incentives (Kohnke, Cole, and Bush, 2014; Park, 2009). In addition, the study by Venkatesh, Thong and Xu (2012) acknowledged facilitating conditions among key variables for the adoption of the new technology. The conditions include the availability of the required resources and environment necessary for smooth operation (Nyamba and Malongo, 2012).

Also, the literature acknowledges social factors to influence the intention to use, and the behavior of using the new technology (Yuan and Anol, 2014). Some social factors are associated with the culture of the society, while some are learned and adopted over time (Yang, Zhiling, and Mu, 2013; Yuan and Anol, 2014). Unfortunately, the available literature fails to consider the fact that social factors differ, and they may offer different influence during technology adoption. Instead of providing a generic discussion on these factors, the current study addresses the factors independently. The study vests its interest to socioeconomic factors influencing the adoption of the new technology to the rural farming community of Tanzania. The interest is fueled by the fact that the study is conducted in the rural area of Tanzania, where social acceptance and the economic status of an individual are key for various decisions (Ngowi, 2009).

Reports by the Tanzanian Communications Regulatory Authority show that in the year 2010 and 2017, there were 21,108,304 and 40,044,186 registered SIM cards, respectively (Tanzania Communications Regulatory Authority, 2010; Tanzania Communications Regulatory Authority, 2017). The information suggests a sharp increase of mobile phone users within the Tanzanian community. Moreover, statistics show the increase in the number of internet users: In 2011 and 2016, users were 5,311,218 (12%) and 19,862,525 (40%) of the whole population, respectively. While the percent of internet users is still low, the adoption of mobile phones (by many) is boosting the use of communication technologies in information sharing, and in providing technical solution to different human activities (Akudugu, Emelia, and Dadzie, 2012). Arguably, the literature suggests that mobile phones are equally used in agriculture, and its rate of use reflects available benefits (Kimberley, Paul, and Sukanlaya, 2012; Kohnke, Cole, and Bush, 2014). Nevertheless, the impact of socioeconomic factors on mobile phone use is lowly emphasized in local contexts; different studies focus on generic factors (Chauvin, Mulangu, and Porto, 2012; Lubua, 2017). Therefore, it is necessary for this study to understand the socioeconomic factors influencing the intention and behavior of farmers toward the use of mobile phones in the Tanzanian farming community. The following objectives are more specific to different aspects of the study in the African context:-

1. To determine the impact of *the perceived benefit, the intention to use, mobile use demands, and the purchasing power of farmers,* on the rate of mobile phone use in agricultural activities.
2. To determine the impact of *the perceived benefits, the peer influence, mobile use demands, and the purchasing power of farmers,* on the intention to use mobile phones in agriculture

3. To determine whether *farmers' experience with the use of mobile phones and peer influence* impacts the perceived benefits of mobile phones in agriculture

LITERATURE REVIEW

All human activities involve decision making at some point. People who have access to the right information are in a better position to make relevant decisions (Lubua, 2014). This is the reason why most organizations put information resources at the center of their attention, for enhanced decision making. It is unarguable that information systems meant to provide users with the ability to access the right information for decision making in economic activities (Lubua, 2014; Byrne, Kelly, and Ruane, 2003). The systems offer an enhanced ability to collect, process, and store data. Moreover, they increase the ability of users to access and share information from different sources. With the increase in the use of mobile phones, the accessibility and efficient sharing of information is more desired (Bindah and Othman, 2016). The increase of information sharing positively impacts different economic activities, including agriculture. In this study, we focus on two categories of variables; the first category is made of three prominent variables for the adoption of the new technology. The variables are the user behavior, the intention to use the technology, and the perceived benefits. The second category of variables focus on socioeconomic factors interacting with the first category of variables.

User's behavior, intention to use and the perceived benefits of mobile phones

The Technology Acceptancy Model (TAM 2) and the Unified Theory of Acceptancy and Use of Technology (UTAUT 2), together with their earlier versions, identify the behavior expressed by users (of the technology) as an important output in defining the success of the adopted technology (Venkatesh and Bala, 2008; Venkatesh, Thong, and Xu, 2012). Generally, the behavior expressed by the user of the technology is defined by the intention to use the technology. On the other hand, the intention to use the new technology is under the influence of the perception of users on benefits to be achieved and the ease of using the subjected technology (Venkatesh and Bala, 2008; Venkatesh, Thong, and Xu, 2012). Meanwhile, the Motivational Model of Microcomputer Usage (introduced by Igbaria, Parasuraman and Baroudi, 1996) confirmed that the perceived benefits of the technology do also determine the behavior of the user towards the technology. Further to this, studies by Venkatesh and Bala (2008), Venkatesh, Thong, and Xu (2012), and Muzari, Wirimayi and Muvhunzi (2012), do also acknowledge the influence of perceived benefits to the intention to use the new technology. In the current study, the three variables (that is, the use behavior, the intention to use, and the perceived benefits) form the basis for conceptualization because they are perceived to integrate better with socioeconomic factors, when compared with the ease of use (Muzari, Wirimayi, and Muvhunzi, 2012; Manda and Mwakubo, 2014). Therefore, based on the Tanzanian agricultural community, the current study predicts that:

Hypothesis 1a. The perceived benefits of mobile phones in agriculture increases the rate of use in related activities

Hypothesis 1b. The perceived benefits of mobile phones in agriculture will determine the intention of farmers to use in related activities

Hypothesis 1c.The intention of farmers to use mobile phones in agriculture determines the rate of use

Socioeconomic factors for mobile phone adoption

The current study was conducted in Tanzania, a community where social factors are at the center of the ideology founding the nation that is socialism and self-reliance (Ngowi, 2009). A good example where the ideology is embraced is the establishment of Village Community Banks (VICOBA), where groups of citizens organize themselves to address common social and economic goals through the fund they raise (Lushakuzi, Killagane, and Lwayu, 2017). Equally, the government uses similar setting of groups in promoting its development agenda. Knowing the importance of socioeconomic factors to the Tanzanian community, it is acceptable to suggest that studies by Venkatesh, Thong and Xu (2012) and Venkatesh and Bala (2008), being the latest in their famous series of technology adoption models, place a low importance to socioeconomic factors in predicting the technology use behavior. The main challenge is that in the study by Venkatesh, Thong and Xu (2012) all social factors are placed in the same cluster, regardless of their uniqueness. The current study addresses this weakness by considering socioeconomic factors independently, respecting their uniqueness in predicting the use. The following socioeconomic variables are included in this study: the peer influence, the purchasing power, mobile use demands, and the user experience.

The purchasing power of users

The purchasing power of users is one of the socioeconomic factors considered to affect the decision to use mobile phones among low income societies. The study by Venkatesh and Bala (2008) ignores the significance of this economic aspect to the adoption. Nevertheless, Venkatesh, Thong and Xu (2012) consider the price value, but do not relate it with the user's behavior. The current study has a low level of interest at the impact of the price value toward the technology use; instead it chooses to study the purchasing power of users. This is because some users may fail to purchase a service of a lower price, due to their weak purchasing power (World Bank, 2016). The purchasing power may affect their technology use behavior. This assumption is more relevant to developing countries (such as Tanzania) where many citizens have a spending ability equivalent to $1USD (or less) per day, to address all of their needs (Ngowi, 2009; World Bank, 2016). Moreover, it is the interest of the current study to know the relationship between the purchasing power and the intention to use among respondents. Therefore, we predict that:

Hypothesis 2a. The purchasing power of the farmer determines the intention to use mobile phone services in agriculture

Hypothesis 2b. The purchasing power of the farmer determines the rate of mobile use in agriculture

Mobile use demands

In this study the mobile use demands represent the concept where the user of the mobile phone is obliged to use mobile facilities to cope with the needs arising from the society (Bindah and Othman, 2016). It is important to emphasize that mobile use demands are expressed through a situation where the adoption of the facilitating technology is necessary to receive a certain service (Livingstone, Schonberger, and Delaney, 2011; Mtebe and Raisamo, 2014)). For example, in agriculture, to use mobile money services and receive agricultural tips; subscription is mandatory (Nyamba and Malongo, 2012). Moreover, some funders and buyers of agro-products require the use of mobile phones linked with a mobile money account for transactions. With this knowledge, the current study was developed under the assumption that socioeconomic demands (surrounding agriculture) to the use mobile phones could affect the intention to use and the use behavior. Based on this information, our study suggests the following hypotheses:

Hypothesis 3a. Mobile phone use demands in agro-activities determine the rate of use among farmers

Hypothesis 3b. Mobile phone use demands in agro-activities determine the intention to use among farmers

User experience and the peer influence

User experience is the subject of the time of use and the frequency of practice (Priyanka, 2012). Farmers experienced with mobile phones are more likely to apply available mobile tools to acquire important information on the value chain system, and manage agricultural activities (Livingstone, Schonberger, and Delaney, 2011). In connection with the theme of the current study, the interest is to determine the influence of user experience on the perceived benefits of mobile phones in agriculture. Furthermore, knowing that there is no formal training given to users of the mobile phone technology (Nyamba and Malongo, 2012; Lubua, 2017), it was the interest of the study to understand the influence of peer pressure in building a knowledge base impacting the perceived benefits of technology. In a community with strong social ties, people are likely to receive motivations on the use of the technology, through witnessing the success or failure of others (Akudugu, Emelia, and Dadzie, 2012). Moreover, in the Tanzanian community, there are times where the adoption of a new service depends on how it identify with social patterns of the society (Ngowi, 2009). In this regard, the question remains whether under such circumstances the peer influence has a role to play, and whether the same is relevant in the intention to use mobile phones in agriculture. Therefore, our study engages the user experience and the peer influence, as input variable, in formulating the following hypotheses:

Hypothesis 4a. The user experience of mobile phones determines the perceived benefits, of the use, in agriculture

Hypothesis 4b. The strength of the peer influence toward using mobile phones determines the perceived benefits

Hypothesis 4b. The perceived peer influence toward using mobile phones in agriculture determines the intention to use

Conceptualization of the study

Generally, the conceptualization of the framework in F

igure 1, was based on the literature presented in subsections above. First, the study used three variables from studies by Venkatesh, Thong and Xu (2012) and Venkatesh and Bala (2008), to form the initial baseline. The variables are the use behavior, the intention to use, and the perceived benefits. In this study the use behavior refers to the rate of mobile phone use in agricultural activities as acknowledged by respondents. Moreover, the intention to use is simply the desire of the respondent to make use of mobile phones in agriculture; this perspective is supported by Kohnke, Cole and Bush (2014) and Venkatesh and Davis (2000). The perceived benefits reflects advantages to be received upon the use. These variables are at the center of technology adoption models (Chan, Gong, Xu, and Thong, 2008; Kohnke, Cole, and Bush, 2014); nevertheless, the uniqueness of the current study is based on the integration of socioeconomic factors to these variables, to form a complete conceptual model. Based on the literature, it was further discovered that the peer influence, the purchasing power, past experience and mobile use demands played a role in different decisions of members of the society; therefore, the variables were integrated to the model through brainstorming (Mitchell and Leturque, 2010; Lubua, 2014). Under mobile use demands, we consider the pressure exerted to the user of mobile phone, to use a certain application, as a condition

to access a certain service. Other variables carry their literal meanings. Ultimately, Figure 1 summarizes key relationships tested.

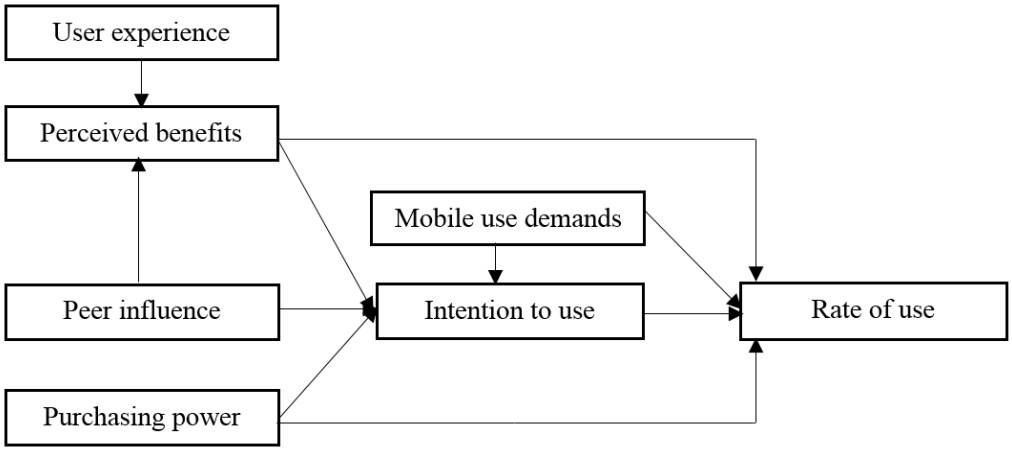

Figure 1: The influence of socio-economic factors to the adoption of mobile phones in agriculture

METHODOLOGY

This study followed quantitative procedures. It was operationalized with the view that the knowledge under search is independent of the researcher, therefore, it is verifiable (Littlejohn and Foss, 2009; Ramanathan, 2008). Moreover, factors influencing the output of the study can be established and studied explicitly (Saunders, Lewis, and Thornhill, 2012). To make an acceptable operationalization of this study, the relationships for testing were pre-established. The testing of these hypothetical relationships is of benefit to the study during the scientific decision-making process and generalization (Collins, 2010; Saunders, Lewis, and Thornhill, 2012). For a proper use of research hypotheses, the study adopted the survey strategy, where closed-ended questions were used to collect data relevant to variables adopted by research hypotheses (Crowther and Lancaster, 2008). The main variables of the study used the Likert scale (ordinal scale), where 1 and 5 represented the lowest and highest perceived points of reference, respectively. Table 1, presents summarized measurements of variables.

	Variable	Measurement scale
1	Rate of use	Ordinal
2	Intention to use	Ordinal
3	The perceived benefit	Ordinal
4	Peer influence	Ordinal
5	Mobile use demands	Ordinal
6	Purchasing power	Ordinal
7	user experience	Ordinal

Table 1: Measurements of the variables

Generally, the study aims to benefit farmers in the Africa Sub-Saharan setting. A common characteristic of these farmers is that they significantly depend on agriculture for their economic survival. For example, in Sub-Saharan Africa, approximately 90% of the whole population engages in small scale farming (Livingstone, Schonberger, and Delaney, 2011). Moreover, they have low capital at their disposal, therefore any innovation to simplify their work would add value to their activities. To obtain a manageable population, the study was conducted in Tanzania with farmers performing their agricultural activities along the Pangani River Basin. Geographically, the study included the part of the river located in Korogwe and Same Districts. Moreover, the study chose two administrative wards (one from each district) to set its sampling frame. The purpose was to make sure that the study meets available resources - that is time and fund. The study managed to access a list of 140 farmers, from their administrators. According to the Krejcie and Morgan (1970) model, the minimum required units of the sample for an effective representation in a sampling frame of 140 units are 116. This sample was obtained through systematic sampling. The size of the sample is supported by Frankfort-Nachmias and Nachimias (1996) who suggested 30 units as the minimum number for quantitative analysis.

Moreover, the study used the Social Science Statistical Package (SPSS) to analyze data. This began with coding the input of the research questionnaire to acceptable variables of analysis. Based on presented hypothetical relationships (in section 3), the study adopted the multiple regression model as the main method for decision making. Moreover, the One Way ANOVA and Chi-square were used to test categorical relationships. The One Way ANOVA fits the analysis where ordinal data are involved with a minimum of 30 units, and data which normally distributed (Lehmann, 1977). This study limited extreme scores and anomalies through the use of a five-level Likert scale.

Accordingly, the validity and reliability of this study were ensured through different methods. First, the content validity ensured that intended variables are appropriately measured (Saunders, Lewis, and Thornhill, 2012). The study relied on an extensive review of the literature to establish measurable aspects of the variables. Moreover, the study used experts of the subject to verify themes of the study, with reference to the conceptual model. Additionally, face validity was conducted to ensure that data are collected from relevant people (Hair, Black, Babin, Anderson, and Tatham, 2006). Furthermore, a pilot study was conducted with 20 respondents, and necessary measures were taken to adjust the contents of the questionnaire based on the feedback from respondents. Accordingly, the reliability of the study was tested through the Cronbach Alpha. On a scale between zero (0) and one (1), the increase of the value increases the reliability, and vice versa (Collins, 2010). The study by Hair, Black, Babin, Anderson and Tatham (2006) recommends that 0.70 represents the minimum acceptable Cronbach value. This study achieved the minimum acceptable value by an average score of 0.74. This study observed research ethics acknowledged and enforced by the University of Cape Town (University of Cape Town, 2008). This includes ethics for using human objects and acknowledging that plagiarism is unacceptable.

RESULTS

This section presents the results of the study, where a total of 116 respondents were engaged. Overall, the following are the characteristics of the sample used by the study: the age of respondents, marital status, gender and the level of education. Table 2 presents the summary of the results, followed by explanations on whether the demographic variables offer a categorical relationship with the intention to use mobile phones in agriculture.

Results in Table 1 reveal that 77.6% of all respondents are of the age below 45 years. The results support the information by the Tanzania Bureau of Statistics, where the largest population composition of adults is below 45 years of age (National Bureau of Statistics, 2013).

	Scale	Frequency	Per cent
Age	Age<=30	32	27.6
	30<Age<=45	58	50
	Age>45	26	22.4
	Total	116	100
Gender	Male	90	77.6
	Female	26	22.4
	Total	116	100
Marital Status	Single	20	17.2
	Married	94	81
	Divorced	2	1.7
	Total	116	100
Education	Primary Education	104	89.7
	Secondary Education	8	6.9
	Post-Secondary Education	4	3.4
	Total	116	100

Table 2: Characteristics of respondents

Accordingly, this age category is expected to be the most active workforce in the society. Moreover, it is necessary to report that the One Way ANOVA test between age groups and the intention to use mobile phones (in agriculture), showed an insignificant relationship; Table 3 shows that the p-value was 0.175. Therefore, the intention to use mobile phones in agriculture, cannot be identified with the age of the farmer. This is possibly because this type of farming is conducted away from residences, and males are more suited based on the African culture (Ngowi, 2009). Other variables that showed an insignificant categorical relationship with the intention to use include the marital status (0.107), and the level of education (0.067); the One Way ANOVA was applied. On the other hand, the study confirmed a significant categorical relationship between the gender of respondents and their intention to use mobile phones in agriculture; the study applied the Chi-square model for testing, and the p-value was 0.000. Furthermore, it was surprising to learn that 77% and 55% of females and males, respectively, desire to use mobile phones in agriculture. Arguably, the results are against a typical African culture, where men define trends in economic activities because they are more privileged (Manda and Mwakubo, 2014).

	Output variable	P-value	Analytical model
Age	Intention to use	0.175	One Way ANOVA
Gender	Intention to use	0.000	Chi-Square
Marital status	Intention to use	0.107	One Way ANOVA

Level of education	Intention to use	0.067	One Way ANOVA

Table 3: Categorical relationships testing

Testing Key Hypotheses of the Study

The operationalization of the study was guided by the conceptual framework (figure 1) and related hypotheses. The operationalization was based on the fact that all hypotheses were pointing to three key output variables: The rate of use, the intention to use, and perceived benefits. Therefore, in the first category of hypotheses, the study used Multiple regression model, to test the impact of each of the following input variables to the rate of mobile phone use in agriculture: The hypothesized input variables are -– the perceived benefits of mobile phones in agriculture, the intention of farmers to use mobile phones in agriculture, the degree to which farmers admit that they adopted the mobile technology due to compelling needs (mobile use demands), and the purchasing power of farmers. The observed results, in table 4, show a collective low predictability of predictor variables. The following model values were observed: r = 0.391, r-square = 0.153, and the adjusted r-square=0.122.

Furthermore, the study examined parameter estimates of the coefficient table (summarized in table 5), to understand the contribution of each variable to the main output. Results from the coefficient table suggest that the p-value for the intention to use is 0.042. The observed p-value is less than 0.05, which is the threshold value. Therefore, the intention to use mobile phones yields a significant causal influence to the rate of using mobile phones in the Tanzanian agricultural community. The p-values for other variables are as follows: the perceived benefit (0.230), mobile use demands (0.235), and purchasing power (0.085). The latter variables do not fit to the relationship.

Input variables	The Output variable	R	Adjusted R^2
Mobile use demands, purchasing power, and the perceived benefits, intention to use	Use rate	0.391	0.122
the purchasing power, perceived benefit, mobile use demands, and the peer influence	Intention to use	0.518	0.242
users' experience, and peer influence	Perceived benefits	0.414	0.157

Table 4: Multiple regression model output

The second aspect of hypotheses testing involved all hypotheses with the intention to use as the output variable. The analysis determined the causal impact of the following variables to the intention to use mobile phones in agriculture: the perceived benefits of mobile phones in agriculture, the degree to which they consider the peer influence as important (in embracing a new technology), the degree to which farmers admit that they adopted the mobile technology due to compelling needs (mobile use demands), and the purchasing power of farmers. The summarized results of the analysis in table 4 suggest the following analytical information: r=0.518, r-square=0.269, and the adjusted r-square=0.242. This category shows an improved relationship, compared to the one representing the first hypothesis. Furthermore, the following p-values, were observed to express the coefficient (refer table 5) of the regression analysis for each respective input variables: mobile use demands (p=0.949), perceived benefit (p=0.012), the

purchasing power of the user (p=0.013), and the peer influence (p=0.001). Therefore, mobile use demands is the variable that did not fit the model.

Accordingly, the third category of hypotheses two variables were involved in determining their causal impact to the perceived benefits of using mobile phones in agro activities. The input variables were: The experience of farmers on the use of mobile phones, and the degree to which farmers consider the peer influence as important (in embracing a new technology).The regression results summarized in Table 4, suggested the following results: r = 0.414, r-square = 0.172, and the adjusted r-square = 0.157. Moreover, the information from the coefficient table (in table 5) suggests the following p-values, for individual predictor variables: Peer Influence (p=0.000), and user experience (p=0.014). The two predictor variables are proved to significantly predict the perceived benefit. Therefore, they fit to the regression model.

	Output variable	p-value
Intention to use	Rate of use	0.042
Perceived benefit	Rate of use	0.230
Mobile use demands	Rate of use	0.235
Purchasing power	Rate of use	0.085
mobile use demands	Intention to use	0.949
Perceived benefits	Intention to use	0.012
Purchasing power	Intention to use	0.013
Peer influence	Intention to use	0.001
Peer influence	Perceived benefits	0.000
User experience	Perceived benefits	0.014

Table 4: Coefficient results of successful relationships of the regression model

Based on the analysis summarized in Table 5; the model in Figure 2 is adopted for this study. The figure presents the combination of variables integrating with socioeconomic factors to predict the use of mobile phones in agriculture. The variable known as mobile use demands failed to qualify the test, therefore, it was dropped from the model presented in Figure 2. Through analysis, the following positions of hypotheses are confirmed:

1. The intention to use mobile phones in agriculture determines the rate of use
2. Perceived benefits of mobile phones in agriculture determine the intention to use
3. The purchasing power of farmers determines their intention to use mobile phones in farming activities
4. The peer influence determines perceived benefits and the intention to use mobile phones
5. The user experience determines the perceived benefits

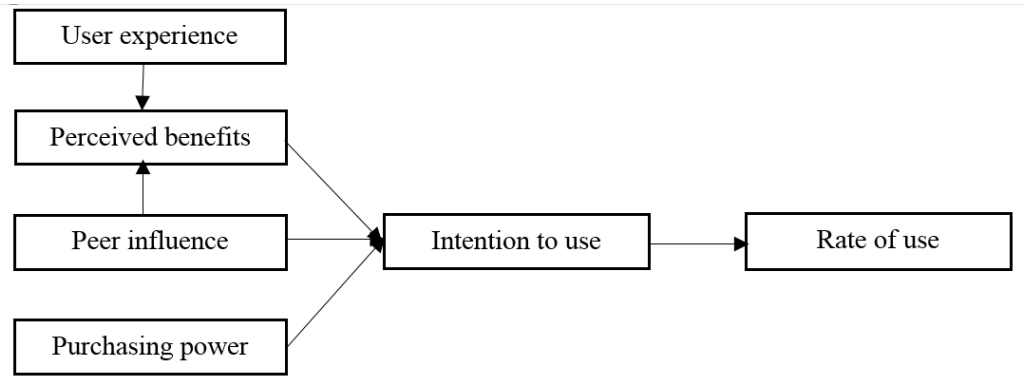

Figure 2: Model for integrating socioeconomic factors to the adoption of mobile phones in agriculture

DISCUSSION

In this study, the key relationships of the conceptual model were established through multiple regression analysis. This is because the conceptual framework dictates the understanding of the causal effect of predictor variables to the output variable. Relationships presented in figure 2 meet this requirement; therefore, they form an important part of this discussion. The study approaches this discussion based on three variables: the perceived benefits, intention to use, and the rate of use. Other variables presented in figure 2 are discussed based on how they relate with the key variables.

The perceived benefit is represented by the value which the farmer places upon the use of mobile phones in agriculture. Different authors use different terms to explain benefits that the user is likely to get through the use of technology in their activities. The study by Venkatesh and Davis (2000) uses the term technology usefulness, and that of Venkatesh, Thong and Xu (2012) considers it as the expected performance. This is the degree to which the use of the technology provides benefits to the consumer in performing a given task (Venkatesh, Thong, and Xu, 2012; Kohnke, Cole, and Bush, 2014). Based on figure 2, the perceived benefit is significantly influenced by two factors: the peer influence and the user experience with the technology. In the Tanzanian context, peer influence is more supported by the social and economic ideology founding the nation, known as socialism and self-reliance (Ngowi, 2009). Moreover, the study by Bindah and Othman (2016) strongly supports this suggestion by stating that peer communications influences the perceived level of materialism anticipated through the use of technology. Moreover, the importance of user experience is approved by different literature. Basically, this is because of the value it provides in the learning process (Bindah and Othman, 2016; Kimberley, Paul, and Sukanlaya, 2012). Learning makes the user realize the value of the given technology.

Accordingly, the intention to use is another variable that depends on numerous factors to exist. First, it receives the influence from the perceived benefit. The literature broadly supports the suggestion that the increase or decrease of the perceived benefit causes the same impact to the intention to use mobile phones in economic activities, including agriculture (Venkatesh and Bala, 2008; Nyamba and Malongo, 2012; Venkatesh, Thong, and Xu, 2012). For example, Venkatesh, Thong, and Xu (2012) use an alternative variable describing the perceived benefit known as the performance expectancy. It represents both technical and economic performances and suggests that it influences the intention of the user to use the technology. Other studies which share this opinion, include Thomas, Lenandlar, and Kemuel (2013), and Kohnke, Cole and Bush (2014), where both articles concluded that the degree to which the user of

the technology believes that the use will improve the benefits, do also increase the intention to use. This study ascertains this position in the farming community of Tanzania.

Secondly, peer influence has a causal impact to the intention to use mobile phones in agriculture. Studies by Bindah and Othman (2016), and Priyanka (2012) collectively suggested that the peer influence supports informal learning and enhances the desire for adoption where prestige is expected. This statement is inconsistent with the current study; however, the impact of the peer influence on the intention to use is equally confirmed. Accordingly, the third variable influencing the intention to use is user purchasing power. The purchasing power is simply the ability to carry the cost to be incurred to use mobile technology. In this study, the purchasing power impacts the intention to use. Studies by Chan, Gong, Xu, and Thong (2008) and Mtebe and Raisamo (2014) concentrated on the cost structure of mobile phone services, and not the ability of users.

The third aspect of the model (Figure 2) considers the rate of using mobile phones, as the output variable. In the model, one variable is proved to influence the rate of use, that is, the intention to use. Arguably, numerous studies offer their support for this observation in different ways. Studies by Venkatesh and Davis (2000), Venkatesh and Bala (2008) and Bindah and Othman (2016) use the same term, as the current study, to explain this relationship. On the other hand, the study by Venkatesh, Thong, and Xu (2012) and Kohnke, Cole, and Bush (2014) uses the term "behavioral intention" for the predictor variable, and "user behavior" for the output variable. This study ascertained the influence of the intention to use to the use behavior, among farmers, in Tanzania. Collectively, although socioeconomic factors do not offer a direct impact to the user behavior, their influence is translated through the intention to use. The model in Figure 2 is more valuable because of the way it integrates socioeconomic factors to the adoption process.

CONCLUSION AND RECOMMENDATION

Overall, it was the intention of this study to determine the integration of socioeconomic factors to the adoption of mobile phones in agricultural activities. The study was based on relationships stated in Section 3 and the results are summarized as follows. Both the user experience with mobile technology and peer influence predict the perceived benefit of using mobile phones in agriculture. Moreover, the perceived benefit, the purchasing power of the use and peer influence determine the intention to use mobile phones. Additionally, the intention to use is the only variable which determines the rate of using mobile phones is agriculture. Arguably, the current study emphasizes the importance of socioeconomic factors in the decision to adopt or decline the mobile technology in the farming community. The integration of factors such as peer influence (pressure) and user's purchasing power is evident. Moreover, with provided evidence, this study contributes to the current body of theory by introducing the model integrating socioeconomic factors to the general adoption of mobile phones in the farming community in Figure 2.

Based on the provided results, the study recommends the consideration of socioeconomic factors in the adoption of mobile phones and related technologies in agricultural activities, among small farmers. The overlooking of these factors has a negative impact on the intention to adopt and the rate of using mobile phones in agriculture. Lastly, the study recommends two things in future studies: First, the social factors can be extended to include more factors viewed to be influential in a given community; moreover approaching the study with a subjective perspective may unveil new social aspects, out of the current theoretical boundaries.

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