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Effects of Farmers' Peer Influence on the Use of ICT-based Farm Input Information in Developing Countries: A Case in Sikasso, Mali

Macire Kante [1], Christopher Chepken[2], Robert Oboko[3]

[1]*Centre National de la Recherche Scientifique et Technologique, Mali*

[2]*University of Nairobi, Kenya*

[3]*University of Nairobi, Kenya*

[1]*maciredancira@gmail.com,* [2]*chepken@uonbi.ac.ke,* [3]*roboko@uonbi.ac.ke*

Abstract

Agriculture, characterised by low productivity and dominated by small-scale cereal farmers constitutes the backbone of developing countries' economy. Use of agricultural inputs permits the increase of the yield and hence productivity. However, use of such farm inputs relies heavily on the availability of information. Information and Communication Technologies (ICT) play a vital role in the dissemination of agricultural input information. Nevertheless, use of ICT-based farm input information is related to certain conditions such as farmers' peer influence. This influence was investigated, and its effect on the use of ICTs for more access and use of agricultural input information was identified. We gathered from 300 respondents in Sikasso, Mali. The results showed that farmers' peer influence explained 80.2% of use ICT-based farm input information. From these results, it is important to take this influence as the main factor determining the utilisation of ICT-based farm input information in the cereal production context.

Keywords: Cereals, Productivity, ICT4D, Developing Countries, Farm Inputs,

1. Introduction

Small-scale cereal farmers mastered the agricultural activities in developing countries. For instance, in Mali, the agriculture sector is dominated by small family farms (68%) (Angelucci, Gourichon, Mas Aparisi, & Witwer, 2013). In addition, cereals constitute the main part of the Malian agricultural production (Aparisi & Balie, 2013). In Ethiopia, in the year 2010/11, over 96 per cent of cereals were produced by smallholder farmers (Bwalya, Asenso-Okyere, & Tefera, 2012). This was also the case in Tanzania (Msoffe & Ngulube, 2016), in India (Kameswari, Kishore, & Gupta, 2011). These farmers, therefore, play an important role in the agricultural production in these countries.

However, low farm productivity characterises small-scale cereal farmers' agricultural production due to a lack of use of farm inputs. For instance, in Mali, Burkina Faso and Ghana, Traoré, Mamy, JBélières, & Hilhorst, (2011) argue that the farm inputs utilisation rates have always been low. To that point, Staatz & Temé (2015) emphasise that one of the sources of productivity increase is technological improvements through access to improved farm inputs in Mali. Therefore, farm inputs increase productivity.

Farm inputs use depends largely on the adoption of farm input information. For instance, in Tanzania, farmers' decision to adopt farm inputs is greatly influenced by the amount of (farm input) information that is available (Msoffe & Ngulube, 2016). Well-informed farmers make wise decisions, which in turn are responsible for improving farm productivity.

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Farm input information can be disseminated by Information and Communication Technologies (ICT). For instance, Aker (2011) reports that since 2007, there has been a proliferation of mobile phone-based applications and services in the agricultural sector, providing information on market prices, weather, transport and agricultural techniques in developing countries. We can cite Senekela and MyAgro in Mali; Nokia Life in India, Indonesia, Nigeria and China; Indian Farmers Fertilizer Cooperative Limited (IFFCO) Airtel Initiative and E-choupal in India; TigoKilimo in Tanzania; Ukisaan and Kissan in Pakistan (Chung, 2015; GSMA, 2015; Pshenichnaya & Clause, 2013; Singh, Bhanotra, L, Wani, & Kumar, 2016; Siraj, 2010). Therefore, (small-scale cereal) farmers have been exposed to ICT-based farm input information in developing countries (Kameswari et al., 2011; Kante, Chepken, & Oboko, 2017b; Kante, Oboko, & Chepken, 2016, 2017).

Despite this availability of different ICT channels, adoption of farm input information remains a problem for farmers. For instance, in Kenya, there is still room for improvement since a large number of the country's 3.5 million smallholder farmers still work without basic agricultural inputs (KTM, 2013). In addition, in Tanzania, the increasing use of ICTs has not benefited the agricultural sector (Wulystan & Andrew, 2013). Though efforts have been made to apply ICT services in the farm input information sector, the contribution of ICT services to the adoption of farm input information is far from expectations (Kante et al., 2016).

1.1. Motivation for the Study

The insignificant contribution of ICTs to adopt agricultural input information in developing countries is due to the lack of use of ICTs. Mittal & Mehar (2012) argue that overall ICTs' have not yet been able to create an impact as expected, possibly because there are challenges (factors) in putting the new knowledge to use. An investigation needs to be conducted into these difficulties (factors) affecting farmers' use of ICT-based farm input information and their relationships to inform the design and delivery of this information service to small-scale cereal producers.

One of the factors emerging as an important element in the use of ICT-based farm input information is the farmers' peer influence. For instance, Lwoga (2010) argued that the primary sources of information for farmers were predominantly local (neighbours, friends and family). In addition, Palmer (2015) reports that almost all users of an ICT-based farm input information service interviewed said that other farmers come to them every month for farming advice in Mali. Therefore, there is a need to investigate farmers' peer influence and its effect on the use of ICT-based farm input information in developing countries.

The objective of this study was to establish farmers' peer influence on the use of ICT-based farm input information and to identify the effects of that influence on the utilisation of these ICTs by small-scale cereal farmers. This study refers to cereal as millet, sorghum, maize and fonio. Adoption and Use are interchangeably used in this study as the decision to start using something such as ICT-based farm input information. This paper assumes that: a) the use of farm inputs will increase the agricultural productivity, and b) other factors can affect ICT-based farm input information services' utilisation.

Finally, in this study farm input information is any information on crop planning (better information on higher yield crops and seed varieties), buying seeds (identify the best time to plant and source of inputs), planting (use better fertiliser and apply better techniques).

The paper is organised as follow: a literature review discusses the state of ICT-based farm input information in developing countries and particularly in Mali focussing on the emerging constructs. The literature review also provides a theoretical background and a conceptual framework for this study. The research methodology section discusses the study design, sampling and investigation tools. The next section, which is results and discussion, deals with the findings and discusses them. The following section provides the conclusions of the study and makes a recommendation for future inquiries. Finally, the last section discusses the contribution and implications of this study.

2. Literature Review

The first subsection states the development of ICT-based farm input information in Mali. The last subsection describes the constructs used to measure the farmers' peer influence with respect to the use of ICT-based farm input information. It also transforms the empirical constructs into theoretical constructs by exploring the models in the field of IT adoption research that fit the most these constructs. The subsection finally provides a conceptual framework.

2.1. Developments of ICT-based Farm Input Information in Mali

The most dominantly used ICT channel in Mali and elsewhere is the mobile phone. It was introduced in Mali in the 1990s with only one telecom operator. The use of mobile telephone has grown since then regarding a number of network providers, coverage, subscriptions and services offered. For instance, in 2005, there were 7,620 mobile phone subscribers, 7.4 million subscribers in 2010 and 10.8 million in 2011 (AMRTP, 2011).

ICTs' services on the mobile phone for farmers started in 2011. The ICT-based farm input information Myagro was launched in 2011 (Myagro, 2016). Another ICT-based farm input information Senekela was launched later on in 2014. These are the two ICT services disseminating farm input information in Mali and specifically in the region of Sikasso towards cereal producers (Kante, Oboko, et al., 2017).

Myagro enables farmers to purchase high-quality farm inputs (certified seeds and fertiliser) on layaway (agreement in which the seller reserves an item for a consumer until the consumer completes all the payments necessary to pay for that item) through an SMS-based platform and a network of local vendors. It helps farmers to get information that would increase their crop yields by using modern planting techniques and providing access to simple agricultural machines that can make their work more efficient and effective and eventually enhance their profitability. The service started with approximately 3,500 customers. It has reached over 18,000 customers by the year 2016 (Kante, Oboko, Chepken, & Hamunyela, 2017).

Senekela relies on a call-centre with agronomists who advise the farmers – in French, Bambara, Senoufo, Peuhl and Bozo (local languages) – on all their daily questions in the agricultural domain including planting methods, the seeds to use, sowing time and application of fertilisers. The service had 180,000 customers in 2014 (GSMA, 2015).

2.2. Theoretical Background and Conceptual Framework

The first sub-section describes some of the relevant theories in the field of technology adoption and individuals. The second sub-section presents the constructs used in this study to measure the farmers' peer influence on the use of ICT-based farm input information. The third sub-section presents the conceptual framework.

2.2.1. Theoretical Background

Concerning Information Technology and Individuals study, Lim et al. (2009) identified five most used theories: the Technology Acceptance Model (TAM), the Theory of Reasoned Action (TRA),the Diffusion of Innovation Theory (DOI/IDT), the Theory of Planned Behaviour (TPB) and the Social Cognitive Theory (SCT).

Nevertheless, in the field of farm input information and technology adoption research, the DOI has been applied in Benin (Adebedi et al, 2012) to propose a model for ICT adoption by rice farmers. In Iran, TAM and DOI have been applied to predict the factors affecting intention to the adoption of precision agriculture technologies among agricultural specialists (Rezaei-Moghaddam & Salehi, 2010). These models have shortcomings. For instance, the model in Benin did not address the Social Influence as a factor in the use of ICT by rice farmers. Moreover, the targeted cereal crop was only rice while it was argued that the most important cereals in Africa are maize, sorghum and millet, with wheat and rice increasing in importance (Wood & Cowie, 2001).

DOI has five characteristics which determine the rate of adoption: relative advantage, compatibility, complexity, trialability and observability (Rogers, 1983). The adoption or use of the DOI is defined at the persuasion level that is labelled as behavioural intention to use in other technology acceptance models/theories such as TAM or UTAUT. DOI attempts to predict the behaviour of individuals and social groups in the process of adoption (use) of innovation, considering their characteristics, social relations, time factor and the features of the innovation (Simin & Janković, 2014). The theory categorises the adopters of technology into innovators, early adopters, early majority, late majority and laggards forming a bell-shaped curve (Rogers, 1983).

This study is part of an extensive research that aims to propose an ICT model for increased adoption of farm input information by small-scale cereal farmers using the DOI as the basis theory. However, this paper is interested only in Observability and Social Influence.

2.2.2. Study's Constructs

Farmers share information among themselves. Each community is comprised of people who regularly act around a respective set of issues, profits or needs (Benard, 2013). That was also emphasised by the findings of Lwoga et al. (2011) which demonstrated that the primary sources of information for farmers were predominantly local (neighbours, friends and family). In addition, they further concluded that 67% of farmers found families, friends and neighbours' information very efficiently. That hence means that sharing information about a new technology or new idea on farm input information accessed through an ICT service is a major key to the success of an innovation especially ICT.

Palmer (2015) conducting a study on Senekela in Mali observed that almost all users interviewed in the field said that other farmers come to them every month for farming advice. This finding means that the information seekers were satisfied with the information given to them by their fellow farmers who were using Senekela. Satisfaction of farmers affects information usage because farmers who are satisfied with the information are likely to adopt it (Msoffe and Ngulube, 2016) or keep using it. Therefore, the non-ICT users would try to get the information directly from the source, which is the use of such ICT.

Moreover, due to the satisfied information that they got, farmers also received advice to use ICT. That was highlighted by Palmer (2015) whose findings concluded that most repeat users recommend the service and share the information they receive with other farmers. About 74% of repeat users in the phone survey said they had recommended the ICT service Senekela to farmers outside of their household, and 63% reported sharing the advice they received with other farmers –both are good indicators of satisfaction with the service (Palmer, 2015). In addition, the customers who used agronomic advice from the service and have seen an increase in yield, share the information they receive with other farmers (ibid.). Further, the same study reports that these farmers recommended to others (non-users) to use the service. Therefore, farmers peer' influence affects the use of ICT-based farm input information.

Repeat users are influential in their communities, providing advice to other farmers (Palmer, 2015). That can be interpreted as the way the influential ICT users can describe (Observability) their achieved results to other farmers. Thereby, the non-users get knowledge of the ICT and its benefit (Observability). It can also be interpreted as the community pressure (Social Influence) on non-users to use ICT. That is emphasised by Pick and Gollakota (2010), who argue that if people in a person's social or reference groups who use the technology report satisfaction and advocate its use to non-users, they motivate non-users to try the system. In conclusion, there is a relation between observability, social influence and the use of ICT-based farm input information. Hence, the study categorises Observability and Social Influence as Farmers' peer influence with respect to the use of ICT-based farm input information.

Table 1. Factors affecting the use of ICT-based farm input information. Adapted from Kante et al. (2016)

Construct	Factor	Countries	Empirical evidence
Farmers' influence on each other in the use of ICT	Observability	Benin, Iran, Mali, Tanzania and Uganda	(Adegbidi, Mensah, Vidogbena, & Agossou, 2012; Chung, 2015; Kaddu, 2011; KTM, 2013; Meera, Jhamtani, & Rao, 2004; Palmer, 2015; Pshenichnaya & Clause, 2013; Rezaei-Moghaddam & Salehi, 2010; Siraj, 2010)
	Social Influence	Tanzania, Mali and Guinea	(Chung, 2015; Kaba, Diallo, & Plaisent, 2006; Palmer, 2015)

- **Observability**

The Observability has been involved in many studies related to developing countries. In a study on the factors influencing the adoption and usage of online services in Saudi Arabia, the Observability was used by measuring people's knowledge about the e-service and its benefits (Al-Ghaith, Sanzogni, & Sandhu, 2010). The study found that there was a significant relationship between e-service adoption and e-service observability in Saudi Arabia.

Adegbidi et al. (2012) argue that Observability, also known as communicability, demonstrability or describability, is the degree to which results of an innovation are visible to others. They found that Observability is positively related to the use of ICT services by rice farmers in Benin. These two studies in Benin and Iran were similar to our study. Thus we concluded the Observability affects the use of ICT-based farm input information. Is Observability significantly affecting ICT-based farm input information used by cereal farmers in Mali?

- **Social influence**

Rogers (1995) defines pressure or social norms as the values or behaviours, which are the most, accepted by the members of society. Social pressure refers to an individual's belief that he should adhere to the same practices agreed to by the people enjoying a high social status in the environment. Ventkatesh et al. (2003) argued that Social influence is defined as the degree to which an individual perceives that important others believe he or she should use the new system.

The social influence has been found in related studies to affect the use of ICT. For instance in Guinea, Kaba et al. (2006) concluded that results obtained from a sample of 463 respondents the social influence is the key determinants of cellular phones' use. In addition, the Social Influence has found to be a driver in the use of ICT in Mali, Tanzania and Iran (Kante et al., 2016). This study refers to the Social Influence as defined by (Ventkatesh et al., 2003) in the context of cereal production by small-scale farmers.

- **Use of ICT-based farm input information**

In the study of Innovation, the term diffusion is most often used to describe the process by which, individuals or groups in the society adopt a new technology or replace old technology with new (Simin & Janković, 2014). Observability and Social Influence affects the Use of ICT-based farm input information (Atkinson, 2007; Dandedjrohoun, Diagne, & Biaou, 2012; Kante et al., 2016; Kante, Oboko, & Chepken, 2017a).

The Diffusion of Innovation Theory has Observability and Adoption (Use) as defined above and has been applied in the field of farm input information. Thus, we chose to use this Observability and Use (of ICT). The theory does not have the construct Social Influence that was empirically supported.

The Unified Theory of Acceptance and Use of Technology (UTAUT) suggests that three constructs are the main determinants of intention to use an information technology: performance expectancy, effort expectancy, and social influence (Li, 2010; Ventkatesh et al., 2003). The construct Social Influence was extracted from this Theory. Figure 1 shows the conceptual model of this paper. It is of importance to recall again that this study is part of a wide research that aims at proposing an ICT model for increased adoption of farm input information. Nevertheless, the current paper is looking at only the two highlighted factors and it assumes that there several other factors that affect the use of ICT.

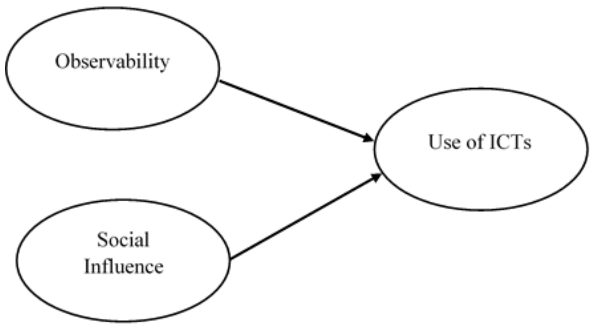

Figure 1. Conceptual Framework

3. Research Methodology

Any research methodology is broadly divided into two: quantitative and qualitative. The study was conducted through quantitative methods. We adopted a cross-sectional survey strategy.

3.1. Population, Sample and Sample Procedure

With a surface area of 71,790 km^2, a population of 2,643,179 and 406,774 households in 2009 (RGPH, 2013), Sikasso is the third administrative region of Mali. The region of Sikasso was purposively selected because it was the main coarse grain (millet, sorghum, maize and fonio) production area in Mali (DRPSIAP, 2011). The selection of the district was based on: a) ICT-based farm input information services in the area and b) cereal production (maize, millet, sorghum and fonio). Consequently, the district of Bougouni was selected as it was the district with the largest number of farmers using the ICT-based farm input information Myagro (KANTE & Myagro, 2016). In terms of cereal production, the district has a cereal production of 105,805.07 tonnes and a population of 69,750 households (DRPSIAP, 2011; RGPH, 2013).

Table 2: sample distribution

District	Commune	Village	Households	Sample
Bougouni	Zantiebougou	Zantiebougou	473	473*300/958 = 148.12 ≈ 148
		Monzondougou koloni	194	194*300/958 = 60.75 ≈ 61
		Sirakoro	152	152*300/958 = 47.59 ≈ 48
		Oure	139	139*300/958 = 43.52 ≈ 43
			958	300

Bougouni has nine communes where cereals are produced (DRPSIAP, 2011) and we had strata of four communes. Among these four municipalities, only Zantiebougou's farmers produce all the cereal crops (that were the interest of this study) (DRPSIAP, 2011; PROMISAM, 2012) and also the commune has the largest number of farmers using the ICT Myagro (KANTE & Myagro, 2016). Thus, we chose that municipality. In that commune, we purposively chose four villages: Sirakoro, Zantiebougou, Monzondougou Koloni and Oure as they had the largest number of farmers using ICT-based farm input information. These villages respectively had 152, 473, 194 and 139 households (RGPH, 2013). A random sampling was adopted for the selection of the respondent. A sample size of 200 cases was enough (Kline, 2013). We proposed to collect data from 300 respondents, which would be at least 50% above the required number. We spread out this figure to the four selected sites proportionally (Table 2).

3.2 Data Collection Tools and Methods

Data were collected between May and July 2016 through a survey questionnaire adapted from researchers (Atkinson, 2007; Ventkatesh et al., 2003). This period coincides with the beginning of the rainy season, which is the planting season, in Mali. Hence, it was at that time that farmers look for farm inputs and information on farm inputs. Respondents were requested to fill out the questionnaires and return them to enumerators as appropriate. If they could not fill, statements were read out to them, and they were asked to indicate their level of agreement or disagreement on a 5-point Likert scale: 1=strongly agree, 2=agree, 3= neutral, 4=disagree, and 5=strongly disagree (See Table 3).

Table 3. Data collection instruments

Observability
. Other farmers were/seemed interested in N'gasene/Senekela when they saw me using it (them) (because I discuss with them sometimes)
. People can tell that I know more about access and use of agricultural input information since I have started using N'gasene/Senekela (because I discuss with them sometimes on these ICTs)
. Other farmers using N'gasene/Senekela liked using them, i.e. they found them (it) satisfactory (because I discuss with them sometimes on these ICTs)
Social influence
. My neighbours (village mates, friends) think I should start using/keep using N'gasene/Senekela
. My friends and parents use N'gasene/Senekela
. I feel that using N'gasene/Senekela gives me a particular status than those who do not
Use of N'gasene/Senekela
. I use/plan to use N'gasene/Senekela regularly when preparing to plant my crops
. I intend to use/continue to use N'gasene/Senekela
. I recommend farmers to use N'gasene/Senekela

We used the Census Bureau Guidelines (Pan & de la Puente, 2005) to translate the instrument. The results were reported elsewhere (Kante, Chepken, & Oboko, 2017). In order to validate the translated research instrument, the widely pretesting technique cognitive interview was used to pre-test the survey instrument with six respondents (6) who were grounded in the field. It helped us to contextualise the instrument. Also, a pilot study was conducted with forty small-scale cereal farmers in the study area. That helped us to assess and validate the survey instrument reliability and validity. The phrase "ICT-based farm input information" was replaced by N'gasene/Senekela. To enhance the instrument reliability and validity, some items were dropped. Participation in this study was voluntary.

3.3 Data Analysis Methods

We entered the data collected into IBM SPSS v20 for analyses that involved simple frequency tables and descriptive statistics such as means and standard deviations. The constructs validity was assessed through the Convergent Validity (Cronbach's alpha) and Discriminant Validity (Fornell–Larcker). Urbach & Ahlemann (2010) argued that the traditional criterion for assessing internal consistency reliability is Cronbach's alpha (CA), whereas a high alpha value assumes that the scores of all items with one construct have the same range and meaning. By convention, the same cut-offs apply: greater or equal to .80 for a good scale, .70 for an acceptable scale, and .60 for a scale for exploratory purposes (Garson, 2016). Whereas convergent validity tests whether a particular item measures the construct it is supposed to measure, discriminant validity tests whether the items do not unintentionally measure something else (Urbach & Ahlemann, 2010). The software SMARTPLS 3.2.6 (Ringle, C. M., Wende, S., and Becker, 2015) was used to assess the discriminant validity.

Ordinal logistic regression (often just called 'ordinal regression') was used to predict the ordinal dependent variable (use of ICT-based farm input information) given the two independent more independent variables (Observability and Social Influence) (Lundresearch, 2013) i.e . to test if the independent variable Information Quality is predicting the dependent variable Use of ICT-based farm input information. When the underlying assumptions, particularly variable normality are not met, which was the case of our dataset, logistic regression is more robust than discriminant analysis and has analytical advantages such as ease of interpretation and diagnostics (Hu, Zhang, Zhang, & Dai, 2009).

We run the Nagelkerke R^2 tests to see if the two variables (Observability and Social Influence) logistic model demonstrates an acceptable level of significance and to what extent they explain the variance in the use of ICT-based farm input information. Statistical significance is accepted when $p < 0.05$ throughout the analyses (Flowers, Freeman, Flowers, Freeman, & Gladwell, 2016).

4. Results and Discussions

This section presents and discusses the findings. It is organised as follow: Statistical analysis of the variables that were used; farmers' peer influence with respect to the use of ICT-based farm input information and finally the use of ICT-based farm input information.

With the software SPSS, the data screening showed that we had 222 valid responses: 178 ICT-based farm input information users against 44 non-users.

4.1. Descriptive Statistics

Table 4 summarises the preliminary analysis of the factors used to measure Observability, Social Influence and use of ICT-based farm input information.

Table 4. Descriptive statistics of the variables

Construct	Items	Mean	Std. Deviation	Skewness		Kurtosis	
		Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Observability	ob_27	1.448	.8941	-.436	.163	-.845	.325
	ob_28	1.520	.9004	-.474	.163	-.370	.325
	ob_29	1.527	.9592	-.264	.163	-.776	.325
Social Influence	si_30	1.167	.9674	.174	.163	-.879	.325
	si_31	1.225	1.0306	.137	.163	-1.061	.325
	si_32	1.369	1.2722	.502	.163	-.833	.325
ICT-based farm input information' use	use_36	1.14	.779	.456	.163	.626	.325
	use_37	1.16	.789	.327	.163	.037	.325
	use_38	1.46	.870	-.541	.163	-.768	.325

As shown in Table 4, some of our variables absolute skew value were above +1 as suggested (Groeneveld & Meeden, 1984). Absolute values from about -1 to over +1 of this index are described as indicating "extreme" kurtosis. Our data distribution was not satisfying these two rules. This means that we could not use a parametric test. It justifies our use of nonparametric test specifically ordinal regression.

Table 5 displays the convergent validity of our constructs.

Table 5. Convergent validity

Construct	Items	Convergent validity (Cronbach's alpha)
Observability	ob_27	0.906
	ob_28	
	ob_29	
Social Influence	si_30	0.895
	si_31	
	si_32	
ICT-based farm input information' use	u_i_o_aif_36	0.821
	u_i_o_aif_37	
	u_i_o_aif_38	

As shown in Table 4, the Cronbach's alpha of each one of the three constructs was above the good scale of 0.8. This means that the internal consistency of the responses was consistent across the items within each one of the constructs (Observability, Social Influence, use of ICT-based farm input information).

The results of the discriminant validity using the Fornell-Larcker criterion are displayed in Table 6.

Table 6. Fornell–Larcker Discriminant validity criterion

	Social Influence	Observability	Use of ICT-based farm input information
Social Influence	**0.788**		
Observability	-0.032	**0.923**	
Use of ICT-based farm input information	0.087	0.841	**0.858**

This method states that the construct shares more variance with its indicators than with any other construct (Garson, 2016; Hair, Hult, Ringle, & Sarstedt, 2014). To test this requirement, the Average Variance Extracted (AVE) of each construct should be higher than the highest squared correlation with any other construct (Gefen, Straub, & Boudreau, 2000; Hair et al., 2014). As shown in Table 5, the discriminant validity of our constructs was established according to this criterion. This means that each one of these constructs was unique in the study. After establishing the Convergent and Discriminant validity, we argued that our Construct Validity was established for all of the three constructs.

4.2. Farmers' Peer Influence with Respect to the Use of ICT-based Farm Input Information

This section describes our findings on the two constructs that were used to measure the influence of farmers on each. With the ordinal logistic regression, this study attempts to build an ordinal logistic regression model that best describes the influence of farmers on each other (Observability and Social Influence) in the use of ICTs to access and use agricultural input information.

4.2.1. Model Fitness

Using SPSS V20, we run the ordinal function and report the results in Table 7 and 8.

Table 7. Model fit information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	282.638			
Final	0.000	282.638	8	**.000***

The Chi-square and -2 Log likelihood (-2LL) are used to assess the model fitness. As shown in Table 6, a Chi-square value of 282.638 proves that the data are well fitting the model with a p-value < 0.05. The -2LL demonstrates a similar result with a p-value < 0.05.

In addition, the Cox and Snell R^2 and the Nagelke R^2 values of respectively .720 and .802 demonstrate a good fitness of the model as shown in Table 8.

Table 8. Pseudo R-square Statistics

Cox and Snell	.720
Nagelkerke	**.802**
McFadden	.558

4.2.2. Interpretation

These findings indicated that the two variables Observability and Social influence used to measure farmers influence on each other explain 80.2% of the use of ICTs to access and use agricultural input information by small-scale cereal growers. The establishment of their respective construct validity (Table 5 and 6) indicates that their use to measure the influence of farmers on each other was also consistent and highly reliable (with a Cronbach's alpha values from 0.8 to 0.9). Moreover, the establishment of their discriminant validity means that they were needed and unique for this study.

4.2.3. Discussion

The results of this study showed that farmers do influence each other in the use of ICT-based farm input information. These results confirm many other studies in developing countries. These results confirm the finding of Palmer (2015) in Mali, Kaba et al. (2006) in Guinea, Adegbidi et al. (2012) in Benin and Rezaei-Moghaddam & Salehi (2010) in Iran.

To get further insight into these findings, correlation analysis was conducted to assess the degree of multicollinearity among the three variables of the study. The results are reported in Table 9.

Table 9. Correlation

Correlations				
		Use	Social influence	Observability
use	Pearson Correlation	1	.016	.717**
	Sig. (2-tailed)		.809	.000
	N	222	222	222
Social influence	Pearson Correlation	.016	1	.078
	Sig. (2-tailed)	.809		.244
	N	222	222	222
Observability	Pearson Correlation	.717**	.078	1
	Sig. (2-tailed)	.000	.244	
	N	222	222	222

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

The analysis revealed that Observability has a stronger correlation with Use (0.717) than Social Influence (0.016). The Social influence was defined as Social Pressure on an individual to Use ICT' services (Kaba et al., 2006; Ventkatesh et al., 2003). However, this result shows that pressure is less likely to drive an individual in the use of ICT-based farm input information compared to Observability (results visibility and results demonstrability due to an interaction). This is supported by the success of Myagro in the study area compared to Senekela. Before launching its services and recruiting clients in any village, Myagro deploys its agricultural technicians to explain the village social committee - gathered around the village chief - and the farmers' representative about its service packages and the advantages of working with Myagro. Once the head of the village and its committee approve or adopt the ICT-based farm input information, others are tempted to adopt the service. Use of ICT-based farm input information will lead to an increased adoption of farm input information.

5. Conclusion and Recommendation

Cereal farmers face many challenges such as modern techniques of planting, the best time for planting, access and use to farm inputs because of the lack of information on farm inputs. ICT-based farm input information can address this lack of information in developing countries. The use of such ICTs will depend on certain factors mainly how farmers' peer influence in the use of these ICTs.

Our findings established that the factor Observability and Social Influence of these ICTs constitute major drivers for cereal farmers. Farmers' peer influence explains 80.2% of the Use of ICT-based farm input information in cereal crops context.

From these results, it is important to realise the Observability and Social Influence of ICT-based farm input information for more use of these ICTs and therefore for more adoption of farm input information that is the basis for the increase of the cereal production. Some of our respondents were helped to fill out the form, and that could bias the quality of the data. However, Bowling (2005) concluded that the legitimacy of a study is difficult to establish with some methods than others. In addition, this study was conducted on two ICT-based agricultural input information services in Sikasso. The results may not be applicable to other countries or regions. A further inquiry could be for instance to test these factors in other developing countries and for other crops.

6. Contribution and Implication

This study has made a theoretical, methodological and managerial contribution.

The technology acceptance model provides the basis for understanding between constructs and technology adoption. These models have been applied in many contexts but barely in the context of agricultural input information for small-scale cereal farmers in developing countries. This study has proposed an ordinal logistic regression model. In addition, the established relationship between the variables Observability, Social Influence and Use of ICT-based farm input information will help us in our extensive study to propose a model for small-scale cereal farmers.

The methodology used in this study do guidelines for researchers interested in the same area or connected. The method used to translate the survey instrument from English to French and Bambara gives guidelines (Kante, Chepken, et al., 2017). In addition, the Pre-test and Pilot study gives guidance for the building of a research instrument and model.

Beyond researchers, the findings of this study have significant practical implications. It proved that the deployment of an ICT service towards farmers because of the demand is not an acceptable standard. The drivers of the use of the technology should be understood before. The model provided helps to inform on which factors affect the use of technology.

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