The Role of Managerial Competency on Information and Communication Technology, Access to Finance, Innovation and Agricultural Performance in Nigeria A Pilot Study

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Abstract:- **The purpose of this paper is to examine a few samples of data on the role of managerial competency on information and communication technology, access to finance, innovation on agricultural performance of small and medium farmers in Nigeria. Hence, to determine the reliability and validity of the instruments the Cronbach alpha was used. The SPSS version 25 was employed to analyze the few data collected from the small and medium farmers. The result revealed that the instruments are sufficiently reliable because all the Cronbach alpha of the instruments exceed the minimum tolerable level of .70.**

Keywords: **information and communication technology, access to finance, innovation, managerial competency, agricultural performance, pilot test, Nigeria**

I. INTRODUCTION

Nigeria is the most populous country in Africa and food insecurity calls for the boosting of agricultural production in Nigeria. Agriculture is one of the main economic sectors in Nigeria providing employment for about 70% of the population of the country. An increase in agricultural productivity could not only improve food security, but also bring more income and enhanced well-being to Nigeria's large rural population (Xie, You, & Takeshima, 2017). The largest producers of agricultural products in Nigeria are the small and medium farmers, and they constitute about 80 percent of Nigerian farmers producing 98 percent of agricultural products in Nigeria (Mgbenka, Mbah, & Ezeano, 2015). Therefore, some factors are identified to be essential in boost agricultural performance which include information and communication technology (McNamara, Belden, Kelly, Pehu, & Donovan, 2017; Sun, Hou, & Li, 2017; Zhang, Wang, & Duan, 2016), access to finance (Adeola & Ikpesu, 2016; Ahmad, Jan, Ullah, & Pervez, 2015; Ayaz & Hussain, 2011) and innovation (Alston &Pardey, 2016; Andersen, 2015; Sauer, 2017).

II. INFORMATION AND COMMUNICATION TECHNOLOGY

Information and communication technology (ICT) comprise of software, hardware, media and network for gathering, storing, processing, transmitting of information (voice, data, image, and text) including other related services (Talebian, Mohammadi, & Rezvanfar, 2014). Information and Communication Technologies (ICTs) includes a wide range of software applications, network infrastructures and communication media that aided information acquisition, processing, storage, retrieval and dissemination among linked computer devices at both local and global levels (Zahedi & Zahedi, 2012; Russell & Steele, 2013). Hence the role ICT plays in enhancing agricultural performance cannot be overemphasized (Aker & Fafchamps, 2015; Mohamad & Gombe, 2017).

III. ACCESS TO FINANCE

Access to finance can be defined as a lack of financial and non-financial barriers in accessing financial resources and services (Ganbold, 2008). In other words, it is the extent to which financial resources and services can be accessed by users at a reasonable cost of capital. According to Peachy and Roe (2006) access to finance enhance economic growth in emerging and developing economies. However, it is also important in advanced economies, where it significantly promotes the social inclusion of some groups of the population. It empowers the people, gives them the privilege to save and invest, to insure their homes or take a loan and in many cases to reduce poverty. Access to finance has also been documented by other studies as been one of the important variables that enhance agricultural performance (Afful, Hejkrlík, & Doucha, 2015; Tadasse, 2014).

IV. INNOVATION

Innovation in agriculture is a continuous activity for agricultural businesses (Micheels & Nolan, 2016). Nelson and Winter (1982) also defined innovation as a 'change in routine'. Changes in routine may include the adoption of new technologies and practices such as new agricultural machinery, new crop varieties, and new production practices by agricultural firms (Llewellyn, D'Emden, & Kuehne, 2012; Maertens & Barrett, 2012; Westgren, 1999). Some studies also posit that without innovation agricultural productivity cannot be sustained, thus, these studies revealed innovation has a significant effect on agricultural performance (Kering &

Broderick, 2018; Ouda, Hefny, Abdel-Wahab, & Abdel-Wahab, 2018)

V. LITERATURE REVIEW

Previous studies revealed that there is significant relationship between ICT and agricultural performance (Aonngernthayakorn & Pongquan, 2017; Seenuankaew, Rattichot, Phetwong, & Leenaraj, 2018; Zhang et al., 2016) while some revealed that ICT does not have a significant impact on agricultural performance (Fafchamps & Minten, 2012; Nakasone, Torero, & Minten, 2014)

However, some empirical studies established that access to finance have significant impact on agricultural performance (Gininda, Antwi, & Oladele, 2014; Mahmud, Islam, Parvez, & Haque, 2017; Solomon, Juliana, & Antonia, 2016) while some indicated that it does not (Chisasa & Makina, 2015; Noonari, Wagan, Memon, Burirro, & Bijarani, 2016)

In addition some studies on innovation found a significant relationship between innovation and agricultural performance (Coulibaly, Chiputwa, Nakelse, & Kundhlande, 2017; Dresemann, Athmann, Heringer, & Kautz, 2018; Kering & Broderick, 2018) while these studies do not (Bhavani, Chakravarthi, Roy, Joshi, & Chandrasekar, 2017; Nkhoma, Kalinda, & Kuntashula, 2017). These inconsistencies in the findings led to the introduction of a moderator which is predicted to strengthen the relationship of these variables. Moderating variables are typically introduced when there is an inconsistency among the variables under study (Baron & Kenny, 1986).In view of the information above the study intends to use managerial competency as a moderating factor on these relationships to conduct an empirical pilot study in the context of small and medium farmers in Niger state, Nigeria which previous studies have not captured before. Hence, information and communication technology, access to finance and innovation are the independent variables, Agricultural performance will serve as the dependent variable while managerial competency will be the moderating variable which is in line with the suggestion made by Baron and Kenny (1986).

According to Gay, Mills and Airasian (2006), a pilot study is a test well-thought-out to be like "an outfit preparation" in which a small scale trial of the study is conducted before the full-scale of the study is carried out. Therefore, this study conducted a pilot study in order to achieve some goals. Firstly, the small study was prepared to ascertain the validity and reliability of the instruments of the study. Secondly, it is aimed at getting near to the actual situation of the main study. Thus, this would enable the researcher to predict and make necessary corrections during the full-scale study. One of the main concerns of the pilot test is the instrument validity and reliability. The extent to which an instrument is measuring what it is supposed to be measured and not measuring something else is described as instrument validity. On the other hand, reliability of a measure is the extent to which an instrument is error-free and hence, consistent and steady across time and likewise the various items in the scale (Sekaran & Bougie, 2010).

On this note, the result of the pilot test with regard to the influence of information and communication technology, access to finance, innovation and managerial competency on agricultural performance of the small and medium farmers in Nigeria is presented.

VI. METHODOLOGY

Knowing very well that this study is a pilot study of an ongoing research small sample of small and medium farmers was randomly selected. This is in line with the recommendation by Malhotra (2008) that the sample size of a pre-test usually starts from 15-30 respondent but the number can be increased considerably if the test involves numerous stages. Thus, a total of 40 copies were personally circulated and 36 were completed and returned out of which 6 were not correctly concluded and hence, not considered for analysis.

According to Sekaran and Bougie (2010), the Cronbach alpha coefficient is the most acknowledged test of inter-item uniformity reliability. Hence, the internal uniformity of the tool for this research is determined using the Cronbach alpha coefficient. SPSS version 25 for windows was employed to analyze the data. Prior to the delivery of the questionnaires, the draft of the questionnaires was first submitted to experts including the distinctive respondents for look and content validity.

6.1 Instrumentation and Measurement of Variables

A well-designed questionnaire which consists of closed-ended multiple questions were used for the research. Base on the fact that the study is mainly measuring the perception of the respondents, hence, the Likert-type scale is recognized as the most appropriate and reliable (Alreck & Settle, 1995; Miller, 1991). The scale that is mostly used for measuring the latent construct in social science research will be employed in this study (Churchill & Peter, 1984). The research will structure all constructs in the measuring instruments to use a 7-point Likert type scale, comprising the independent, moderating and the dependent variables. Although some other literature have argued on the advantages of using the 5-point Likert type scale, despite that a 7-point Likert scale is perceived to provide a comprehensive feedback and also not confining the respondents into any unnecessary cognitive burden (Cavana, Delahaye, & Sekaran, 2001; Churchill & Peter, 1984; J F Hair, Black, Babin, & Anderson, 2010). Thus, to attain a better maximum result in processing information and determining scale reliability, the 7-point Likert scale is said to be more efficient (Churchill & Peter, 1984).

In addition, a 7-point Likert scale seems to be optimal because a scale with more points allows the respondents to demonstrate their stand conveniently, in the same regard, employing a scale with mid-point based on the observation by Krosnick and Fabrigar (1997), that if a participant is forced in a particular direction, it could result in an increase in

measurement error. Krosnick and Fabrigar(1997) also indicated that the outcome of interviewer bias is likely to reduce, and data quality tends to increase when a midpoint is contained in a scale. This will allow the respondents to express their feelings comfortably.

The main factors included in the study are: information and communication technology, access to finance, innovation, managerial competency and agricultural performance. All the constructs/variables are uni-dimensional. Section 1: contains eight questions which seek to measure how the respondents perceived agricultural performance. Section 2: consists of a set of twenty-eight questions that seek to measure the relationship between information and communication technology and agricultural performance. Section 3: consists of eight questions aimed at measuring the relationship between access to finance and agricultural performance. Section 4: is comprised up of a total of twenty-three questions which attempt to measure the relationship between innovation and agricultural performance. Section 5: contains five items that are directed to measure the managerial competency as perceived by the respondents. Only the significant items that will be used in answering the research questions are included in the questionnaire.

VII. RESULTS OF VALIDITY AND RELIABILITY TESTS

7.1 Content and Face Validity

In order to make sure that the determine consists of a sufficient and representative position of items that gives a thorough idea, this involves an orderly assessment of the scale's ability to ascertain what is theoretical to measure. Thus, content validity involves requiring a few samples of characteristic respondents and/or team of experts to make a judgement on the suitability of the items selected to measure a variable (Hair et al., 2010; Hair Jr, Money, Samuel, & Page, 2007; Sekaran & Bougie, 2010)

Furthermore, in order to get good results concerning the suitability of the instruments, a sample of the instrument of this paper was issued out to a specialist, to ascertain the comfortability and sufficiency of the items that are intended to determine the constructs under investigation. Similarly, some Ph.D. candidates who are well-known with the context of the study were also contacted to make sure of the clearness of the instrument. a number of observations were re-worded/rephrase in order to determine the constructs properly and also to be clear to the possible respondents. This process of seeking for the opinion of the specialist was accomplished within a three-week period. Following the accomplishment of the process, the researcher then came up with an improved version of the instrument which was finally circulated for the pilot study.

7.2 Reliability Test

There are different kinds of reliability tests that are frequently used apart from the content and face validity, thus, the most commonly used method by researchers is the internal consistency reliability test (Litwin, 1995). It is referred to as the degree to which items "dangle jointly as a set" and are able of freely measuring the same concept to the degree that the items are linked with one another. Hence, Sekaran and Bougie (2010) indicated that the most accepted test of inter-item consistency reliability is Cronbach's alpha coefficient. However, the Cronbach alpha test is used in this study to assess the internal consistency of the mechanism. After running the data using SPSS version 25 for windows, the result shows that all the instruments have a high-reliability benchmark ranging from 0.75 to 0.96. This is in line with the benchmark that any measure with coefficient of 0.60 is recognized to have an average reliability while the coefficient that exceeds 0.70 and above illustrates that the instrument has a high-reliability standard (Hair et al., 2010; Hair, Black, Babin, Anderson, & Tatham, 2006) and coefficient of 0.50 as supportive (Nunnally, 1967). Further, Hair, Money, Samouel, and Page (2007) are of the view that a researcher typically considers that an alpha value of 0.70 as a least, however, lower coefficients may be acceptable. Table1 shows the summary of the reliability results. It may possibly be seen from the table that the result of the pilot study reveals that Cronbach's alpha values for the variable under examination are all above 0.70. Accordingly, based on the acceptable benchmark of 0.70 all the variables are reliable.

7.3 Data Distribution

Mostly, the inferential statistical methods require the accomplishment of normality hypothesis (Pallant, 2001; Tabachnick, Fidell, & Ullman, 2007) Normal data is the one that is balanced, bell-shape, with the highest frequency of scores in the middle and smaller distribution towards the extreme ends. The normality of data can be measured using the values of skewness and kurtosis. Whereas skewness deal with the symmetry, kurtosis illustrates the degree to which the data is at its zenith or flat (Tabacknich & Fidell, 2007). Therefore, the values of skewness and kurtosis of the data for this paper can be considered as reasonably normal.

VIII. CONCLUSION

The main objective of this pilot study to determine the validity and reliability of the instrument of an ongoing project in preparation for the large-scale study. Thus, the result of this study is attached to its aims which are primarily statistical in nature at this point. The final implication of the constructs would be fully revealed after the main study has been conducted. The study brings the few scale data that was retrieved during the pilot study. Content and face validity were carried out which subsequently led to the consideration of expert view to achieve the modified version of the instruments. More so, the inter-item reliability test displays that all the items were reliable with Cronbach Alpha adequately above the yardstick of 0.70; to this end, no item was deleted. Lastly, the normality test after using skewness and kurtosis, indicates that the data in totality is rationally normal.

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Table Summary of Reliability Study using SPSS Version 25 for Windows

Variable		Number of Items	Number of Items Deleted	Cronbach's Alpha
1	Agricultural Performance	8	0	0.81
2	Information and communication Technology	28	0	0.96
3	Access to Finance	8	0	0.78
4	Innovation	23	0	0.97
5	Managerial Competency	5	0	0.75