



# Examining e-Adoption of Agricultural Systems by Farmers in Central Nigeria

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## ABSTRACT

In this study the authors examined what factors impacted the agricultural information system (AIS) electronic software adoption by rural farmers in central Nigeria. They collected a moderately large sample of responses from rural farmers and examined the generally accepted factors that were found in the literature. The authors applied nonparametric Spearman as well as canonical correlation along with discriminant analysis and developed a statistically significant classification model which used only three independent factors to predict AIS e-adoption. The results should generalize to other rural farm decision makers in Nigeria and the paper should be of interest to other researchers in this field.

## KEYWORDS

Africa, Agriculture Information System, Discriminant Analysis, E-Adoption, Nigeria

## INTRODUCTION

Central Nigeria and other emerging countries are struggling with agriculture production to the extent that many citizens live in poverty (Fountas, Carli, Sørensen, Tsiropoulos, Cavalaris, Vatsanidou, & Tisseyre, 2015). Agriculture production in African countries once met 89% of the resident needs during the 1960s but this has dropped to 75% and continues to decrease (Thiendou, 1993). This drop in self-sufficiency was caused by political, economic, environmental issues as well as lack of technology adoption by comparison to competitors in other developing countries (Pinet & Papajorgji, 2014). An important problem is farmers are not adopting agricultural information systems (AIS) to help with crop planning (Aker, 2011), which is the problem we examine in this study.

According to Kim et al. (2015), an Agricultural Information System (AIS) is an information system that can among general agricultural data related to crops as well as their varieties, farm inputs, cultivation practices as well as farm activities. A Farm Management Information System (FMIS) can be considered to be a form of AIS which primarily deals with the collection, storage, and processing of data necessary to complete the operational functions in a farm (Kim et al., 2015).

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Information systems and technology were initially used in the area of agriculture primarily for data storage and tasks, including financial accounting and bookkeeping. AIS and farm management information systems have evolved from simple recordkeeping into the adoption of complex information systems (Fountas et al., 2015). The adoption of technology was limited in the early days and the usage rate was low as well. However, with technological advancements, especially over the last decade, information systems have been used for a wide range of tasks, including the usage of tiny sensor nodes to advanced AIS and FMIS. The technological advancements were also coupled with a reduction in the cost of technology as well as increased awareness among farmers about the advantages of the use of technology. The development of AIS, as well as FMIS, has opened up possibilities for improved farm output. North and West European countries are considered to be data-integrated and have successfully integrated these technologies. However, there is limited research, especially in developing countries in Asia and Africa about the factors that contribute to the adoption and use of these technologies.

Agriculture contributes significantly to economic activity and employment in developing countries, especially in Africa. For instance, in Tanzania, the agriculture sector employs more than 70% of the total population (Tumbo et al., 2018). The agricultural sector in African countries is facing challenges, including political, economic, and geographical. For instance, climate change has affected the agricultural sector in African countries causing low productivity in agriculture. Such challenges can partly be addressed by the use of advanced technology to help in climate change prediction and adaptation.

However, the information systems adoption and usage rate are rather low in African countries. The existing research in this area has identified some of the factors, including the limited number of agricultural extension workers, low levels of interactivity in the media, such as radio and television, as well as lack of awareness among the farmers. However, there is limited research exploring the influence of various demographic factors on the adoption and use of agricultural information systems. Considering that there are significant cultural differences between African countries as compared to European and Asian countries, exploring the role of demographic factors would contribute to understanding the issues influencing the adoption and use of AIS. Hence, investigating the role of various factors, especially, demographic factors might offer deeper insights into this problem.

## **BACKGROUND**

Röling (1988) defined AIS as a system, in which agricultural information is generated, transformed, transferred, consolidated, received and fed back in such a manner that these processes function synergistically to underpin knowledge utilization by agricultural producers. AIS also includes e-farming, which is described as the use of information technology in farming as well as its related operations, also referred to as FMIS (Adeyemo, 2013). The agriculture sector in Nigeria had performed well in the 1960s. However, with the emergence and growth of the oil sector, the growth in the agriculture sector took a backseat and was ignored by successive governments. Several countries in Asia, Africa, and South America, including India, Kenya, and Nicaragua had implemented AIS and FMIS successfully (Lu et al., 2015). In the case of Nigeria, which is the most populous African country, the research on the implementation, usage, and adoption of AIS is quite limited. There is a need to examine the factors that contribute to higher levels of adoption and usage of AIS.

Several researchers have explored the role of demographic factors on various information systems, including educational information systems and hotel management information systems (Teeroovengadam et al., 2017; Tarcan & Varol, 2010; Tarhini et al., 2016). There is a literature gap as there are limited studies exploring the influence of demographic factors on the acceptance and use of AIS. According to Tarcan and Varol (2010), individual differences appear from attitudes and beliefs that determine individual behavior. The same premise was also rated in the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB). Researchers have explored the moderating role played by demographic factors on the usage of information systems. For instance, Teeroovengadam

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