Adoption of Mobile Technology by Farmers in Southwest-Nigeria: A Cross-Sectional Study

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ABSTRACT

This study evaluates the behavioral intention of farmers in selected areas of Nigeria to adopt mobile technology for agricultural purposes. A theoretical framework was developed based on the technology acceptance model (TAM) and innovation diffusion theory (IDT). Five variables were evaluated. Convenience sampling was employed in the investigation. A total of 202 responses were retrieved. Factor analysis was performed to test the reliability and validity of the measurement items. Correlation analysis was used to test the conformity of the empirical data with the presumed model using SPSS version 16. All five measurement items: perceived ease of use, perceived usefulness, relative advantage, compatibility, and attitude were found to be direct predictors of adoption behavior. The study provides evidence for the potential of mobile technology in agriculture.

Keywords: Adoption, Agriculture, Innovation Diffusion Theory (IDT), Mobile Technology, Nigeria, Technology Acceptance Model (TAM)

1. INTRODUCTION

Agriculture has played an important role in civilization. Back in the days, farmers practiced agriculture to satisfy their immediate food consumption needs, and provision of clothing and shelter. There has been advancement in this sector over the years through wide range of methods and practices, introduction of machinery which has helped in production of various produce in large quantities not just to meet the needs of one’s immediate family but for profit, growth and development of the world in general.

Mobile technology today has evolved over time, which has resulted in the advancement not just in mobile technology but in technology as a whole. In the context of the rapid growth of mobile phone penetration in developing countries, mobile telephony is currently considered to be...
particularly important for development (Rashid & Elder, 2009). It is gaining wide acceptance as the new service delivery platform especially in developing countries. Mobile technology has been applied in healthcare (Anhøj & Moldrup, 2004; Miskelly, 2005; Kim and Jeong, 2007; Blake, 2008; Ilyuem, 2008, 2009; Lester et al., 2009; Blake, 2009); tourism (Cheverst et al., 2000; Brown & Chalmers, 2003; Fesenmaier et al., 2003; Brown et al., 2003; Schwinger et al., 2005; Kim et al., 2008); agriculture (de Silva & Ratnadiwakara, 2010; Maumbe & Okello, 2010; Okello et al., 2010; Katengeza et al., 2011; Lawal-Adebowale & Omotayo, 2012) and education (Lee et al., 2004; Naismith et al., 2004; Mostakhdemin-Hosseini & Tuimala, 2005; Laouris et al., 2005; Najafabadi, 2008).

In this article we introduce a research model to evaluate the factors affecting mobile technology adoption in agriculture; discuss underlying theories and present research hypotheses to test the strength of variables empirically; describe the methodology, report analytical results of the study; and present the discussion and conclusion.

1.1. Application Areas of Mobile Technology in Agriculture

Information is fundamental in the development of the rural environment, particularly for people with limited resources such as land and capital. Information plays an important role in reducing poverty to make good decisions. We can point to the millennium development goals that the first goal is to eradicate poverty and hunger in the information age. Farmers with relevant information can control their resources and decision-making processes which bring about empowerment. An effective and efficient delivery of relevant information in agriculture will facilitate improved production, processing, trading and marketing in the sector (Allahyari et al., 2010).

In recent times, new and various knowledge and information sources need more advanced information channels. Conventional methods of communicating information to the agricultural community include the use of newspapers, magazines, radio, television and organizing of seminars (Allahyari et al., 2008). Studies have shown that the conventional methods of disseminating information to farmers who are generally illiterate and distant from formal sources of information such as libraries have their drawbacks (Allahyari et al., 2010), which are: 1) Irrelevance of the delivered information: Most times only few crops are considered, which makes the information of less importance because there is no new knowledge gained concerning other crops; 2) Lack of coverage: In the case of radio and television media, the system is out of reach to most of the farmers who are illiterate and cannot have access to information; and 3) Lack of opportunity to improve performance: the information is given to the farmer in one direction and if the farmer complains there is no efficient way to improve the service. The conventional methods should be reformed to improve performance in the agricultural sector by the introduction of better technologies. Mobile technology in agriculture can be used as a tool to establish communication among rural farmers. This will create stability of information by updating the farmers on agricultural technologies such as machinery, prices of produce, markets, consumer tastes, financial resources, and environmental conditions (Allahyari et al., 2010).

Farmers should have access to information on market prices of produce, information on the kind of crops to be cultivated depending on the weather, and the appropriate machinery to be used for such development. Mobile technology can help to provide information to farmers on the availability of planting materials with different varieties in their nearest farms through mobile devices (Ballantyne et al., 2010). It can provide farmers with information on the best soil type to plant crops and also to help them in decision making regarding the fertilizer to be used for each crop (Pretty et al., 2010; Wilson et al., 2010). Mobile technology can be used in animal husbandry to provide information to the farmers on the availability of the quality...
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