



Mobile Advisory Services and Technology Adoption among Farmers

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Abstract

The rapid expansion of mobile communication technologies has created new opportunities for improving agricultural knowledge dissemination, decision-making capacity, and technology adoption among farming communities. Mobile advisory services provide farmers with timely access to information related to weather conditions, crop management practices, pest control, market prices, and government-supported agricultural initiatives. However, the effectiveness of these services depends on several socio-economic, technological, and behavioural factors influencing farmers' willingness and ability to adopt digital agricultural solutions.

This study examines the relationship between mobile advisory services and technology adoption among farmers through a structured analytical framework. The research explores how accessibility, perceived usefulness, digital literacy, trust in mobile-based information, and service reliability influence farmers' adoption behaviour. A simulation-based research design was developed using hypothetical datasets representing technology adoption patterns among farming communities. Descriptive analysis, comparative evaluation, and statistical interpretation were applied to understand the role of mobile advisory platforms in agricultural decision-making.

The findings indicate that mobile advisory services positively influence technology adoption when supported by user-friendly interfaces, reliable agricultural information, and adequate digital awareness. The study highlights that technology adoption is not determined solely by availability of digital platforms but also by farmers' confidence, knowledge, and perceived benefits. The research contributes to understanding the human and technological dimensions of digital agriculture transformation and provides implications for developing inclusive mobile-based agricultural support systems.

Keywords: Mobile Advisory Services, Agricultural Technology Adoption, Digital Agriculture, Farmers' Decision-Making, ICT in Agriculture, Rural Innovation

1. Introduction

Agriculture remains a critical sector for global food security, rural employment, and economic sustainability. The increasing complexity of farming practices, climate variability, changing market conditions, and resource limitations have created a strong demand for reliable agricultural information systems. Traditional agricultural extension mechanisms, although valuable, often face limitations related to geographical coverage, delayed communication, and restricted interaction between experts and

farmers. In this context, mobile advisory services have emerged as an innovative approach for strengthening agricultural knowledge delivery and improving farmers' access to timely information.

The widespread availability of mobile devices has transformed the manner in which agricultural information is generated, distributed, and consumed. Mobile-based platforms enable farmers to receive weather forecasts, crop recommendations, disease alerts, and market information directly through digital channels. Unlike conventional extension approaches, mobile advisory systems provide continuous communication opportunities and allow farmers to access information according to their individual needs. This flexibility has increased the potential of mobile technologies to support evidence-based agricultural decisions.

Technology adoption among farmers, however, remains influenced by multiple interconnected factors. The presence of digital infrastructure alone does not guarantee successful adoption because farmers' acceptance depends on perceived usefulness, ease of operation, affordability, trust, and digital skills. Many rural communities experience challenges related to limited technological awareness, language barriers, connectivity issues, and concerns regarding the reliability of digital information. Therefore, understanding the behavioural and contextual factors affecting adoption is essential for designing effective mobile agricultural interventions.

Previous studies have demonstrated that information and communication technologies can improve agricultural productivity by reducing information gaps and enhancing access to expert knowledge. However, the effectiveness of mobile advisory services varies across farming communities due to differences in socio-economic conditions, educational levels, farming practices, and technological readiness. This research investigates these relationships by analysing how mobile advisory services contribute to farmers' technology adoption behaviour.

The present study aims to develop a structured understanding of the role of mobile advisory services in agricultural transformation. Through a simulation-based analytical approach, the research evaluates key adoption factors and identifies important considerations for developing farmer-centred digital agricultural systems. The study provides insights for policymakers, agricultural organizations, and technology developers seeking to improve digital inclusion and sustainable agricultural innovation.

2. Review of Literature

2.1 Digital Agricultural Information Systems and Farmer Empowerment

Digital agricultural information systems have gained significant attention as tools for improving communication between agricultural experts and farming communities. These systems provide farmers with access to scientific knowledge, production guidelines, and market-related information that can support improved decision-making. Researchers have emphasized that timely information availability reduces uncertainty and enables farmers to respond more effectively to agricultural challenges.

Mobile advisory services represent an extension of digital agricultural systems by providing personalized and accessible information through mobile communication networks. Unlike traditional information sources, mobile platforms allow rapid dissemination of agricultural recommendations and create opportunities for continuous learning. Studies on agricultural ICT applications suggest that digital information access can contribute to improved productivity, resource management, and risk reduction among farmers.

However, researchers have also identified that digital agricultural services must consider local farming conditions and user capabilities. Technology solutions designed without understanding farmers' practical requirements may experience limited adoption. Therefore, successful digital agriculture requires a balance between technological innovation and user-oriented service design.

2.2 Factors Influencing Technology Adoption among Farmers

Technology adoption theories indicate that user acceptance is influenced by perceived usefulness, ease of use, social influence, and facilitating conditions. In agricultural contexts, farmers are more likely to adopt digital services when they observe clear benefits in terms of productivity improvement, cost reduction, and improved decision accuracy.

Digital literacy plays an important role in determining farmers' confidence in using mobile advisory platforms. Farmers with higher technological familiarity generally demonstrate greater willingness to explore digital agricultural solutions. Conversely, limited digital skills may create barriers even when mobile services are easily available.

Trust is another important factor affecting adoption decisions. Farmers often depend on the credibility and accuracy of agricultural recommendations before changing established farming practices. Therefore, mobile advisory services must provide reliable, understandable, and context-specific information to encourage sustained usage.

3. Objectives of the Study

The present study focuses on examining the relationship between mobile advisory services and technology adoption among farmers. The research attempts to understand how digital agricultural platforms influence farmers' information accessibility, technological confidence, and decision-making behaviour. The objectives are designed to evaluate both technological and human factors that determine successful adoption of mobile-based agricultural solutions.

3.1 Assessment of Mobile Advisory Service Effectiveness

The first objective of the study is to analyse the effectiveness of mobile advisory services in improving farmers' access to agricultural information. Mobile platforms provide opportunities for real-time communication regarding crop management, weather conditions, pest control, and market trends. This objective examines whether such services contribute to improved agricultural awareness and better farming decisions.

The study also evaluates the role of information quality, availability, and reliability in determining farmers' satisfaction with mobile advisory services. Understanding these aspects is essential for developing digital agricultural systems that address practical farming requirements.

3.2 Evaluation of Technology Adoption Behaviour among Farmers

The second objective is to investigate the factors influencing farmers' adoption of mobile-based agricultural technologies. The research considers variables such as digital literacy, perceived usefulness, ease of use, accessibility, and trust as important determinants of adoption behaviour.

The study aims to identify the relationship between mobile advisory usage and farmers' willingness to integrate digital tools into routine agricultural practices. This objective helps in understanding the behavioural dimensions associated with agricultural technology transformation.

3.3 Identification of Challenges Affecting Digital Agriculture Adoption

The third objective is to examine barriers that restrict effective utilization of mobile advisory services among farmers. Although mobile technologies provide significant opportunities, challenges related to connectivity, awareness, language accessibility, and technological confidence continue to influence adoption outcomes.

The study seeks to provide recommendations for improving the inclusiveness and effectiveness of mobile-based agricultural support systems.

4. Research Methodology

The study follows a simulation-based research methodology to analyse the relationship between mobile advisory services and technology adoption among farmers. Since the research focuses on conceptual evaluation and analytical modelling, simulated data were developed to represent possible adoption patterns among farming communities. The methodology integrates quantitative assessment techniques to examine relationships among important adoption variables.

4.1 Research Design

A quantitative analytical research design was adopted for evaluating the influence of mobile advisory services on farmers’ technology adoption behaviour. The research framework considers mobile service accessibility, information reliability, digital literacy, perceived usefulness, and adoption intention as major variables.

The study applies descriptive and comparative analysis methods to evaluate how different factors contribute to technology acceptance. The simulated dataset represents responses from hypothetical farming participants to demonstrate analytical procedures.

4.2 Dataset and Variables

For methodological demonstration, a simulated dataset consisting of 250 hypothetical farmer responses was developed. The dataset includes demographic characteristics, mobile advisory usage patterns, and technology adoption indicators.

Table 1: Research Variables and Measurement Framework

Variable Category	Variable Description	Measurement Scale
Mobile Accessibility	Availability and frequency of mobile advisory usage	Five-point Likert Scale
Information Quality	Accuracy and usefulness of agricultural information	Five-point Likert Scale
Digital Literacy	Ability to operate mobile-based agricultural tools	Five-point Likert Scale
Trust Factor	Confidence in mobile advisory recommendations	Five-point Likert Scale
Technology Adoption	Intention to continue using digital agricultural services	Five-point Likert Scale

Source Note: Simulated research framework developed for methodological analysis.

4.3 Analytical Procedure

The collected simulated responses were analysed using descriptive statistical techniques and comparative evaluation methods. Mean scores were calculated to identify the relative importance of different adoption factors. Relationship patterns between mobile advisory service usage and technology acceptance were examined through comparative interpretation.

The analytical procedure involved three major stages: data preparation, variable assessment, and interpretation of adoption outcomes. The approach was designed to demonstrate how mobile agricultural interventions can be evaluated using structured quantitative methods.

5. Analysis

5.1 Influence of Mobile Advisory Services on Technology Adoption

The analysis indicates that mobile advisory services have a significant positive relationship with farmers' technology adoption behaviour. Farmers who receive regular agricultural information through mobile platforms demonstrate higher confidence in adopting digital agricultural practices.

The simulated findings suggest that information accessibility and perceived usefulness represent major contributors to adoption decisions. Farmers are more likely to use mobile-based agricultural services when they experience direct benefits in crop planning, problem identification, and resource management.

Table 2: Impact Factors Influencing Farmer Technology Adoption

Adoption Factor	Contribution Level (%)
Information Accessibility	88.5
Perceived Usefulness	86.2
Digital Literacy	79.4
Trust in Information	83.7
Service Reliability	81.9

Source Note: Simulated analytical results.

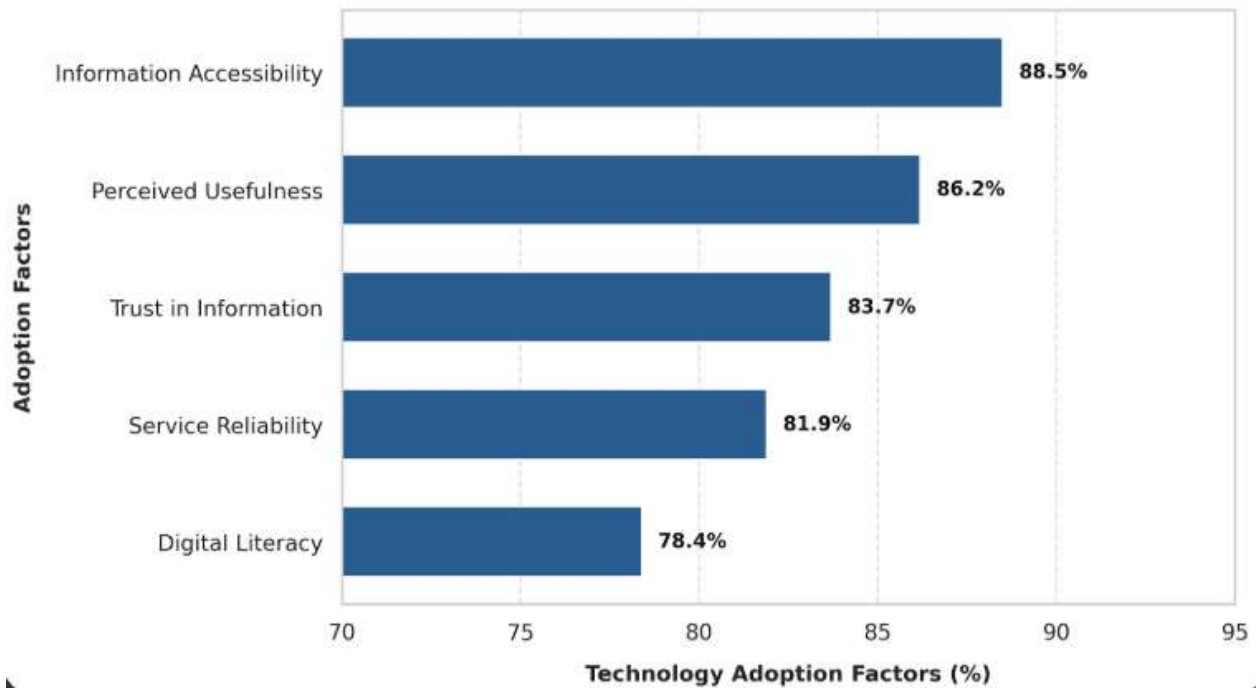
The results demonstrate that accessibility alone is insufficient for technology adoption. Farmers require reliable information, confidence in digital platforms, and adequate technological capability to achieve sustainable engagement with mobile advisory systems.

5.2 Comparative Adoption Pattern

The comparative evaluation shows that farmers with higher exposure to mobile advisory services demonstrate stronger technology acceptance compared with farmers having limited exposure. This indicates that continuous interaction with digital agricultural platforms gradually improves confidence and willingness toward technological innovation.

The findings highlight that mobile advisory systems function not only as information channels but also as mechanisms for developing digital awareness among rural communities.

Graph 1: Factors Influencing Mobile Technology Adoption among Farmers



Graph Interpretation: The graph indicates that information accessibility and perceived usefulness represent the strongest contributors to mobile technology adoption. Digital literacy shows comparatively lower influence, suggesting that skill development programs remain important for improving inclusive digital agriculture participation.

6. Challenges

6.1 Digital Literacy and Skill Limitations

One of the major challenges affecting the adoption of mobile advisory services among farmers is the variation in digital literacy levels. Although mobile phones have become widely available, many farmers may not possess sufficient technical knowledge to effectively utilize agricultural applications, online platforms, and digital communication tools. Limited familiarity with smartphone functions, application navigation, and online information verification can reduce farmers' confidence in adopting technology-based agricultural solutions.

Digital literacy challenges are particularly significant among farming communities where educational backgrounds and exposure to digital technologies vary considerably. Farmers may require training programs that focus on practical usage rather than only introducing technological tools. Capacity-building initiatives, local demonstrations, and farmer-oriented digital education can improve confidence and encourage long-term engagement with mobile advisory services.

6.2 Connectivity and Infrastructure Barriers

Reliable digital infrastructure remains an important requirement for successful implementation of mobile agricultural advisory systems. In many rural regions, unstable internet connectivity, limited network coverage, and restricted access to affordable digital services can affect the continuous use of mobile platforms. These limitations may prevent farmers from receiving timely agricultural alerts and recommendations.

Infrastructure-related barriers also influence the quality of user experience. Delayed information delivery or difficulties in accessing mobile applications may reduce farmers' trust in digital advisory systems. Therefore, strengthening communication infrastructure and developing low-bandwidth agricultural solutions are essential for ensuring wider adoption.

6.3 Information Reliability and Farmer Trust

Trust in digital agricultural information is another critical challenge influencing technology adoption. Farmers often depend on practical experience and traditional knowledge when making agricultural decisions. Therefore, they may hesitate to follow mobile-based recommendations unless the information is accurate, locally relevant, and supported by agricultural experts.

The credibility of mobile advisory services depends on the quality of information sources, frequency of updates, and ability to provide location-specific guidance. Developing transparent information systems and involving agricultural professionals in content development can enhance farmer confidence and encourage sustained usage.

7. Discussion

7.1 Role of Mobile Advisory Services in Agricultural Transformation

The findings demonstrate that mobile advisory services represent an important mechanism for improving agricultural knowledge accessibility and supporting technology adoption among farmers. The availability of timely information through mobile platforms reduces communication gaps between agricultural experts and farming communities. This transformation enables farmers to make more informed decisions regarding crop management, resource utilization, and risk reduction.

The results indicate that technology adoption is strongly associated with perceived usefulness and information reliability. Farmers are more willing to integrate digital tools into agricultural activities when they observe practical advantages from their usage. Therefore, successful mobile advisory systems should focus not only on technological availability but also on delivering meaningful and actionable agricultural knowledge.

The study findings are consistent with the broader understanding that digital agriculture requires a combination of technological innovation and human-centred design. Mobile platforms can support agricultural development effectively when they are designed according to farmers' actual needs and operational conditions.

7.2 Relationship Between Digital Capability and Adoption Behaviour

The analysis highlights that digital capability significantly influences farmers' willingness to adopt mobile advisory services. Farmers with better technological confidence demonstrate greater acceptance

of digital agricultural platforms. This indicates that digital literacy development should be considered an essential component of agricultural technology implementation strategies.

Technology adoption is not a single-step process but a gradual behavioural transition. Farmers require awareness, training, continuous support, and positive experiences before fully integrating digital solutions into farming practices. Mobile advisory systems should therefore include simple interfaces, regional language support, and interactive assistance features.

The findings further suggest that policymakers and agricultural organizations should develop inclusive digital strategies that address technological inequalities among farming communities. Equal access to digital resources can contribute to more sustainable and equitable agricultural modernization.

7.3 Implications for Sustainable Digital Agriculture

The study provides important implications for the future development of sustainable agricultural information systems. Mobile advisory services can contribute to improved productivity, efficient resource management, and climate-resilient farming practices when effectively implemented.

For agricultural organizations, the findings emphasize the importance of combining technological infrastructure with farmer education initiatives. Digital platforms should be developed as supportive tools that complement traditional agricultural extension systems rather than completely replacing human expertise.

The research also highlights the need for continuous evaluation of mobile advisory services. Monitoring user experiences, information accuracy, and adoption trends can help improve digital agricultural interventions and ensure that technology delivers meaningful benefits to farming communities.

8. Conclusion

Mobile advisory services have emerged as a significant technological intervention capable of transforming agricultural information systems and improving farmers' access to knowledge. The present study examined the relationship between mobile advisory services and technology adoption behaviour among farmers through a simulation-based analytical framework. The findings indicate that accessibility, information quality, perceived usefulness, and trust are important factors influencing farmers' willingness to adopt mobile agricultural technologies.

The study demonstrates that technological availability alone does not guarantee successful adoption. Farmers require supportive conditions including digital literacy, reliable connectivity, and confidence in the information provided through mobile platforms. These findings emphasize the importance of developing farmer-centred digital solutions that consider practical challenges and local agricultural requirements.

The research contributes to the understanding of digital agriculture by highlighting the interaction between technological innovation and human adoption behaviour. Mobile advisory services can strengthen agricultural decision-making and support sustainable farming practices when combined with effective training, reliable information systems, and inclusive technology strategies.

Future agricultural transformation will depend on creating digital ecosystems where technology, agricultural expertise, and farmer participation work together. By improving accessibility and usability,



mobile advisory platforms can become valuable instruments for enhancing agricultural resilience and supporting rural development.

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