

**JOURNAL OF INFORMATION
SYSTEM AND TECHNOLOGY
MANAGEMENT
(JISTM)**www.gaexcellence.com/jistm**USER-CENTRIC INVESTIGATION ON ICT ADOPTION
AMONG RURAL FARMERS IN KELANTAN**

Zuriani Ahmad Zukarnain^{1*}, Noorihan Abdul Rahman², Nor Asma Mohd Zin³, Wan Fariza Wan Abdul Rahman⁴, Cik Ku Haroswati Che Ku Yahaya⁵, Siti Haslini Zakaria⁶, Yeffry Handoko Putra⁷

¹Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA Kelantan Branch, 18500 Machang, Kelantan, Malaysia

✉ zurianiaz@uitm.edu.my

iD <https://orcid.org/0009-0008-3471-9941>

²Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA Kelantan Branch, 18500 Machang, Kelantan, Malaysia

✉ noorihan@uitm.edu.my

iD <https://orcid.org/0000-0002-0510-519X>

³Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA Kelantan Branch, 18500 Machang, Kelantan, Malaysia

✉ norasma@uitm.edu.my

iD <https://orcid.org/0000-0003-4907-285X>

⁴Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA Kelantan Branch, 18500 Machang, Kelantan, Malaysia

✉ wfariza@uitm.edu.my

iD <https://orcid.org/0000-0001-5543-7267>

⁵Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA Kelantan Branch, 18500 Machang, Kelantan, Malaysia

✉ haroswati@gmail.com

iD <https://orcid.org/0000-0001-6683-4268>

⁶Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA Kelantan Branch, 18500 Machang, Kelantan, Malaysia

✉ haslini@uitm.edu.my

iD <https://orcid.org/0009-0001-0069-3957>

⁷Universitas Komputer Indonesia, Kota Bandung, Jawa Barat 40132, Indonesia

✉ yeffryhandoko@email.unikom.ac.id

iD <https://orcid.org/0000-0003-3993-4647>

*Corresponding Author

Article Info:**Article history:**

Received date: 17.12.2025

Revised date: 07.01.2026

Accepted date: 23.08.2026

Published date: 03.09.2026

Abstract:

Agriculture is a major economic activity in Kelantan, where many rural communities rely on small-scale farming for their income. However, productivity remain low due to several factors such as limited mechanization and access to information. Nowadays Information and Communication Technology (ICT) play a significant role in improving agricultural activity including farm management, market access, and decision-making. Despite national initiatives to improve digital

To cite this document:

Zukarnain, Z. A., Rahman, N. A., Zin, N. A. M., Rahman, W. F. W. A., Yahaya, C. K. H. C. K., Zakaria, S. H., & Putra, Y. H. (2026). User-Centric Investigation on ICT Adoption Among Rural Farmers in Kelantan. *Journal of Information System and Technology Management*, 11 (44), 72-82.

inclusion in agriculture such as the Digital Economy Blueprint (MyDIGITAL) and the National Agrofood Policy 2021–2030 (NAP 2.0), there are still a lot of challenges in ICT adoption among rural farmers in Kelantan. This study aimed to assess the reliability and suitability of a questionnaire designed to measure farmers' perceptions toward ICT adoption and to identify preliminary patterns of awareness, attitudes, and challenges. A quantitative approach was employed using a structured questionnaire comprising 24 items with six constructs including importance, ease of use, knowledge, equipment, cost, and attitude. Data collected from 30 rural farmers were analyzed and presented using descriptive statistics. All constructs demonstrated acceptable reliability, with Cronbach alpha values ranging from 0.76 to 0.84. The findings confirm that the instrument is reliable and suitable for large-scale use while emphasizing the need for improved digital infrastructure and farmer training.

DOI: 10.35631/JISTM.1144005

Keyword:

Digital Agriculture; ICT Adoption; Rural Farmers; Technology Acceptance Model; Unified Theory of Acceptance and Use of Technology



© The authors (2026). This is an Open Access article distributed under the terms of the Creative Commons Attribution (CC BY NC) (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited. For commercial re-use, please contact jistm@gaexcellence.com.

Introduction

Agriculture is one key component of Malaysia's socio-economic structure, which significantly contributes to food security, employment, and rural development. In the state of Kelantan, agriculture plays a vital role as most of its population resides in rural areas where farming is the main source of income. According to the Department of Statistics Malaysia (2023), more than 60 percent of Kelantan's land area is dedicated to agricultural use, with key crops including paddy, rubber, oil palm, and vegetables. The agricultural sector not only sustains local income but also preserves traditional livelihoods and social relationship in rural communities. However, productivity from this sector in Kelantan remains relatively low due to heavy reliance on traditional practices, labour intensive methods, and limited exposure to modern technology. In this context, Information and Communication Technology (ICT) has emerged as a transformative enabler for agricultural modernization. ICT tools such as mobile phones, farm management systems, online platforms, and other digital applications have been recognized globally for their potential to enhance information sharing, market access, and decision-making among farmers (Meera et al., 2021; Awuor et al., 2020). The integration of ICT into agriculture can improve efficiency, reduce information gaps, and empower smallholder farmers with real-time data. In Malaysia, the government has launched several initiatives, including the Digital Economy Blueprint (MyDIGITAL) and the National Agrofood Policy 2021–2030 (NAP 2.0), aimed at accelerating digital adoption including in the agricultural sector (Ministry of Agriculture and Food Security, 2021).

Despite these national efforts, ICT implementation at the grassroots level especially among small-scale farmers in rural states such as Kelantan remains inconsistent due to several factors. The local-level adoption of such technologies in Kelantan is constrained by persistent infrastructural and socio-economic barriers. Key challenges include poor internet connectivity, high equipment costs, low technical literacy, and limited access to training opportunities (Ismail et al., 2020; Kamaluddin et al., 2022). Without reliable, context-sensitive instruments to assess farmers' perceptions, it is difficult for policymakers and development agencies to design targeted interventions that promote digital inclusion.

Based on this situation, there is an urgent need to understand how rural farmers in Kelantan perceive ICT and the challenges they face in adopting it. While several national-level studies have investigated ICT adoption among Malaysian farmers, few have focused specifically on Kelantan's unique rural agricultural landscape. Additionally, existing instruments for measuring farmers' ICT adoption have not been thoroughly tested for reliability and clarity in this demographic. Existing research tends to focus on national trends rather than localized studies that capture the specific experiences of smallholder farmers in rural states. Thus, a pilot study is necessary to test and refine a survey instrument that captures the perceptions, attitudes, and digital readiness of Kelantan farmers toward ICT adoption.

This study primary aimed to access the reliability and suitability of a questionnaire designed to measure rural farmers' perception of ICT adoption, while also exploring preliminary patterns of awareness, attitudes and constrain. Three objectives to be achieve in completing this study are:

1. To evaluate the reliability and internal consistency of the instrument measuring six constructs of ICT adoption including importance, ease of use, knowledge, equipment availability, cost, and attitude among rural farmers in Kelantan.
2. To identify the preliminary perceptions and attitudes of rural farmers in Kelantan toward the use of ICT in their agricultural activities.
3. To determine the key challenges and barriers that may influence farmers' readiness and willingness to adopt ICT in agricultural practices.

Literature Review

This section provides an overview of previous studies and theoretical foundations relevant to ICT adoption in agriculture, with a focus on its application among rural farmers. It examines the role of ICT in transforming agricultural practices, explores key factors influencing adoption, and highlights challenges faced by smallholder farmers.

The integration of Information and Communication Technology (ICT) into agriculture has transformed traditional farming systems worldwide. ICT facilitates access to information on weather, pest management, market prices, and financial services, thereby improving farm productivity and decision-making (Awuor et al., 2020; Meera et al., 2021). Mobile technologies, in particular, enable farmers to communicate directly with suppliers, extension agents, and customers, reducing dependency on intermediaries and enhancing income opportunities (Tobbin & Adjei, 2021). In developing countries, ICT has been shown to bridge the information gap between rural farmers and agricultural institutions, fostering greater efficiency and innovation in smallholder farming (Bolarinwa et al., 2021). However, the degree

of ICT adoption varies widely, depending on infrastructure quality, affordability, and user readiness.

Malaysia has recognized ICT as a key driver for modernizing its agricultural sector. Government initiatives such as the Digital Economy Blueprint (MyDIGITAL) and the National Agrofood Policy 2021–2030 (NAP 2.0) emphasize digitalization, smart farming, and capacity-building to promote sustainable agricultural growth (Ministry of Agriculture and Food Security, 2021). Despite these efforts, studies indicate that ICT adoption remains unequal across regions, particularly in rural states such as Kelantan (Ismail et al., 2020; Kamaluddin et al., 2022). While urban farmers and agribusinesses benefit from digital technologies, rural farmers often face barriers such as limited network coverage, high equipment costs, and inadequate technical skills. These challenges restrict the ability of smallholder farmers to move from subsistence farming to technology-based agriculture. In Kelantan, agriculture remains central to the state's economy, but most farmers continue to rely on traditional tools and practices. ICT adoption in this context could help farmers access up-to-date information, connect with wider markets, and improve productivity. However, limited empirical data exist on the extent of ICT use among Kelantan farmers or their perceptions of its relevance. This gap points out the importance of localized studies to understand farmers' readiness and constraints in adopting digital solutions. The adoption of ICT in agriculture is influenced by a combination of technological, socio-economic, and psychological factors. The Technology Acceptance Model (TAM) proposed by Davis (1989) identifies two key predictors: perceived usefulness and perceived ease of use, both of which shape users' attitudes toward technology. The Unified Theory of Acceptance and Use of Technology (UTAUT) later expanded this framework by incorporating additional factors such as social influence, facilitating conditions, and behavioural intention (Venkatesh et al., 2003). Studies in developing countries have adapted these models to explore ICT adoption in rural farming contexts, emphasizing factors like cost, knowledge, and infrastructure availability (Rahman & Hassan, 2019; Awuor et al., 2020). Empirical research across Southeast Asia and Africa shows that farmers' ICT adoption decisions are strongly influenced by their education level, income, access to equipment, and previous exposure to technology (Munthali et al., 2018; Sulaiman et al., 2022). In Malaysia, Kamaluddin et al. (2022) found that digital literacy and affordability are significant predictors of ICT usage among rural communities. Similarly, Norizan and Aziz (2022) highlighted that government-led ICT training programs enhance farmers' awareness and skills, though sustainability remains an issue. These findings suggest that improving farmers' knowledge, affordability, and access to ICT tools is critical to fostering adoption in rural areas.

Despite the recognized potential of ICT, several challenges hinder its effective implementation in agriculture. Poor internet connectivity, high equipment costs, and limited digital infrastructure continue to delay access, especially in remote areas (Ismail et al., 2020; Bolarinwa et al., 2021). Additionally, low levels of digital literacy and lack of localized content reduce farmers' confidence in using ICT tools (Rahman & Hassan, 2019, Tanaka & Nguyen, 2024). Cultural and social norms can also influence ICT adoption, as some older or less-educated farmers may perceive technology as complex or unnecessary (Nor Diana et al., 2026). These barriers highlight the importance of targeted interventions that combine infrastructure development with capacity-building and awareness programs. In Kelantan, such barriers are particularly obvious due to the rural nature of its farming communities. The lack of reliable internet infrastructure and high cost of digital devices have limited the diffusion of ICT-based agricultural innovations. Consequently, while awareness of ICT's benefits may be increasing, practical utilization remains low. These issues finally effect the adoption of ICT among farmers

specifically in Kelantan. Thus, it requires a comprehensive understanding of farmers' perceptions, attitudes, and readiness.

In summary, existing literature emphasizes the transformative potential of ICT in enhancing agricultural productivity, efficiency, and market connectivity. However, despite government initiatives to promote digital adoption, rural farmers in Malaysia particularly in Kelantan continue to face challenges such as inadequate infrastructure, high equipment costs, and limited digital literacy. Previous research has largely focused on national-level analyses, with limited attention to localized studies that explore farmers' specific perceptions, readiness, and barriers in rural contexts. Extensive study is needed to determine the factors that lead to the ICT adoption specifically among farmers in Kelantan. Moreover, few studies have validated instruments tailored to measure ICT adoption among this group in Malaysia. Given these gaps, this pilot study was designed to test the reliability and suitability of a structured questionnaire assessing six key constructs: the importance of ICT, ease of use, knowledge, equipment availability, cost, and attitude. By conducting the study among rural farmers in Kelantan, the research seeks to refine the measurement instrument and ensure its contextual relevance Before applying it to a larger population. The following section outlines the methodological procedures employed in this pilot study.

Research Methodology

This research employed a quantitative pilot study design to evaluate the reliability, clarity, and suitability of the research instrument measuring farmers' perceptions toward ICT adoption in agriculture. The study focused on six core constructs adapted from the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) including importance of ICT, ease of use, knowledge, equipment availability, cost, and attitude toward ICT usage. The pilot study served as a preliminary phase to ensure that the questionnaire items were understandable, consistent, and relevant to the local agricultural context before conducting a large-scale survey. The pilot study was conducted in Kelantan, a state located in the northeast region of Peninsular Malaysia, known for its strong agricultural base. Most farmers in Kelantan engage in small-scale farming activities such as paddy, rubber, and vegetable cultivation. Conducting the pilot in this region allowed the researcher to test the applicability of ICT-related questions among farmers with varying levels of exposure to digital tools.

The target population for the pilot study consists of rural farmers actively involved in agricultural activities in Kelantan. A random sampling technique was used to select respondents. A total of 30 respondents participated in the pilot study, which aligns with recommendations for pilot testing to assess instrument reliability and comprehension (Hertzog, 2008; Johanson & Brooks, 2010). The sample was diverse in terms of age, education level, and farming experience to reflect the characteristics of the larger farming community. Data were collected through field visits with the assistance of local farmer groups.

A structured questionnaire was developed as the main data collection instrument. The questionnaire consisted of two sections:

- Section A captured demographic information such as age, gender, education level, years of farming experience, and type of agricultural activity.

- Section B contained 24 items measuring the six constructs related to ICT adoption: importance (4 items), ease of use (4 items), knowledge (4 items), equipment (4 items), cost (4 items), and attitude (4 items).

Result and Discussion

In the first section of the questionnaire, demographic information such as age, gender, education level, years of farming experience, and type of agricultural activity are captured. Figure 1 shows gender of the respondents. 81% of the respondents are male, while 19% are female. Less than 20% of the respondents are below 20 years old.

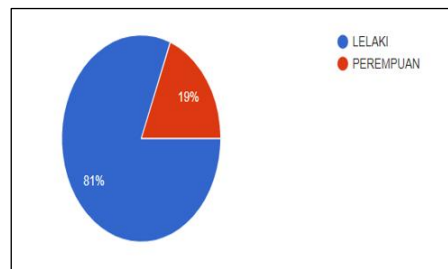


Figure 1: Gender

The second section of the questionnaire consists of 24 items measuring six constructs adapted from the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). The items including importance of ICT, ease of use, knowledge, equipment availability, cost, and attitude toward ICT adoption. After analysis, all constructs demonstrated acceptable internal consistency, with Cronbach's alpha values ranging from 0.76 to 0.84, indicating good reliability of the measurement scales. Table 1 presents the descriptive statistics and reliability coefficients of the constructs.

Table 1: The Descriptive Statistics And Reliability Coefficients Of The Constructs.

Construct	Mean (M)	Standard Deviation (SD)	Cronbach's Alpha
Importance of ICT	4.35	0.52	0.83
Ease of Use	3.89	0.64	0.81
Knowledge	3.78	0.70	0.80
Equipment Availability	3.22	0.75	0.78
Cost	3.10	0.81	0.76
Attitude toward ICT Adoption	4.12	0.58	0.84

The findings from the analysis of 30 respondents in Kelantan reveal an overall positive perception toward ICT adoption in agriculture. The construct measuring perceived importance of ICT recorded a high mean score of 4.35 (SD = 0.52) on a five-point Likert scale, indicating strong agreement that ICT contributes to farming efficiency and decision-making. Most respondents (87%) agreed that ICT provides access to timely market information and supports

improved productivity. This demonstrates that farmers are increasingly aware of ICT's role in enhancing competitiveness and reducing dependency on traditional methods. The Cronbach's alpha value of 0.83 for this construct confirmed strong internal consistency among the related items, validating the reliability of the measurement.

For the ease of use and knowledge constructs, the results showed moderate levels of agreement among farmers. The mean score for ease of use was 3.89 (SD = 0.64), while knowledge recorded 3.78 (SD = 0.70). All respondent familiar with smartphones and social media platforms reported greater confidence in using ICT to check weather forecasts, search for fertilizer information, and communicate with extension officers. However, around 42% of respondents admitted that they still found it difficult to use advanced applications such as digital farm management systems or online marketing tools due to limited digital skills. This suggests that while awareness and basic usage are relatively widespread, practical competency remains an area for improvement. The positive correlation observed between ICT knowledge and attitude ($r = 0.61$, $p < 0.01$) indicates that farmers who are more knowledgeable tend to have more favourable attitudes toward ICT integration.

Despite the overall positive outlook, several challenges remain evident. The equipment and cost constructs recorded lower mean scores of 3.22 (SD = 0.75) and 3.10 (SD = 0.81) respectively, showing that access to digital devices and affordability continue to be major barriers. Many farmers (56%) reported difficulties in purchasing or maintaining ICT equipment, while 48% cited unstable internet connectivity as a constraint. Furthermore, although the attitude toward ICT adoption construct showed a high mean of 4.12 (SD = 0.58), external challenges such as limited infrastructure and financial capacity often restrict full utilization of ICT tools. Nevertheless, the majority (79%) expressed strong willingness to participate in future ICT training programs. These findings highlight that while Kelantan's farmers are conceptually ready for digital transformation, practical challenges such as particularly cost, infrastructure, and digital literacy must be addressed to achieve effective and sustainable ICT adoption in rural agriculture. The results of this study indicate that farmers in Kelantan generally have a favourable perception of ICT and recognize its importance in improving agricultural practices. High mean scores for importance ($M = 4.35$) and attitude ($M = 4.12$) suggest that most farmers value ICT as a tool for enhancing productivity, accessing information, and facilitating communication. Moderate scores for ease of use ($M = 3.89$) and knowledge ($M = 3.78$) imply that while many farmers are familiar with basic ICT tools such as smartphones and social media, they still face difficulties in applying more advanced digital technologies. Lower mean values for equipment ($M = 3.22$) and cost ($M = 3.10$) highlight the continuing challenges of limited device availability, unstable internet connectivity, and high operational costs.

Overall, the findings demonstrate that farmers in Kelantan generally possess a positive perception of ICT adoption in agriculture. Most respondents recognized ICT's potential in improving productivity, accessing market information, and enhancing communication with agricultural stakeholders. High mean scores for perceived importance and attitude indicate readiness to embrace digital tools, aligning with previous studies that identified perceived usefulness and ease of use as key predictors of technology adoption (Awuor et al., 2020; Meera et al., 2021). Reliability results confirmed that the instrument was both valid and appropriate for future large-scale studies.

However, persistent barriers such as limited equipment access, poor connectivity, and high costs continue to restrict effective ICT utilization (Ismail et al., 2020; Kamaluddin et al., 2022). While awareness is increasing, many farmers lack the digital skills required for more advanced applications, such as e-commerce or precision farming. This gap between positive attitudes and practical usage underscores the importance of improving digital literacy and affordability (Rahman & Hassan, 2019; Bolarinwa et al., 2021).

The study also found strong willingness among farmers to participate in ICT-related training, highlighting opportunities for targeted interventions. Strengthening extension services, promoting affordable devices, and expanding broadband infrastructure could enhance digital inclusion. As Norizan and Aziz (2022) suggest, sustained institutional support and training can significantly increase rural farmers' engagement with ICT. Overall, this pilot study confirms the reliability of the measurement instrument. The finding provides a foundation for future research on ICT adoption among rural farmers in Kelantan.

Conclusion

This pilot study examined the reliability and suitability of the questionnaire to be used to investigate the perceptions and attitudes of farmers in Kelantan toward ICT adoption in agriculture, focusing on six key constructs including importance, ease of use, knowledge, equipment availability, cost, and overall attitude. The results revealed that the reliability value is acceptable. Therefore, the questionnaire is valid to be used to determine ICT adoption specifically among farmers.

Declaration of AI-Generated Content

During the preparation of this work, the authors used ChatGPT to organize the idea and Quillbot in order to check grammar and enhance language clarity. After using these tools, the authors reviewed and edited the content as needed and takes full responsibility for the content of the publication.

-
- Acknowledgements:** The authors would like to express their sincere gratitude to Universiti Teknologi MARA Cawangan Kelantan for providing the necessary resources and support throughout the course of this research. Special appreciation is extended to colleagues and peers who contributed valuable insights and constructive feedback, which greatly enhanced the quality of this paper.
- Funding Statement:** No Funding
- Conflict of Interest Statement:** The authors declare that there is no conflict of interest regarding the publication of this paper. All authors have contributed to this work and approved the final version of the manuscript for submission to the Journal of Information System and Technology Management (JISTM)
- Ethics Statement:** This study was conducted in accordance with ethical research standards. All procedures involving human participants were reviewed and approved by the Branch Ethics Review Committee (BERC) Universiti Teknologi MARA Cawangan Kelantan, approval number BERC/EX/UG/2026/007. Informed consent was obtained from all participants prior to data collection. Participation was voluntary, and respondents were assured of confidentiality and anonymity. The data collected were used solely for academic purposes.
- Author Contribution Statement:** All authors contributed significantly to the development of this manuscript. Zuriani Ahmad Zukarnain was responsible for the conceptualization, methodology, and overall supervision of the study. Siti Haslini Zakaria handled data collection, analysis, and interpretation of results. Noorihan Abdul Rahman, Nor Asma Mohd Zin, Wan Fariza Wan Abdul Rahman and Cik Ku Haroswati Che Ku Yahaya contributed to the literature review, drafting, and critical revision of the manuscript. All authors read and approved the final version of the manuscript prior to submission.
-

References

- Arokoyo, T. (2019). *ICTs in the transformation of agricultural extension: The case of Nigeria*. Journal of Agricultural Extension and Rural Development, 11(5), 87–95.
- Awuor, F. M., Rabah, K., & Okelo-Odongo, P. (2020). *Determinants of ICT adoption among smallholder farmers in East Africa*. Information Development, 36(4), 532–547.
- Bolarinwa, K. K., Fakayode, S. B., & Ayinde, O. E. (2021). *Information and communication technology adoption among rural farmers in developing countries: A review*. International Journal of Agricultural Economics, 6(3), 143–151.
- Davis, F. D. (1989). *Perceived usefulness, perceived ease of use, and user acceptance of information technology*. MIS Quarterly, 13(3), 319–340.
- Department of Statistics Malaysia. (2023). *Selected agricultural indicators, Malaysia 2023*. Putrajaya: DOSM.
- Economic Planning Unit. (2021). *MyDIGITAL: Malaysia Digital Economy Blueprint*. Prime Minister's Department, Malaysia.
- Hertzog, M. A. (2008). *Considerations in determining sample size for pilot studies*. Research in Nursing & Health, 31(2), 180–191.
- Ismail, N., Yusof, S. A., & Jalil, N. A. (2020). *Barriers to ICT adoption among rural farmers in Malaysia*. Malaysian Journal of Rural Studies, 25(2), 65–77.
- Johanson, G. A., & Brooks, G. P. (2010). *Initial scale development: Sample size for pilot studies*. Educational and Psychological Measurement, 70(3), 394–400.
- Kamaluddin, M. A., Rahim, N. A., & Abdullah, S. (2022). *Digital literacy and ICT usage among Malaysian rural communities*. Journal of Social Sciences and Humanities, 19(3), 201–215.
- Krejcie, R. V., & Morgan, D. W. (1970). *Determining sample size for research activities*. Educational and Psychological Measurement, 30(3), 607–610.
- Meera, S. N., Jhamtani, A., & Rao, D. U. M. (2021). *Information and communication technology in agricultural development: A comparative analysis*. Asian Journal of Agricultural Research, 15(2), 44–55.
- Ministry of Agriculture and Food Security. (2021). *National Agrofood Policy 2021–2030 (NAP 2.0)*. Putrajaya: MAFS.
- Munthali, N., Manda, S., & Phiri, T. (2018). *Socio-cultural influences on technology adoption among smallholder farmers in Sub-Saharan Africa*. Journal of Rural Development Studies, 34(2), 201–215.
- Nor Diana, M. I., Loyola, O. P., Lee, K. E., Nur Riza, M. S., & Chin, H. C. (2026). *Aplikasi Model UTAUT dalam Penggunaan Dron di KADA: Menilai Peranan Saiz Ladang Sebagai Pembolehubah Penyederhana*. Malaysian Journal of Social Sciences and Humanities (MJSSH), 11(2).
- Norizan, A. R., & Aziz, M. H. (2022). *Empowering rural farmers through ICT training: The Malaysian experience*. Pertanika Journal of Social Sciences & Humanities, 30(1), 15–27.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). McGraw-Hill.
- Rahman, A., & Hassan, H. (2019). *Technology acceptance among Malaysian farmers: Extending the TAM framework*. Journal of Agricultural Management, 8(1), 33–46.
- Ramli, R., Zainuddin, M., & Ariffin, F. (2021). *The role of ICT in Malaysian agricultural extension services: A case study approach*. Malaysian Journal of Agricultural Economics, 12(1), 55–69.
- Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.

- Setiawan, B., Suharyanto, & Nurlina. (2020). *ICT-based agricultural extension and farmer empowerment in Indonesia*. Asian Journal of Agricultural Extension, 8(2), 119–131.
- Sulaiman, A. H., Wahab, S. A., & Noor, M. N. (2022). *Social influence and digital readiness among Malaysian rural farmers*. Journal of Rural Sociology, 35(1), 77–95.
- Tanaka, K., & Nguyen, M. T. (2024). Intergenerational adoption gap: Digital literacy training and its effect on older farmers' use of precision technology in Thailand. Global Agricultural Technology Review, 12(3), 112–129. <https://doi.org/10.3389/gatr.2024.112345>
- Tobbin, P., & Adjei, J. (2021). *Adoption of mobile ICTs in agriculture: A study of rural Ghana*. Information Technology for Development, 27(2), 198–213.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). *User acceptance of information technology: Toward a unified view*. MIS Quarterly, 27(3), 425–478.