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Towards Digital Resilience:
Formulating strategies for farmers in a digitally disruptive environment

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Abstract
This study conceptualizes a digital culture strategy to fortify the resilience and competitiveness of middle-skilled farmers in Selangor, Malaysia. Utilizing a mixed-method approach, it synthesizes the Technology Acceptance Model, Theory of Planned Behaviour, and Hofstede's cultural dimensions into a rural digital framework. The research underscores a positive correlation between strategic digital culture adoption and factors like digital literacy and farming productivity, moderated by cultural dimensions. It offers actionable recommendations for policy formulation and resource allocation, enriching existing literature on technology adoption in traditional sectors.

Keywords: Information Science; Digital Culture; Agriculture; Digital Disruption; Farmer Community

1.0 Introduction
The modern world is witnessing a transformative era, often referred to as the 'Fourth Industrial Revolution', where the integration of digital technology into various industries is altering the traditional landscape (Smith, et al., 2022). One such sector that is undergoing a monumental shift is agriculture. Coined as 'Digital Agriculture' or 'Smart Farming', this revolution marks the infusion of digital technologies such as big data, the Internet of Things (IoT), artificial intelligence, and blockchain into conventional farming practices. These technologies are enabling farmers to monitor soil moisture levels in real-time, automate irrigation systems, track the health of livestock through wearable devices, and even predict yields based on machine learning algorithms (Johnson & Yang, 2022). Despite its promising prospects, the adoption of digital technology in agriculture presents a nuanced picture (Khanna & Kaur, 2023). While countries like the United States and Germany are making significant strides in implementing advanced farming practices, many developing nations lag, revealing an evident digital divide (Smith, et al., 2022). These disparities have far-reaching implications, including the potential to exacerbate existing social and economic inequalities.

Focusing on the context of Malaysia, the adoption of digital agriculture is in its embryonic stages but holds considerable promise (Ashvini et al., 2023, pp. 21-26). Malaysia has a rich agricultural heritage (Mohd Suib et al., 2023, p. 990), with sectors like palm oil, rubber, and paddy rice being significant contributors to the national economy (Man et al., 2023). The COVID-19 pandemic has acted as a catalyst, accelerating the adoption of digital tools among the farming community (Mishra et al., 2023). However, the process is not without challenges. Several barriers, including financial constraints, a lack of technical expertise, and socio-cultural factors, are hindering full-scale digital adoption (Agbehadji, Awuzie, & Ngowi, 2021). Moreover, the rural-urban divide in Malaysia presents another layer of complexity. While urban and peri-urban areas benefit from better connectivity and access to digital resources, many rural regions are still grappling with fundamental issues such as unstable electricity and internet connectivity (Zubidi et al., 2023). The divergence in digital adoption rates between these geographic locales puts rural farmers at a disadvantage and widens the inequality gap (Agbehadji, Awuzie, & Ngowi, 2021). Therefore, understanding the dynamics of digital adoption in agriculture, especially within the context of a developing nation like Malaysia, is of paramount importance. It allows us to formulate strategies that are not only technologically sound but also socio-economically inclusive, ensuring that the fruits of the digital revolution are accessible to all, regardless of their socio-economic or geographical standing.

1.2 Aim and Objectives
Given these complexities, this paper aims to formulate a digital culture strategy to mitigate the adverse effects of digital disruption on small-scale farmers in Malaysia.
The specific objectives are:
1. To identify the level of digital technology adoption among small-scale farmers in Malaysia.
2. To determine the challenges faced by these farmers in transitioning to digital agriculture.
3. To establish a framework that fosters a digital culture in agriculture tailored to Malaysia's unique needs.

1.3 Scope
This paper will focus on the adoption of digital technologies in industrial crops, particularly paddy farming, in Malaysia. The research will employ a mixed-methods approach, combining qualitative interviews and quantitative surveys, to achieve its objectives. Creating a digital culture strategy for Malaysian agriculture is timely and essential for several reasons:
It addresses the acute problem of digital disruption affecting the sector.
1. It offers a localized solution based on Malaysia's specific challenges and opportunities in adopting digital agriculture.
2. It fills a gap in existing literature by focusing on a framework uniquely tailored for Malaysia, thus contributing to broader digital culture theories.
The rest of this paper is organized as follows: Section 2 reviews the relevant literature, focusing on models and frameworks related to digital disruption and culture in agriculture. Section 3 outlines the proposed conceptual framework, followed by the methodological discussion in Sections 4 and 5, respectively. The paper concludes with recommendations and directions for future research in sub-Section 5.

2.0 Literature Review

2.1 Digital Culture Definition
The study of digital culture is a multidisciplinary field that is continually evolving, and its definition has varied since its first academic exploration. Initially discussed by Soledad Ferreira in 1997, digital culture was understood as a confluence of ethnic culture and new technologies (Wiggins, 2019). Deuze (2006) later cemented a more academic definition, portraying digital culture as an emergent set of values and practices that influence human interactions in contemporary networked societies (Shin et al., 2023).

Uzelac (2008) posited that digital culture is not just about consumption but is inherently participatory. Users don't just receive information passively; they actively contribute, creating a dynamic flow of information and culture. Miller (2011) adds another dimension by emphasizing that digital culture is not just influenced by technology; it is a culture shaped by the use and integration of this technology into daily life. Carlton (2014) expands upon this, saying that digital culture is both a creative and a connective platform, transforming how technology is utilized for various societal purposes. d'Arnault (2015) took a more psychological view, suggesting that digital culture impacts how humans behave, think, and communicate in societal settings. The internet and technology, according to d'Arnault, serve as an invisible hand shaping our beliefs and customs. Guy (2019) sees digital culture as a current challenge in sociological analysis, a lens through which society's digital transformation can be examined critically. Ayala-Perez & Joo-Nagata (2019) bring it back to a technological perspective, stating that the digital culture revolves around the technology itself, emphasizing the 'digital' in the digital culture.

2.2 Sustainable Farmer Community
The concept of sustainability in farming communities is multi-faceted, with scholars providing different interpretations based on the context in which it is studied. Krstić, Ilic, and Avramović (2018) define sustainability as the endurance of processes and activities over an indefinite period. Mollenkamp (2022) builds on this by stressing the importance of current actions not compromising the welfare of future generations. Sustainability in farming is particularly pertinent, given the trifecta of economic, social, and environmental factors that underpin it. In the agricultural sector, Information and Communication Technology (ICT) has shown the potential to enhance these

pillars of sustainability. Digital technologies offer farmers new methods for effective crop and livestock management, and online platforms provide new avenues for marketing and customer engagement. Such technologies can profoundly impact a farming community's resilience and economic viability.

2.3 Middle-Skilled Farmer in Malaysia
Farming communities in Malaysia exhibit a unique set of characteristics shaped by socioeconomic factors. Based on a study by Firos et al. (2020), land is considered an economic space that is primarily situated in rural areas and significantly influenced by the community's socioeconomic status. Medhi et al. (2020) support this view by outlining factors like education, gender, wealth, health, and access to credit and technology as determinants of a community's adaptive capacity. Statistics from the Ministry of Agriculture and Food Industries have shown a disparity in the income generated by various categories of farmers. The large number of paddy farmers indicates a need for targeted intervention in this category to mitigate poverty and low income.

In the wake of the global COVID-19 pandemic, digital technology adoption among these communities has become increasingly relevant. Resistance or reluctance to technology adoption may have been true in the past, but the imperatives of modern agriculture technology and the external pressures from the pandemic have made it more critical than ever for these communities to adapt and embrace technology.

3.0 Digital Culture Strategy Towards Sustainability Farmer Community: A Proposed Conceptual Framework
The philosophical foundation of this research is established upon a multidimensional framework synthesized from various models and theories in the domain of information technology adoption. This includes the Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB), and Hofstede's Culture Approach. Each of these theories brings to light specific variables—perceived ease of use and perceived usefulness (TAM), attitudes and norms (TPB), and cultural dimensions (Hofstede)—that influence behavior. The extant literature suggests that technology adoption is governed by a multiplicity of factors ranging from individual perceptions to social and cultural norms (Venkatash, 2003; Phua, Wong & Rosini Abu, 2012; Nikou & Economides, 2019). Echoing the findings of Samsuddin et al. (2016), this research amalgamates these dimensions to holistically assess the behavioral inclinations of Malaysia's farmer community towards digital technology. Furthermore, cultural dimensions serve as moderating variables in this framework, shaping the efficacy of technology adoption and use among rural farmer communities.

3.1 Perceived Ease of Use
Within technology adoption research, the notion of 'ease of use' is indispensable. It refers to the intuitive nature of technology, positing that user-friendly systems are more likely to be adopted. However, 'ease of use' is not just a static concept; it evolves with technological familiarity and skill development. Hence, community-level interventions aimed at educating farmers about technology's utility could transform their perceptions over time. This dimension acts as a cornerstone for establishing a digital culture, particularly in rural communities where skepticism towards new technology might be prevalent.

3.2 Perceived Usefulness
While 'ease of use' is crucial, it is the perceived usefulness of technology that ultimately dictates its adoption (Dah and Hussin, 2021). This dimension gains significance when we consider that farmers are pragmatic individuals who invest in solutions providing tangible benefits. Technology will find a place in the daily operations of these farmers only when they discern its direct advantages for their livelihoods—increased crop yield, better market reach, etc. Hence, this research aims to explore what specific features or applications of technology the farming community finds most beneficial for sustainability.

3.3 Attitudes
Attitude is a composite of an individual's beliefs, feelings, and behavioural tendencies towards an object or idea. In the context of technology adoption, attitude can be shaped by several underlying dimensions such as ease of use and perceived usefulness. Attitudes, once shaped, can be enduring and influence subsequent actions. For rural farmers, attitudes toward technology can be heavily influenced by their socio-economic status, educational background, and even communal narratives about technological advances.

3.4 Subjective Norms
Subjective norms refer to the social pressures that influence whether an individual engages with technology. These norms are especially potent in tight-knit communities like those of rural farmers. Leadership and peer influences, for instance, can either accelerate or stifle technology adoption. Hence, understanding these social dynamics is pivotal for any attempt to inculcate a digital culture within this community. Interventions could range from grassroots advocacy to policy-driven incentives that encourage collective action towards technological adoption.

3.5 Self-Efficacy
Bandura's concept of self-efficacy underscores an individual's belief in their abilities to achieve specific outcomes. In the realm of technology, self-efficacy can dictate the enthusiasm with which individuals explore new technological facets. A farmer with high self-efficacy may be more likely to venture into using advanced agricultural software than someone with low self-efficacy. Therefore, building self-efficacy through training and support systems is critical for the effective utilization of technology.

3.6 Cultural Dimensions
Cultural aspects, as defined by Hofstede, could serve as either enablers or barriers to technology adoption. The study of cultural dimensions in a diverse country like Malaysia becomes particularly interesting, given its multi-ethnic fabric. This research explores how various cultural elements like individualism, uncertainty avoidance, and long-term orientation moderate the relationship between the proposed dimensions and technology adoption.

3.7 Actual Usage of Digital Technology
Last but not least, the ultimate metric of successful adoption is the actual usage of digital technology. This dimension serves as an endpoint to measure the effectiveness of the multiple influences discussed above. It will help in isolating factors that most significantly contribute to technology acceptance and use, providing policy-makers, and community leaders actionable insights for promoting sustainable farming through digital means.

By weaving these dimensions into a cohesive framework, this study aims to offer a robust analytical lens for understanding the complex interplay of individual, social, and cultural factors that influence the adoption of digital technology among rural farmer communities in Malaysia. With sustainability as the overarching aim, the research posits that fostering a digital culture is not merely a technical exercise but a socio-cultural transformation requiring multi-faceted strategies.
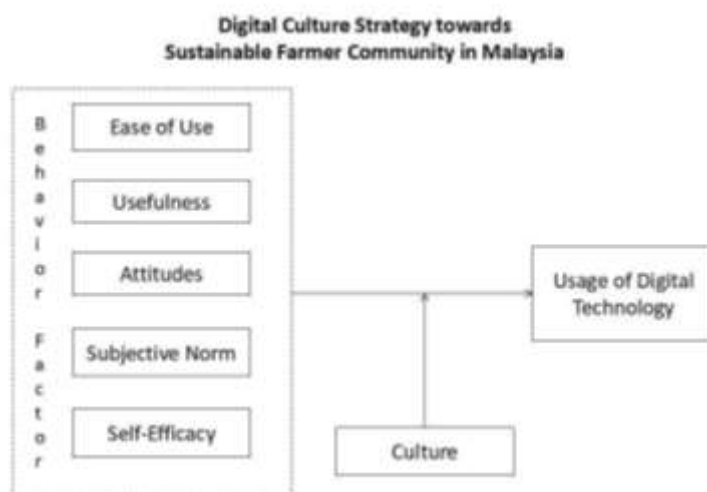

Fig. 1: A Conceptual Framework of Digital Culture Strategy toward Sustainable Farmer Community in Malaysia (constructed by authors)

4.0 Methodological Framework for Investigating Digital Culture in Middle-Skilled Farmers
The investigative framework of this research hinges on a comprehensive literature survey, a methodological choice that far transcends a simplistic collation of existing research. It instead functions as an intricate tapestry, weaving together various threads of empirical and theoretical knowledge to elucidate the nuanced dynamics of digital culture adoption among middle-skilled farmers in Selangor, Malaysia. Building upon Hesse-Biber & Johnson (2015) conception, a literature survey serves not just as an inventory of previous studies, but as an advanced hermeneutic tool. It aids in decoding the nascent and complex phenomena concerning digital culture by rigorously scrutinizing an extensive range of secondary data. This incorporates not just scholarly articles but also what is often classified as "grey literature," including governmental reports, opinion pieces, web-based publications, and academic dissertations. The inclusive nature of this approach ensures that the research is grounded in a holistic understanding, capturing the full scope of attitudes, behaviours, and socio-cultural factors related to digital technology adoption among farmers.

One might argue that the utilization of secondary data could be perceived as a limitation, given that these sources are not tailored to our specific research questions. However, the value lies in their capability to provide a multidimensional and temporal view of the subject matter, which would otherwise be impractical and resource-intensive to collect anew. Moreover, secondary data facilitate triangulation, thereby increasing the validity and reliability of the research findings.

In the quest to construct a well-rounded understanding of digital culture among middle-skilled farmers, this research transcends mere empiricism. It embarks on a theoretical odyssey, exploring relevant models and paradigms in the domain of technological adoption, particularly within information science. This endeavour is imperative for laying the groundwork for a robust conceptual framework, which serves dual purposes: first, to provide a theoretically sound understanding of the factors influencing farmers' attitudes, acceptance, and self-efficacy in digital technology adoption; second, to furnish actionable insights that could inform policy decisions at the governmental level.

In sum, this methodological framework, embedded in its multi-tiered and interdisciplinary approach, positions the study not merely as an academic venture but as an impactful research initiative. It stands to offer invaluable insights that could galvanize policy formulation, particularly aimed at empowering middle-skilled farmers to seamlessly integrate digital technologies into their agricultural

practices. These recommendations have the potential not only to enhance individual livelihoods but to significantly contribute to the overall economic development of Malaysia.

5.0 Discussion and Conclusion

5.1 Synthesis of Findings
The findings of this research underscore the intricate dynamics of digital culture strategy adoption within rural farmer communities in Malaysia. Leveraging models like the Theory of Planned Behavior, the Technology Acceptance Model, and Hofstede's cultural dimensions, this study has elucidated several key factors affecting technology acceptance. These include Perceived Ease of Use, Perceived Usefulness, Attitudes, Subjective Norms, Self-Efficacy, Cultural Dimensions, and Actual Usage of Digital Technology. Our study further supports Samsul Farid Samsudin's (2016) dimensions for assessing behavioral factors in technology use.

5.2 Theoretical Implications
The study's findings enrich extant theories on technology adoption by incorporating a multi-dimensional approach that includes both psychological and cultural factors. For instance, the moderating role of culture elucidates how adoption models can't be 'one-size-fits-all' but should be tailored to the community in focus, thus contributing to more culturally sensitive theories of technology adoption.

5.3 Practical Implications
The conceptual framework generated from this research could serve as an instrumental tool for policymakers and stakeholders in Malaysia's agricultural sector. By understanding the roles played by each dimension in technology adoption, strategies can be tailored to bolster the sustainable implementation of digital technologies among farmers, potentially enriching both their yields and the national economy. In line with Dongoski (2021), our study posits that increased adoption of digital technology among farmers could substantially improve agricultural productivity, particularly in paddy production. The research could assist the Malaysian Government in promoting digital literacy among independent and low-income workers, offering them alternative ways to sustain their livelihoods and improve living standards.

5.4 Limitations and Future Research
While the research methodology deployed for this study offers a comprehensive outlook on the subject, it relies predominantly on secondary data. This methodological choice may limit the depth of insights into real-time user experience and attitudes. Future research could involve in-depth discussions with farmers to better understand the barriers and opportunities related to digital technology adoption. Additionally, a more hands-on approach would assist not only the farmers but also help governmental bodies like the Ministry of Communication and Multimedia in channeling technological infrastructure more effectively.

5.5 Directions for Future Research
Given that this study focuses on middle-skilled farmers in Selangor, future research should extend to other demographics and regions in Malaysia for more generalizable results. The development towards a Society 5.0 direction could also be explored, examining how the agricultural sector fits within broader societal transformations mediated by technology.

In an increasingly digital world, understanding the dynamics of technology adoption in rural agricultural communities is not just timely but also pivotal. This study provides an invaluable roadmap for tailoring digital technology strategies that are both effective and culturally sensitive. Through such endeavors, a sustainable agricultural future, empowered by digital technology, becomes an achievable vision for Malaysia.

Contribution to Related Fields of Study
This paper contributes to the field of Information Science by exploring how information and communications technology can be successfully implemented in traditional sectors like agriculture. It offers a comprehensive model that includes not only the technical aspects but also the psychological and sociocultural factors that affect technology adoption. From a social science perspective, the study provides a nuanced understanding of how communities adapt to technological changes, integrating theories like Hofstede's cultural dimensions and the Theory of Planned Behaviour. It uncovers the social factors that could either impede or accelerate the adoption of digital technologies, which can be instrumental in policy design aimed at digital inclusivity. The direct application of this research is most keenly felt in the field of agriculture. The paper highlights the vital role that digital technology can play in advancing agricultural practices, specifically among middle-skilled farmers in Malaysia. The study aims to be a catalyst for technological change that could potentially lead to increased yields and sustainable farming practices.

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References

Adila Ismail, Habee Bullah Affandy, And Mohammad Rezal Hamzah (2018). Factors Influencing the Use of ICT in Rural School Libraries. MATEC Web of Conferences 150, 06045 (2018). Retrieved March 2020, from: https://www.matec-conferences.org/articles/matec conf/pdf/2018/09/matecconf_mucet2018_06045.pdf

Agbehadji, I. E., Awuzie, B. O., & Ngowi, A. B. (2021). COVID-19 pandemic waves: 4IR technology utilisation in multi-sector economy. Sustainability, 13(18), 10168.

AbuShanab, E. and Pearson, J.M. (2007). Internet banking in Jordan: The unified theory of acceptance and use of technology (UTAU T) perspective. Journal of Systems and Information Technology, 9(1): 78-97.

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211. doi:10.10 16/0749-5978(91)90020-T

Anem, M. (2013). Petani Malaysia. Retrieved 13 February 2021, from: http://skeletonacet.blogspot.com/2011/02/petani-malaysia.html

Anitei, M., Veres, C., & Pisla, A. (2021, January). Research on Challenges and Prospects of Digital Agriculture. In Proceedings (Vol. 63, No. 1, p. 67). MDPI.

Ashvini, G., Salamzadeh, Y., & Abdul Rahim, N. F. (2023). Which E-Leadership Skills Are Needed to Deploy Digital Strategies? A Study on Multinational Companies in Northern Malaysia. In Multidimensional and Strategic Outlook in Digital Business Transformation: Human Resource and Management Recommendations for Performance Improvement (pp. 217-230). Cham: Springer International Publishing.

Athirah, R. N., Norasma, C. Y. N., & Ismail, M. R. (2020). Development of an android application for smart farming in crop management. In IOP Conference Series: Earth and Environmental Science, 540(1), 012074

Baskaran-Makanju, S., Hoo, S., Mitchell, C., Larson, J., Unnikrishnan, Vasudevan, S., Zrikem, Y. (2021). The Digital Agriculture Revolution Will Take More Than Innovation. BCG.com, Retrieved July 2022, from: https://www.bcg.com/publications/2021/digital-agriculture-and-development

Bertschi, M., 2018. Einsatzm¨oglichkeiten von Smart Farming in der CH Landwirtschaft. Presented at the Nationale Ackerbautagung (Murten).

Borkar, S. (2020). Digitisation can help agricultural sector reap better gains. New Straits Times. Retrieved from: https://www.nst.com.my/opinion/letters/2020/01/555446/digitisation-can-help-agricultural-sector-reap-better-gains

Carlton, N. R. (2014). Digital culture and art therapy. The Arts in Psychotherapy, 41(1), 41-45.

Chen, Y. (2020). Correlation between Self-Efficacy and English Performance. International Journal of Emerging Technologies in Learning (iJET), 15(8), 223-234.

Cheng, T.C.E., Lam, D.Y.C. and Yeung, A.C.L. (2006). Adoption of internet banking: An empirical study in Hong Kong. Decision Support Systems, 42(3): 1558-1572

Christensen, CM (1997). The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail. Harvard Business Press, Boston.MA

Christensen, C., & Raynor, M. (2013). The innovator's solution: Creating and sustaining successful growth. Harvard Business Review Press.

Dah, J., & Hussin, N. A. (2021). Conceptual framework of a streamlined extended technology acceptance model for mobile application adoption. International Journal of Social Science Research, 9(2), 1-29.

Davis, F. D. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", MIS Quarterly, 13 (3): 319–340, doi:10.2307/249008, JSTOR 249008

Deuze, M. (2006). Participation, remediation, bricolage: Considering principal components of a digital culture. The information society, 22(2), 63-75.

Dongski (2021). Digital agriculture: enough to feed a rapidly growing world? EY Agribusiness Leader. Retrieved August 2022, from: https://www.ey.com/en_my/digital/digital-agriculture-data-solutions

Erasmus, Etienne, Rothmann, Sebastiaan, & van Eeden, Chrizanne. (2015). A structural model of technology acceptance. SA Journal of Industrial Psychology, 41(1), 01-12. https://dx.doi.org/10.4102/sajip.v41i1.1222

Firos, M., Ismail, F. A., & Goh, S. (2020). The Malaysian Farmers and Agricultural Entrepreneurship Development. Journal of Global Business and Social Entrepreneurship (GBSE), 6(19).

Gudek, B. (2019). Computer Self-Efficacy Perceptions of Music Teacher Candidates and Their Attitudes towards Digital Technology. European Journal of Educational Research, 8(3), 683-696.

Guy, J. S. (2019). Theory Beyond Structure and Agency: Introducing the Metric/Nonmetric Distinction. Springer Nature.

Hesse-Biber, S. N., & Johnson, R. B. (Eds.). (2015). The Oxford handbook of multimethod and mixed methods research inquiry. Oxford University Press.

Hofstede, G. (2001). Culture's consequences: Comparing values, behaviors, institutions and organizations across nations. Sage publications.

Hofstede, G. (2011). Dimensionalizing cultures: The Hofstede model in context. Online readings in psychology and culture, 2(1), 230 7-0919.

Hubert, M., Blut, M., Brock, C., Zhang, R. W., Koch, V., & Riedl, R. (2019). The influence of acceptance and adoption drivers on sm art home usage. European Journal of Marketing.

Ivypanda (2020). Culture in Human Behavior. Retrieved March 2021, from: https://ivypanda.com/essays/culture-in-human-behavior/

John, O. P., & Srivastava, S. (1999). The big five trait taxonomy: History, measurement, and theoretical perspectives. In L. A.

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Johar, M. G. M., & Awalluddin, J. A. A. (2011). The role of the technology acceptance model in explaining effect on the e-commerce application systems. International Journal of Managing Information Technology, 3(3), 1-14.

Khanna, A., & Kaur, S. (2023). An empirical analysis on adoption of precision agricultural techniques among farmers of Punjab for efficient land administration. Land Use Policy, 126, 106533.

Krstić, I. I., Ilić, A., & Avramović, D. (2018). The three dimensions of sustainable development: environment, economy and society.

Landmann, D., Lagerkvist, C. J., & Otter, V. (2020). Determinants of Small-Scale Farmers' Intention to Use Smartphones for Generating Agricultural Knowledge in Developing Countries: Evidence from Rural India. The European Journal of Development Research, 1-20.

Lekhanya, L. M. (2013). Cultural influence on the diffusion and adoption of social media technologies by entrepreneurs in rural South Africa. The International Business & Economics Research Journal.

Man, N. K. N., Ismail, N. E., Zakaria, N. A., & Chang, C. K. (2023). Agriculture irrigation development in Kedah, Malaysia. Water Projects and Technologies in Asia: Historical Perspectives, 303.

Maršíková, K., & Mazurchenko, A. (2022). Digital Transformation and Skill Acquisition: Enablers and Barriers for Today's Workforce. In Handbook of Research on Smart Management for Digital Transformation (pp. 113-138). IGI Global.

Medhi, S., Singha, A. K., Singh, R., & Singh, R. J. (2020). Socio-Economic, Psychological Profile and Constraints Faced by the KV K Adopted Farmers for Improved Rice Cultivation in West Garo Hills District. Economic Affairs, 65(3), 379-388.

Mishra, D., Muduli, K., Raut, R., Narkhede, B. E., Shee, H., & Jana, S. K. (2023). Challenges facing artificial intelligence adoption during COVID-19 pandemic: an investigation into the agriculture and agri-food supply chain in India. Sustainability, 15(8), 6377.

Mohd Suib, N. A. B., Salleh, N. H. M., Shukor, M. S., Chamhuri, N., Shahimi, S., Salleh, K. M., & Hashim, K. (2023). The Influence of Good Agricultural Practice (GAP) on the Productivity and Well-Being of Malaysian Sustainable Palm Oil (MSPO)-Certified Independent Smallholders in Malaysia. Agriculture, 13(5), 990.

Nikou, S. A., & Economides, A. A. (2019). Factors that influence behavioral intention to use mobile-based assessment: A STEM tea chers' perspective. British Journal of Educational Technology, 50(2), 587-600.

Phua, P. L., Wong, S. L. & Rosini Abu (2012). Factors influencing the behavioural intention to use the internet as a teaching-learning tool in home economics. Procedia - Social and Behavioral Sciences 59, pp 180 – 187.

Piccion, V. (2010). Do the right thing: innovation diffusion and risk dimensions in the passage from conventional to organic agriculture, Journal of central European agriculture, 11(1).

Protopop, I., & Shanoyan, A. (2016). Big data and smallholder farmers: Big data applications in the agri-food supply chain in developing countries. International Food and Agribusiness Management Review, 19(1030-2016-83148), 173-190.

Purcell, K., Rainie, L., Mitchell, A., Rosenstiel, T., & Olmstead, K. (2010). Understanding the participatory news consumer. Pew Internet and American Life Project, 1, 19-21.

Samsuddin, S. F., Omar, S. Z., Samah, B. A., & Bolong, J. (2016). Potential impingement factors of Information and Communication Technology usage at rural libraries in Malaysia. Mediterranean Journal of Social Sciences, 7(2), 360.

Sekaran, U. (2003). Research Method for business: A skill-building approach. United States of America: John Wiley & Sons, Inc.

Siti Hajar Halili, Hamidah Sulaiman & Rafiza Abdul Razak (2017). Information and Communications Technology Acceptance among Malaysian Adolescents in Urban Poverty. TOJET: The Turkish Online Journal of Educational Technology – January 2017, 16 (1).

Siyam, N. (2019). Factors impacting special education teachers' acceptance and actual use of technology. Education and Information Technologies, 24(3), 2035-2057.

Smidt, H. J., & Jokonya, O. (2022). Factors affecting digital technology adoption by small-scale farmers in agriculture value chains (AVCs) in South Africa. Information Technology for Development, 1-27.

Suleman, D., Zuniarti, I. & Sabil (2019). Consumer Decisions toward Fashion Product Shopping in Indonesia: The effects of Attitude, Perception of Ease of Use, Usefulness, and Trust. Management Dynamics in the Knowledge Economy, 7(2), 133-146.

Tan, G. W. H., Chong, C. K., Ooi, K. B., & Chong, A. Y. L. (2010). The adoption of online banking in Malaysia: an empirical analysis. International Journal of Business and Management Science, 3(2), 169.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. MIS Quarterly, 425-478.

Watts, B. 201.