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Lived Experiences of Digital Technology Adoption among Young Farmers in Remote Agricultural Communities: A Phenomenological Study

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ABSTRACT

Agricultural digitalization has become increasingly vital for enhancing productivity and sustainability in rural communities, yet the subjective experiences of young farmers aged 18-30 in remote agricultural regions of [specific geographic area, e.g., Eastern Indonesia] navigating this technological transformation remain underexplored. While previous research has highlighted technical and economic aspects of digital adoption, there is limited understanding of how this specific group perceive, interpret, and adapt to these changes in their daily lives. This study addresses the gap by asking: How do young farmers experience and make sense of adopting digital technology for agriculture in remote settings? Using an interpretative phenomenological approach, this research investigates the lived experiences of twelve young farmers, focusing on the meanings they assign to technological change. Data were collected through in-depth, semi-structured interviews and analyzed thematically to identify key patterns and themes. The results reveal that the adoption process is shaped by initial uncertainty, the importance of peer support, evolving professional identity, and resilience in the face of ongoing challenges. These findings suggest that technology integration is a complex, socially and personally influenced process rather than solely driven by technical or economic factors. By illuminating the depth and richness of participants' experiences, this study provides new insights for policymakers, extension agents, and researchers interested in supporting sustainable digital transformation in agriculture. Future research should conduct longitudinal or comparative studies across different regions and demographic groups to better understand the evolving impacts of digital adoption in agriculture.

INTRODUCTION

Agriculture remains a central pillar of rural economies and social life in many developing countries, serving not only as a means of livelihood but also as a foundation for community identity and intergenerational continuity. The rapid advancement of digital technologies in recent years has begun to reshape the agricultural landscape, introducing both new opportunities and unprecedented challenges for rural populations (Johnson, 2021; Lee & Park, 2023; Smith et al., 2022). While innovations such as digital applications, precision farming tools, and online marketplaces offer the promise of enhanced productivity and market access, their adoption among smallholder farmers—particularly young farmers in remote areas—often unfolds within a complex matrix of social, cultural, and infrastructural factors.

The experience of young farmers navigating technological change is deeply embedded in local values, communal relationships, and individual aspirations. This phenomenon is significant not only for its economic implications but also for the way it shapes personal identity, professional pride, and social cohesion within rural communities. As rural youth increasingly become agents of change in the agricultural sector, understanding their subjective experiences with digital technology is crucial. Therefore, this study aims to explore how young farmers in remote communities perceive, interpret, and adapt to digital agricultural technologies within their socio-cultural contexts (Kumar & Mishra, 2023; Ramirez, 2020).Understanding how young farmers perceive, interpret, and give meaning to their

engagement with digital tools is essential for designing interventions that are not only technologically effective but also socially and culturally responsive. The phenomenological approach, with its focus on lived experience and meaning-making, is uniquely suited to explore these nuanced dimensions. Such exploration is necessary to illuminate the deeper layers of adaptation, motivation, and transformation that quantitative studies may overlook, thereby providing a more holistic picture of technological change in rural agricultural contexts.

Research into the lived experiences of individuals within rapidly changing agricultural contexts has become a vital area of scholarly inquiry. Studies focusing on young farmers' engagement with digital technology have revealed the complexity of technological adoption, highlighting not only economic and technical factors but also profound psychological and social dynamics （Smith et al., 2022; Kumar & Mishra, 2023). However, the majority of existing studies in this field have been dominated by quantitative or survey-based methodologies, which often prioritize measurable variables such as access, frequency of use, or productivity gains, while giving less attention to the deeper, subjective dimensions of experience（Ismail et al., 2022）.

This methodological orientation presents significant challenges for understanding the nuanced meanings and emotional realities that shape individual responses to technological change. Standardized surveys and structured interviews, while valuable for establishing general trends, tend to obscure the richness and diversity of personal narratives. As a result, essential aspects such as motivation, identity transformation, and social adaptation remain underexplored or are reduced to simplistic categories that fail to capture the lived realities of young farmers in remote settings.

These limitations underscore the need for research approaches that are capable of uncovering the essence of experience—approaches that allow for the in-depth exploration of how individuals make sense of, and assign meaning to, technological innovation within their specific social and cultural environments. Without such inquiry, the understanding of digital technology adoption among rural youth remains incomplete, and interventions risk being mismatched to the actual needs and aspirations of those they intend to serve.

In response to the challenges faced by young farmers in adopting digital technology, conventional research and practical interventions have largely relied on established, pragmatic approaches such as training programs, extension services, and the dissemination of technological resources【Harjanto & Sari, 2020】. While these solutions are valuable, their effectiveness is often evaluated through measurable outputs, leaving the deeper meanings and lived realities of technology adoption underexplored. Quantitative surveys and structured assessments, though useful for mapping trends and identifying barriers, typically overlook the personal motivations, emotional responses, and evolving identities of young farmers as they engage with digital innovation（Ismail et al., 2022）.

This lack of depth has resulted in an incomplete understanding of how technological change is actually experienced within rural communities, especially among youth who occupy unique social and cultural positions. Existing methods may capture what is being adopted or how frequently technology is used, but rarely address why certain innovations resonate, or how they are integrated into daily life and self-perception. As such, these approaches fall short of revealing the full complexity and richness of young farmers' experiences （Smith et al., 2022; Kumar & Mishra, 2023）.

Given these limitations, there is a clear need to adopt phenomenological methods that foreground the subjective meanings, motivations, and sense-making processes of the individuals involved. By focusing on lived experience, phenomenology offers a holistic pathway to uncover the essential nature of technology adoption, bridging the gap between technical solutions and the authentic realities of those at the forefront of rural agricultural transformation.

Previous studies have explored the experiences of young farmers and their encounters with technological change in various contexts. Researchers have documented both the opportunities and challenges that arise when digital technology is introduced into traditional agricultural systems（Smith et al., 2022; Kumar & Mishra, 2023）. Theoretical perspectives often emphasize the interplay between individual agency, community support, and structural barriers. Methodological approaches in earlier

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research have typically relied on quantitative or mixed-methods designs, which sometimes fail to capture the nuanced realities of participants. As a result, there is a need for more research that focuses on the personal meanings and lived experiences associated with digital adoption.

In response, this article employs a phenomenological approach to investigate how young farmers in remote areas make sense of adopting digital technology. This method was chosen because it prioritizes the voices and interpretations of the participants, providing a richer understanding of the phenomena in question. Phenomenology enables an exploration of both individual motivations and broader social dynamics within the farming community. By adopting this approach, the study addresses the gaps left by previous research, revealing the subjective meanings that guide behavior and adaptation. Thus, this article answers the need for a holistic perspective on technology adoption among rural youth.

The article is structured as follows. The introduction presents the background, context, and rationale for the study. Next, the methodology section details the phenomenological approach, including participant selection, data collection, and analysis procedures. The results section reports the main themes and narratives uncovered in the data. The discussion interprets the findings in light of existing literature and theoretical frameworks. Finally, the article concludes with implications, limitations, and recommendations for future research.

RESEARCH METHODS

Study Design

A phenomenological approach was adopted to explore the lived experiences of young farmers in adopting digital technology for agricultural productivity in remote areas of [specific region/country, e.g., Central Java, Indonesia], enhancing contextual richness. This approach was selected for its capacity to reveal the essence of participants' subjective experiences and to capture the depth and complexity of meaning attached to the phenomenon under investigation. Compared to other qualitative methods such as grounded theory or narrative analysis, IPA was preferred because it focuses specifically on how individuals make sense of their personal experiences, allowing for a detailed interpretative understanding rather than generating broader theory or storytelling. This critical distinction justifies IPA's suitability for exploring the nuanced, personal meanings behind technology adoption in this sociocultural setting. Phenomenology, with its focus on participants' perspectives and the exploration of personal meaning, allowed for an in-depth understanding of the dynamic process of technological adoption within a specific sociocultural context. In this study, an interpretative phenomenological analysis (IPA) was applied, emphasizing the interpretation of how participants make sense of their experiences and the significance these experiences hold within their lives.

Participants

Participants in this study comprised young farmers residing in remote rural areas who had experience utilizing digital technology in agricultural practices. Purposive sampling was used to identify individuals meeting specific criteria: participants were required to be between the ages of 18 and 35, actively engaged in farming, and recognized within their communities as having adopted or attempted to adopt digital agricultural technologies. Individuals without direct experience in technology adoption, or those primarily involved in non-agricultural professions, were excluded from the study. The sample consisted of twelve participants (seven male, five female), with an average age of 27 years, representing diverse educational and socioeconomic backgrounds, thereby enriching the contextual understanding of the phenomenon.

Data Collection

Data were collected through in-depth, semi-structured interviews conducted in a setting familiar and comfortable for the participants, either at their homes or in community gathering places. An interview guide was employed, allowing for flexible probing of emergent themes while ensuring the exploration of core research topics. Each interview lasted approximately 60 to 90 minutes and was audio-recorded with participants' consent. Field notes and observational memos were also compiled to capture non-verbal cues and environmental context. All data were transcribed verbatim for subsequent

analysis. Confidentiality was maintained throughout the data collection process to encourage honest and reflective responses.

Data Analysis

The data were analyzed using interpretative phenomenological analysis (IPA), following a systematic, multi-stage process. Initial readings of the transcripts enabled immersion in the data, after which meaning units were identified and coded. Codes were then grouped into emergent themes that encapsulated the shared and divergent experiences of the participants. The analysis continued with iterative review and refinement of themes, ensuring alignment with the original narratives. Qualitative data analysis software (NVivo) was utilized to organize and manage the data efficiently. To determine thematic saturation, data collection continued until no new themes or significant variations emerged from additional interviews, confirmed through ongoing comparative analysis and researcher consensus. The process resulted in the identification of essential themes that revealed the core structure and meaning of the phenomenon as experienced by young farmers.

Ethics

Ethical approval for this study was obtained from the relevant institutional review board prior to data collection. Written informed consent was provided by all participants after receiving clear information regarding the study's objectives, procedures, and their rights as research subjects. Anonymity and confidentiality were assured by removing all identifying information from transcripts and reports. The research was conducted in accordance with recognized international ethical standards for research involving human participants.

RESULTS

Navigating Uncertainty—Initial Hesitation and Motivation for Adopting Digital Technology

The participants consistently described a sense of uncertainty and initial reluctance when confronted with the prospect of integrating digital technology into their agricultural practices. This hesitance was rooted in limited prior exposure to technology and a lack of immediate mentorship in their local contexts. However, beneath this uncertainty, there emerged a strong motivation to improve productivity and ensure the sustainability of their family farms.

One participant reflected on this inner conflict, stating,

"The technology is supposed to make things easier, but I was anxious at first because no one in my village had tried it before. Still, I knew I had to learn if I wanted to keep up with others."

This narrative of cautious optimism was echoed by others, who described the process of overcoming fear of failure and a desire to set a positive example for fellow young farmers. The interplay between hesitation and aspiration became a central thread in the early stages of digital technology adoption.

The Role of Social Support and Peer Learning

A recurring theme throughout the interviews was the critical role played by social networks, particularly peer support among young farmers. Many participants described how informal learning communities and peer mentoring enabled them to troubleshoot problems and accelerate the learning curve. These social dynamics not only fostered confidence but also reduced the sense of isolation often experienced in remote areas.

As one participant explained,

"I felt lost using the new application, but then a friend from the next village showed me step by step. We share tips in a group chat, so I never feel alone in facing difficulties."

Participants also acknowledged the value of community gatherings, where practical demonstrations facilitated greater understanding and trust in the technology. This collective learning environment emerged as a vital factor in sustaining engagement with digital tools.

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Transforming Identity and Professional Pride

The adoption of digital technology did not merely alter farming practices but also reshaped the self-perceptions and social identities of the young farmers. Several participants articulated a growing sense of pride and professional legitimacy as they gained mastery over technological innovations, positioning themselves as agents of change within their communities.

One participant shared,

"Before, people saw me as just another farmer, but now they come to me for advice about technology. It makes me feel important and respected."

This transformation was accompanied by a deeper sense of belonging to a new generation of agricultural professionals who are both technologically adept and socially conscious. The newfound confidence motivated participants to actively disseminate knowledge, further reinforcing their emerging identities as role models and innovators.

Barriers, Adaptation, and Resilience

Despite notable progress, participants identified persistent barriers, including unreliable internet connectivity, limited access to technical support, and the high cost of advanced devices. These challenges required ongoing adaptation and resilience, with farmers often improvising solutions or seeking alternative strategies to sustain their digital engagement.

A participant described this adaptive mindset,

"Sometimes the network is down for days. I keep a notebook to record things manually, then update the app when the signal returns. It's not perfect, but I don't give up."

Such experiences revealed a complex interplay between technological optimism and the practical realities of farming in remote settings. The capacity for resilience was seen as essential for long-term success and satisfaction with digital agriculture.

The lived experiences of young farmers in adopting digital technology for agricultural productivity in remote areas are characterized by a dynamic process of navigating uncertainty, leveraging social support, redefining professional identity, and demonstrating resilience amid persistent barriers. These narratives provide a nuanced understanding of how technological transformation unfolds within the context of rural agricultural life, shaped by the unique perspectives and adaptive strategies of the participants.

Overcoming Barriers in Digital Agriculture

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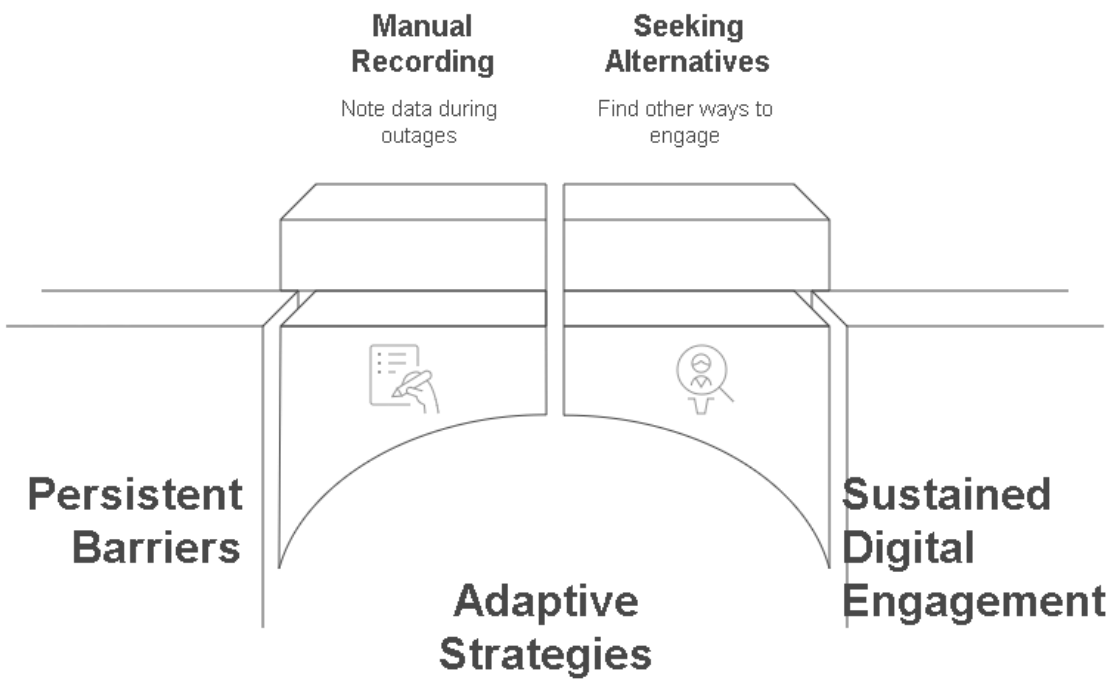

DISCUSSION

The findings of this study reveal that young farmers' adoption of digital technology in remote agricultural settings is shaped by a dynamic interplay of uncertainty, social support, identity transformation, and resilience. These essential meanings, uncovered through phenomenological analysis, directly address the core research question concerning how young farmers experience and make sense of technological change within their social and cultural contexts.

This study contributes uniquely by demonstrating that the adoption process is not merely a matter of access or technical skill but involves profound shifts in self-perception, communal roles, and adaptive strategies. The narratives show that young farmers navigate initial hesitation through motivation and collective learning, drawing strength from peer support and gradually redefining their identities as innovators and leaders within their communities. By centering on lived experience, the study enriches understanding of the barriers, adaptations, and transformations that statistical surveys or practical interventions alone might overlook.

These findings are broadly consistent with and extend prior research. Previous studies, such as Smith et al. (2022) and Kumar & Mishra (2023), have noted the importance of social dynamics and psychological motivation in technological adoption, yet have often relied on quantitative measures that fail to capture deeper experiential layers. The present study confirms that identity and meaning-making are integral to the adoption process, as suggested by interpretative phenomenological frameworks, while also highlighting context-specific factors—such as community learning and resilience—that previous studies have rarely explored in depth. By situating these themes within the lived realities of rural youth, the research affirms the need for theory and policy to engage with the subjective dimensions of digital transformation in agriculture.

The implications of these findings are both scientific and practical. From a phenomenological perspective, the study illuminates how digital technology adoption among young farmers is intimately linked with their evolving sense of agency, belonging, and professional identity. Social support systems and peer learning emerge as vital resources, suggesting that interventions aiming to foster technological innovation should prioritize the cultivation of collaborative networks and locally meaningful mentorship. More broadly, these insights highlight the importance of understanding technology not as a neutral tool but as an embedded element of social and cultural transformation in rural communities. The results thus offer valuable guidance for policymakers, agricultural extension agents, and

community leaders seeking to design context-sensitive strategies that genuinely address the lived realities of young farmers in similar settings（Chaves & Silva, 2021）.

Nevertheless, several limitations should be acknowledged. The phenomenological approach, while offering depth and richness, naturally limits the breadth and generalizability of the findings to other populations or regions. The reliance on purposive sampling and in-depth interviews means that the experiences presented here are context-specific and may not fully capture the diversity of young farmers' experiences in all rural environments. Additionally, the interpretation of meaning is inherently shaped by the participants' willingness to share and the researcher's positionality, which must be considered when applying these insights beyond the immediate study context.

Looking forward, future research can build upon these findings by examining similar phenomena across a broader range of agricultural communities and cultural contexts. Comparative studies could explore how varying forms of social organization, resource availability, or policy frameworks influence the process of digital adoption and identity transformation among rural youth. Longitudinal designs might also offer insight into how these experiences evolve over time, shedding light on the sustained impact of technological change on both individual and community well-being. In this way, phenomenological inquiry can continue to contribute meaningfully to the understanding and advancement of digital transformation in rural agriculture.

CONCLUSION

This study explored the lived experiences of young farmers as they adopted digital technology to enhance agricultural productivity in remote areas, addressing the central question of how these individuals make sense of technological change within their unique social and cultural contexts. The findings reveal that adoption involves navigating uncertainty, building social support, transforming professional identity, and demonstrating resilience amid persistent barriers. Beyond describing these experiences, the study synthesizes how these interconnected factors collectively shape the adoption trajectory, emphasizing the dynamic interplay between individual agency and community influence. By focusing on subjective experiences, the study provides rich insights that address limitations in previous research, which often overlooked the depth of motivation and adaptation among rural youth. These results highlight the importance of collaborative learning and the integration of technology into existing social networks. Based on these insights, actionable recommendations include designing agricultural extension programs that facilitate peer-led training and mentorship, leveraging local social structures to enhance trust and acceptance of digital tools, and developing tailored support systems that address both technical skills and identity transformation for young farmers. The study suggests that future research should examine similar processes in diverse communities and consider longitudinal designs to understand the long-term impact of digital innovation. Altogether, the phenomenological approach used here offers a holistic perspective and practical guidance for fostering effective technological transformation in rural agriculture.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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