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Cultivating Digital Literacy: Mentorship Models for Farmers Engaging in Live Streaming and E-Commerce – Systematic Literature Review

Kultywowanie cyfrowej kompetencji: modele mentorstwa dla rolników angażujących się w transmisje na żywo i e-commerce – systematyczny przegląd literatury

Introduction

Live streaming and e-commerce continue to be vital channels through which rural farmers gain access to broader markets. Numerous farmers, however, are gravely affected by high levels of digital illiteracy, making the channels ineffective. Hasan et al. (2024) posited that higher levels of digital

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literacy increase entrepreneurial behaviour and market activity. In contrast, technology acceptance variables such as perceived usefulness, ease of use, and social influence have a strong impact on farmers' desire to use live streaming (Chen, Zhang and Chen, 2024). The use of multidimensional digital literacy, such as media technology, information awareness, access and dissemination and e-commerce technology, is associated with engagement in online marketplaces (Radovanović, 2024). Thus, mentorship has become a potential avenue to fill in such gaps, even though few syntheses of mentorship models specific to agricultural live streaming and e-commerce have been done. This is a significant gap as mentorship is essential for developing digital skills and confidence among farmers. The novel insights into these processes are essential in scaling adoption and enhancing equitable participation in digital agriculture.

In this research, a hybrid theoretical framework that combines the Diffusion of Innovation theory (Rogers, 2003), the Community of Practice (Lave and Wenger, 1991; Wenger, 1998) and the Capability Approach (Sen, 1999; Nussbaum, 2011). This provides a better understanding of mentorship-based digital literacy among rural farmers. Mentorship facilitates the adoption of live streaming and e-commerce by alleviating uncertainty and instilling confidence in farmers regarding innovations. Based on the Diffusion of Innovations, recent surveys indicate that a broader population are now adopting digital literacy education and agricultural technology. Community of Practice highlights the peer-to-peer, collaborative concept of mentorship, in which farmers will jointly develop knowledge and exchange digital practices. It has been demonstrated that community-based learning centres support rural digital skills initiatives. The Capability Approach views digital literacy as a form of enlarging the substantive freedoms of farmers. Through mentorship, farmers not only acquire technical knowledge but also enhance resilience, entrepreneurial performance, and gain more income opportunities. Collectively, these structures offer a multi-level prism that connects personal skill development with general adoption processes. Simultaneously, they shed light on the role of mentorship in empowering communities and developing rural areas.

While the research builds on established viewpoints, the analytical power of these perspectives lies in how they frame mentorship-based digital literacy. Diffusion of Innovations provides a framework for understanding how mentorship alleviates uncertainty and influences farmers' attitudes towards the value of live streaming and e-commerce technologies. Communities of

Practice framework guides the analysis of peer learning, emphasizing how collective learning spaces and community learning centres support the co-construction of digital skills. The Capability Approach guides analysis of how mentorship expands farmers' substantive freedoms, such as resilience, entrepreneurial capabilities, and livelihood opportunities. These frameworks provide a complementary analytical framework that links digital skills to processes of adoption, social learning and empowerment in rural settings.

This systematic literature review, based on the PRISMA 2020 guidelines, investigates evidence on mentorship in digital agriculture worldwide. It is an amalgamation of peer-to-peer, institution-led, platform-integrated, and hybrid models that foster farmers' digital literacy in live streaming and e-commerce. The review has four goals, which are to: (1) define and classify mentorship models; (2) study the most effective way to develop digital skills; (3) evaluate effects such as adoption, participation, entrepreneurship, and income growth and (4) examine enabling policy. Guided by these aims, the review asks: What mentorship models are used to build farmers' digital literacy for live streaming and e-commerce? What skills are most effectively cultivated? What outcomes and enabling policies are reported across contexts?

Methodology

To enhance the transparency and rigour of the review, it is important to provide additional details about the search strategy, data extraction, and analysis. The search strategy adhered to PRISMA 2020 guidelines and involved a systematic search using a combination of terms related to digital literacy, mentorship, peer learning, live streaming, e-commerce and the platform economy. Boolean operators and controlled vocabulary (when available) were tailored to each database and search strings were refined through pilot searches in Scopus and Web of Science before being applied to CNKI, AGRIS and FAO databases, Google Scholar and ProQuest. The reference lists of eligible studies and NGO/government reports were also searched for comprehensive coverage.

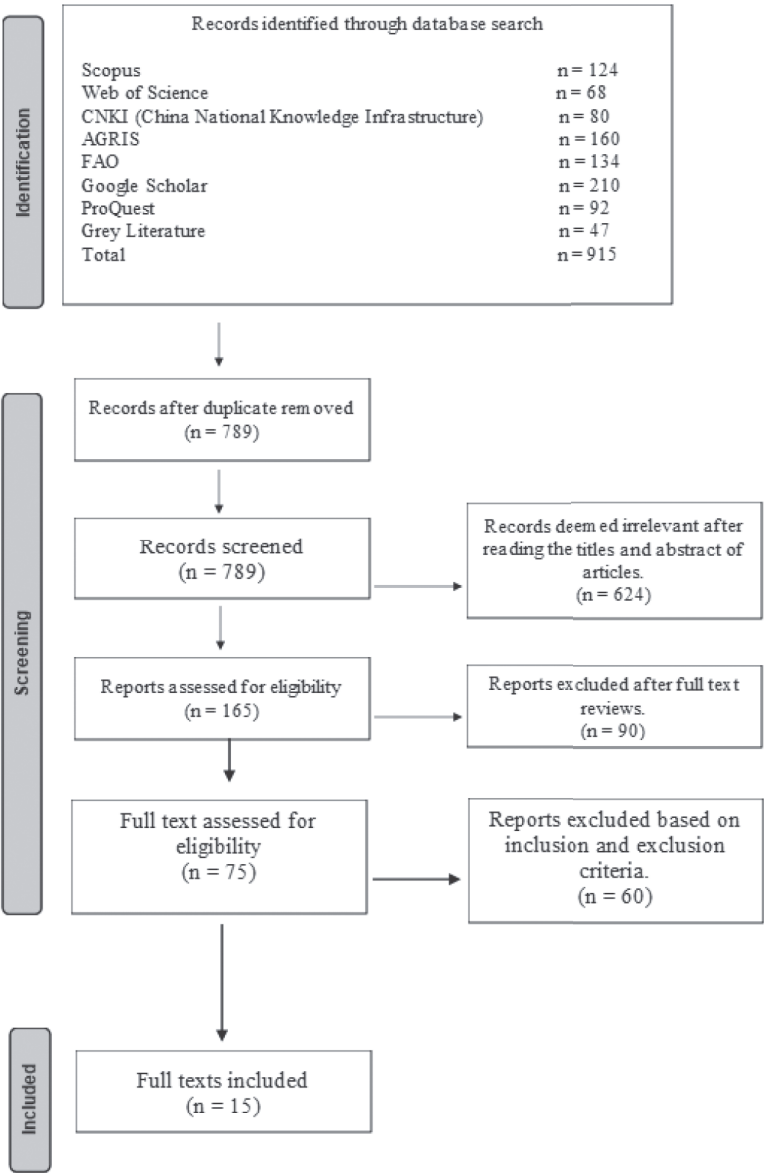
The process of screening included deduplication, reading titles and abstracts and full-text screening based on eligibility. A PRISMA flow diagram was used to describe all these steps (see Figure 1). A pre-tested data extraction form was used to extract information on study characteristics, intervention type, digital literacy dimensions, mentorship components, outcomes and

methodological aspects. Data were independently extracted by two reviewers for a sample of studies, with any inconsistencies resolved by consensus. Data were then tabulated into matrices to compare the effects across settings, intervention types, and outcomes.

Quality appraisal utilized CASP and ROBINS-I for qualitative research and non-randomized studies, respectively. MMAT was also used for mixed methods, and AACODS to assess grey literature. This helped in synthesizing the results. Mentorship models were identified and categorised according to patterns that emerged across studies. Interventions were categorised by structure, including peer-to-peer mentoring, institution or extension-based mentoring, platform-based mentoring and hybrid models that included both community and digital elements. Classification was based on descriptions provided in the studies and complemented by theoretical distinctions derived from the Communities of Practice and Diffusion of Innovations theories. These classifications were subsequently utilized to describe how diverse mentorship structures aligned with specific digital literacy outcomes and adoption behaviours. In cases where the data were found to be homogenous enough, meta-analysis was taken into consideration; in other instances, narrative synthesis combined the technology acceptance model (TAM) determinants and multidimensional literacy structures that have been reported in recent research (Chen et al., 2024; Hasan et al., 2024; Radovanović, 2024). This method guaranteed that the synthesis showcased empirical patterns and theoretically based distinctions.

As depicted in the diagram below, a total of 915 records were initially identified in eight databases and sources, such as Scopus ($n = 124$), Web of science ($n = 68$), CNKI ($n = 80$), AGRIS ($n = 160$), FAO ($n = 134$), Google scholar ($n = 210$), ProQuest ($n = 92$) and grey literature ($n = 47$). After the duplicates were eliminated, 789 unique records remained and were filtered for title and abstract. Among them, 624 were irrelevant and 165 reports were left for full-text evaluation. After a thorough examination, 90 reports were eliminated, and 75 full-text reports were evaluated regarding the inclusion and exclusion criteria. Finally, 15 studies were used in the final synthesis. This was done in accordance with PRISMA 2020 guidelines to ensure that the selection process is transparent, rigorous and reproducible.

Figure 1. Flow diagram of search results in line with the PRISMA Guidelines



Source: Authors' own elaboration based on Page et al. (2021).

Findings

The analysis of 15 studies presents a unified body of evidence to answer the main research question: How do mentorship models facilitate farmers' digital literacy and livestream e-commerce adoption in different rural settings?

- Adoption and Confidence: Mentorship decreased uncertainty and complexity in livestreaming and e-commerce adoption. Higher digital literacies led farmers to perceive the tools as more useful, increasing confidence and willingness to adopt livestreaming (Yang, Yu, & Liu, 2025; Wang, Mao, Zhou, & Li, 2025; Chen, Zhang, & Chen, 2024).
- Technical Literacies: Mentoring built technical literacies like livestreaming production, mobile payment and logistics through shared repertoires of practice (Li & Wang, 2024; Luo, 2025).
- Social Literacies: Community and cooperative-based mentorship contributed to digital skill development (Cropway, 2024; IFAD, 2022). However, in isolated rural settings, this was less successful (FAO, 2023; CaFAN, 2024).
- Critical Literacies: Farmers became more cognizant of algorithms and compliance requirements. This extends digital literacy beyond technical knowledge (Chen et al., 2024; Duan, Lin, & van Dijck, 2023).
- Capability Gains: With mentorship, farmers were able to apply digital skills to build resilience, performance and earnings. Still, disparities in resilience were noted in government and NGO reports when long-term mentorship and institutional support were lacking (MARA, 2023; OECD, 2020; IFAD, 2022).
- Regional Variation: Platform partnerships, subsidies and rural revitalization policies in China encouraged livestreaming adoption (MARA, 2023; People's Daily Online, 2023, 2024). In the Caribbean, cooperative mentoring programmes showed collective power, but faced infrastructural challenges (FAO & Canada, 2024; CaFAN, 2024).

Discussion

Diffusion of Innovations

In the Diffusion of Innovations model, peer-to-peer and extension-based mentor models consistently decreased uncertainty and increased perceived

utility of livestreaming/e-commerce technologies. These models were well supported by multiple Chinese studies (Yang, Yu, & Liu, 2025; Wang, Mao, Zhou, & Li, 2025). Evidence showed increased adoption when mentors offered demonstrations and problem-solving support. The evidence is also inconsistent, while several studies confirm higher adoption, others note that inadequate infrastructure and connectivity (FAO, 2021; World Bank, 2020) limit diffusion. So, mentorship supports adoption, but only where conditions are right, and the evidence is more robust for peer-to-peer and extension models, compared to hybrid models.

Communities of Practice

Community-embedded models of mentorship (such as farmer field schools, cooperative digital hubs and group learning circles) were successful in tight-knit communities. Consistent evidence from China and the Caribbean (Cropway, 2024; CaFAN, 2024) supports outcomes such as enhanced streaming production and mobile payment skills. However, in a dispersed or culturally fragmented environment, impacts were mixed and there was less evidence of skill-building. This implies that the Communities of Practice approach is validated, but its effectiveness relies on robust social structures and ongoing interactions.

Capability Approach

Longitudinal mentoring, especially institutionally and NGO supported programmes, was associated with improved resilience, entrepreneurship and income diversification. Numerous studies offer favourable results of capability expansion (Chen et al., 2024; Duan, Lin, & van Dijck, 2023), however, NGO and government assessments (OECD, 2020; IFAD, 2022) warn that these results continue to be weak when institutional support does not last long. Here, the evidence is sparse and more heterogeneous. Contrarily, some studies note substantive gains and others underscore disparities in resilience once pilot programmes come to a close. Therefore, capability expansion is evident, but the evidence is only moderate and reliant on ongoing mentorship and support.

Triangulation and Policy Implications

Cross-referencing academic, NGO and government case studies shows that mentorship is necessary but not sufficient to address systemic constraints. The most consistent evidence of positive impacts comes from peer-to-peer

and community-based models, with less research and studies supporting hybrid and platform-integrated models. The impacts of structural inequities in infrastructure, subsidies and regulatory frameworks remain constrained. Future Research should explicitly incorporate triangulated evidence to minimise biases, broaden geographical representation and include gender and youth-centred analyses (World Bank, 2020; GSMA, 2019; FAO, 2025). This will help determine the most effective models of mentorship under different circumstances and inform policy and practice.

Limitations

This review has several limitations. The body of evidence is quite limited, with just 15 studies synthesised from an initial 915 records. The evidence is also heavily influenced by regional representation, with many studies from China and governments or Non-Government Organizations (NGO)-led reports, which reduce its representativeness. Furthermore, certain mentorship models are under-researched and fewer studies support hybrid and platform-integrated models, limiting confidence in their effectiveness. Finally, many of the reported outcomes depend on infrastructure and long-term institutional commitment, so the sustainability of mentorship impacts cannot be fully evaluated.

Conclusion

Mentorship can be seen as a key tool in rural digital transformation, as it will make farmers have the necessary digital literacy skills. These skills enable farmers to consider livestreaming and e-commerce not only as a means of earning income, but also as a means of macroeconomic renewal. The review is significant because it determines a variety of mentorship models and charts technical, critical, and social literacies. It further points out comparative lessons, in which China is seen to be embracing the policy at a very fast pace, unlike the Caribbean, which does so in a cooperative, community-based manner. The discussion reveals that mentorship, in conjunction with technology acceptance theory and multidimensional literacy models, can decrease interventions to technology use. It is also empowering farmers and building resilience in rural economies.

Strong digital infrastructure and the establishment of mentoring within agricultural extension systems are mentioned among the actionable

recommendations. They also demand collaborations among governments, non-governmental organizations and platforms to ensure equal access. Platform alliances and state-sponsored programs have increased digital adoption in China (MARA, 2023; People's Daily Online, 2024). In comparison, the Caribbean programmes focus on culturally relevant and collaborative mentoring models as the core of the engagement with the farmers (FAO, 2023; FAO and Canada, 2024). To capture the changing dynamics in future research, it will be important to develop longitudinal and cross-regional studies. It would be especially important that these studies consider gender and youth perspectives to ensure comprehensive findings (World Bank, 2020; GSMA, 2019).

Mentorship provides farmers with technical skills, like production and logistics. It also cultivates critical literacies of compliance and algorithmic awareness, as well as social literacies that can develop trust and enhance collective empowerment. This makes livestreaming a new frontier towards sustainable rural development. It fills the divide between old-fashioned agriculture and digitally mediated economies.

Contributions and Future Directions

This review adds to the literature by providing one of the first categorisations of mentorship strategies, peer-to-peer, institution-based, platform-based and hybrid, for farmers to improve their digital literacy for live streaming and e-commerce. It also combines Diffusion of Innovations, Communities of Practice, and the Capability Approach to demonstrate how mentorship overcomes uncertainty, fosters collective learning, and enhances farmers' digital capability. Lastly, this review offers comparative perspectives on China's policy-driven mentorship system and the Caribbean's community-based practices. Research should expand beyond the Chinese context, include longitudinal studies to assess long-term impacts, and explore the effects of mentorship quality, infrastructure and policy environments. Research should also consider gender and youth issues and rigorously assess new hybrid and platform-based mentorship models.

Abstract: Rural farmers are shifting to live streaming and e-commerce to serve more markets, but most have a digital literacy gap, making it difficult for them to succeed. The development of digital competencies has been observed to enhance entrepreneurial activities, market participation, and belief in the adoption of new technologies. This literature review identifies four types of mentorship models, including the peer-to-peer model, the institution-based model, the platform-based model, and the hybrid model, that can be used to equip farmers with the necessary skills on live streaming production, audience engagement, e-commerce activities, and information assessment. These results indicate that mentorship not only enables digital literacy but also enhances adoption, engagement, resilience and income. All in all, mentorship can be seen as a viable way to revitalize rural settings, as significant consequences require investment in infrastructure, partnerships with platforms, and the establishment of community-based training hubs.

Keywords: digital literacy, mentorship, farmers, live streaming, e-commerce, rural revitalization

Streszczenie: Rolnicy wiejscy przechodzą na transmisje na żywo i handel elektroniczny, aby obsługiwać więcej rynków, ale większość z nich ma lukę w cyfrowej znajomości technologii, co utrudnia im sukces. Zaobserwowano, że rozwój kompetencji cyfrowych zwiększa aktywność przedsiębiorczą, uczestnictwo w rynku oraz wiarę w przyjmowanie nowych technologii. Przegląd literatury identyfikuje cztery typy modeli mentorskich, w tym model między rówieśnikami, model oparty na instytucjach, model oparty na platformie i model hybrydowy, które mogą być wykorzystane do wyposażenia rolników w niezbędne umiejętności w zakresie produkcji transmisji na żywo, angażowania publiczności, działań e-commerce oraz oceny informacji. Wyniki te wskazują, że mentoring nie tylko umożliwia cyfrową znajomość technologii, ale także zwiększa przyjęcie technologii, zaangażowanie, odporność i dochody. Ogólnie rzecz biorąc, mentoring można postrzegać jako realny sposób na ożywienie obszarów wiejskich, ponieważ poważne konsekwencje wymagają inwestycji w infrastrukturę, partnerstw z platformami oraz tworzenia ośrodków szkoleniowych opartych na społecznościach.

Słowa kluczowe: Umiejętności cyfrowe, Mentoring, Rolnicy, Transmisje na żywo, Handel elektroniczny, Rewitalizacja

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