Addressing Digital Divide Barriers in Electronic Agri-Marketplace Adoption

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Electronic agri-marketplaces are changing the way farming works in a big way. They make it easier for farmers, especially smallholders, to get to markets, lower transaction costs, and make more money. But the digital divide, which is marked by differences in access to technology, digital literacy, and infrastructure, makes it very hard for people to use these platforms. This study looks at recent studies from peer-reviewed publications to find the main reasons why people don't use electronic agri-marketplaces and suggests ways to close the digital divide. This study looks at infrastructural, socio-economic, and institutional problems based on research that were published between 2018 and 2025. It focuses on remedies including digital literacy programs, building up infrastructure, and making policies that include everyone. The results are meant to help anyone who have a stake in making digital agriculture ecosystems fair and long-lasting.

1. Introduction

Electronic agri-marketplaces like e-NAM in India and FarmCrowdy in Nigeria have changed the way farmers sell their goods by linking them directly with customers, cutting out middlemen, and making prices more clear (Kumar & Gupta, 2023). These platforms use digital tools like mobile applications, blockchain, and the Internet of Things (IoT) to make supply chains more efficient and markets work better (Panwar & Sahoo, 2022). However, the digital divide—differences in access to digital tools, internet connectivity, and digital skills—makes it harder for them to be used, especially by smallholder farmers in low- and middle-income countries (LMICs) (Fairbairn et al., 2025). This study looks at the reasons why people don't use electronic agri-marketplaces and suggests ways to close the digital divide based on high-impact journal studies to make sure the information is accurate and useful.

2. The Role of Electronic Agri-marketplaces in Agriculture

Electronic agri-marketplaces are digital platforms that facilitate the buying and selling of agricultural produce, often integrating services like logistics, digital payments, and quality assurance (Raman & Naik, 2025). These platforms offer several benefits:

2.1 Enhanced Market Access

Electronic agri-marketplaces let smallholder farmers contact more customers by cutting out middlemen. Kumar and Gupta (2023) showed that platforms like e-NAM in India made it easier for farmers to reach bigger markets, which raised their profit margins by 10–15%. FarmCrowdy and other platforms like it let farmers connect with customers all across the world, which opens up more market options (Folio3, 2024).

2.2 Improved Supply Chain Efficiency

Digital platforms streamline supply chain operations by integrating information, material, and capital flows. Yang et al. (2021) demonstrated that platforms like Tudouec in China reduced transaction costs by 12% through efficient logistics and inventory management.

2.3 Price Transparency and Financial Inclusion

Real-time price information from agri-marketplaces helps to level the playing field. Ali et al. (2020) said that e-NAM adoption in northern India made prices more clear, which led to a 7% rise in farmers' earnings. Digital payment systems also help those who don't have a lot of money get credit and insurance (Raman & Naik, 2025).

3. Barriers to Electronic Agri-marketplace Adoption

Despite their potential, electronic agri-marketplaces face significant adoption barriers, particularly due to the digital divide. These barriers are categorized into infrastructural, socio-economic, and institutional challenges.

3.1 Infrastructural Barriers

3.1.1 Limited Internet Connectivity

Poor internet connectivity in rural places is a big reason why people don't use it. Hota and Verma (2022) found that bad network connectivity is a major problem for e-agriculture portal use in India, as 40% of rural farmers don't have reliable internet access. In the same way, just 28% of rural regions in sub-Saharan Africa have mobile broadband (GSMA, 2022).

3.1.2 Lack of Access to Digital Devices

Smallholder farmers can't get to smartphones and laptops because they are so expensive. Panwar and Sahoo (2022) showed that 35% of farmers in Haryana, India, said that the cost of devices was a barrier to using digital platforms. 3.3 billion people in low- and middle-income countries (LMICs) are affected by the use gap, which is when there is mobile coverage but devices or subscriptions are too expensive (GSMA, 2021).

3.2 Socio-economic Barriers

3.2.1 Low Digital Literacy

Limited digital literacy, particularly among older and less-educated farmers, hinders adoption. Panwar and Sahoo (2022) reported that younger, more educated farmers in Haryana showed higher awareness of digital platforms, while older farmers struggled due to low digital literacy. In South Africa, low literacy levels were a significant barrier for small-scale farmers (Odini, 2014).

3.2.2 Economic Constraints

High initial costs for technology adoption, including devices and subscriptions, deter smallholders. Hota and Verma (2022) noted that small landholdings and low incomes exacerbate economic barriers in India. In Nigeria, poverty and lack of access to credit further limit adoption (Nmadu et al., 2013).

3.2.3 Gender and Social Disparities

Gender disparities exacerbate the digital divide, with women farmers facing greater barriers due to lower access to education and technology. Kaur and Sharma (2020) found that women farmers in Haryana had 20% lower ICT adoption rates than men. Cultural inertia and social norms also hinder adoption in rural communities (Fairbairn et al., 2025).

3.3 Institutional and Policy Barriers

3.3.1 Lack of Supportive Regulations

Complex regulatory frameworks and lack of supportive policies limit platform scalability. Hota and Verma (2022) highlighted that unclear regulations around digital transactions in India deter farmer participation. In South Africa, the absence of policies promoting digital literacy restricts adoption (CTA, 2019).

3.3.2 Privacy and Security Concerns

People don't trust digital platforms because they are worried about data privacy and security, which is a big problem. Raman and Naik (2025) said that 30% of Indian farmers were worried about how their data might be used on e-commerce sites. Blockchain-based solutions include problems including scalability and regulatory concerns that make it much harder to use them (Zhao et al., 2019).

4. Strategies to Bridge the Digital Divide

To address these barriers, the following strategies are proposed based on recent literature:

4.1 Infrastructure Development
4.1.1 Expanding Rural Connectivity
Governments and private sectors should invest in rural broadband infrastructure. Folio3 (2024) emphasized that initiatives to improve internet access in rural areas can bridge the digital divide. For example, India's Digital India Programme aims to provide broadband to 250,000 villages by 2025 (GOI, 2015).

4.1.2 Affordable Device Access
Subsidies for smartphones and low-cost digital devices can enhance access. Marie (2022) suggested that collaborative efforts between governments and NGOs to provide affordable devices can empower smallholder farmers.

4.2 Digital Literacy and Capacity Building
4.2.1 Targeted Training Programs
Digital literacy programs that are made just for farmers are very important. Panwar and Sahoo (2022) suggested training that is appropriate for each age group to bridge literacy gaps. They said that such programs led to a 25% rise in platform use in Haryana. Small farmers in Africa have increased their digital abilities thanks to e-extension programs (Doyle et al., 2022).

4.2.2 Inclusive Education for Women
Gender-focused training can address disparities. Kaur and Sharma (2020) found that women-specific ICT programs in India increased adoption rates by 15%. The Women Leadership Programme in Africa also emphasizes digital skills for women farmers (GIZ, 2024).

4.3 Policy and Institutional Reforms
4.3.1 Supportive Regulatory Frameworks
Streamlined regulations and incentives for digital adoption are essential. Hota and Verma (2022) suggested simplifying documentation for e-agriculture portals to enhance participation. In South Africa, policies promoting digital training have increased adoption rates (CTA, 2019).

4.3.2 Enhancing Data Security
Blockchain and secure data-sharing models can address privacy concerns. Raman and Naik (2025) highlighted that blockchain-based platforms like Tudouec improved trust by ensuring data transparency. Research into privacy-preserving data platforms is also needed (GSMA, 2021).

4.4 Collaborative Ecosystems
4.4.1 Public-Private Partnerships
Collaborative initiatives between governments, NGOs, and private sectors can enhance adoption. Folio3 (2024) noted that cooperatives and farmer groups help smallholders pool resources for e-commerce participation. In India, FICCI (2022) reported that public-private partnerships increased platform adoption by 20%.

4.4.2 Localized Content and Platforms
Developing platforms in local languages and tailored to regional needs can improve accessibility. Odini (2014) emphasized the need for localized content to address language barriers in Kenya.

Conclusion
Electronic agri-marketplaces have the power to change farming by making it easier for farmers to go to markets and work more efficiently. But the digital gap, which includes impediments in infrastructure, social and economic conditions, and institutions, makes it hard for smallholder farmers to use them. By making targeted investments in infrastructure, digital literacy initiatives, supporting regulations, and collaborative ecosystems, stakeholders may make the digital agriculture environment more welcoming to everyone. This assessment shows how important it is to have fair plans so that all farmers may profit from the digital revolution in farming.

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