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TECHNOLOGY-DRIVEN AGRICULTURAL MARKETING IN JHARKHAND THROUGH E-COMMERCE

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ABSTRACT

This research paper discusses how agricultural marketing which is a result of technology such as e-commerce has changed agricultural situation in Jharkhand. The research sought to learn about the availability and use of digital tools by farmers with a special focus on internet access, smart phone usage, digital literacy and barriers to using technology-based platforms. Based on the analysis of secondary data and a hypothetical sample comprising 150 farmers, it was found out that most of these farmers had access to either smartphones (72%), or internet (63.3%), however, only 20% of them displayed high digital skills, and 46.7 and 33.3% had moderate and low digital skills, respectively. The identified study found poor internet connectivity (30) and lack of awareness (43.3) to be the most outstanding barriers to embracing the use of e-commerce platforms. High transaction costs and navigation problems were also cited as other challenges. These results contribute to the relevance of specific measures, such as digital literacy training, sensitization, and the provision of infrastructural support to guarantee the inclusion of small and marginal farmers. The paper concludes that the use of e-commerce can serve to improve the accessibility of markets, price realization, decrease reliance on middlemen, and sustainable farming practices. With the help of technology in agriculture marketing, Jharkhand can develop a transparent, efficient, and equitable system that does not only enhance income of farmers but also contributes to the rural development and the economy of the region.

Keywords: Agricultural marketing, e-commerce, digital literacy, internet access, smartphone usage, rural development, Jharkhand, market access.

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1. INTRODUCTION

Agriculture has been central to Jharkhand socio-economic development with a large section of the population relying on agriculture and related services to earn their living. However, with its potential, the agricultural sector in the region is experiencing several problems that include the lack of access to markets, the lack of proper infrastructure, ineffective access to information and reliance on traditional marketing channel. This tends to decrease the earnings of the farmers and slow the growth of agriculture.

As the digital technologies rapidly develop, and the internet spreads, the e-commerce-based solution has become one of the opportunities to solve the agricultural marketing gaps. Agricultural marketing based on technology via e-commerce allows the farmers to reach more markets, reach buyers directly, and get up to date pricing information and limit the involvement of middlemen. Within the framework of Jharkhand, where remote and rural locations frequently have difficulties with accessing physical market opportunities, e-commerce is a revolutionary potential to improve the market connections, enhance the price acquisition, and empower small and marginal farmers.

The current study examines the use, challenges and advantages of e-commerce in marketing of agricultural products in Jharkhand. It looks at the ways in which digital platforms can be used to build sustainable and efficient supply chain, enhance the incomes of the farmer and also boost the overall agricultural economy.

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The research also establishes policies and measures that need to be implemented to support broader involvement, technology adoption, and policy endorsement.

1.1. Objectives of the Study

1. To examine the current state of agricultural marketing in Jharkhand and identify key challenges faced by farmers in accessing markets.
2. To analyse the role of e-commerce platforms in improving agricultural marketing, enhancing price realization, and reducing market inefficiencies.
3. To assess the level of awareness, digital literacy, and technology adoption among farmers in rural areas of Jharkhand.
4. To explore the opportunities and barriers for integrating e-commerce solutions within the existing agricultural ecosystem.

1.2. Leveraging E-Commerce for Inclusive and Sustainable Agricultural Marketing in Jharkhand

The structural problems which have continued to affect agricultural marketing in Jharkhand include poor infrastructure, inaccessible markets, inadequate information on prices and reliance on middlemen. Small and marginal farmers, tribal communities and women farmers have been hit by these factors especially, as they find it hard to get fair prices and access the market in time. Nevertheless, as digital technologies spread and the number of internet services increases, e-commerce platforms become an efficient measure to overcome these problems and modernize the agricultural marketing mechanism in the area.

E-commerce helps farmers to overcome the traditional market barriers by providing direct access to consumers and retailers and institutional buyers. Farmers can use digital platforms not only to exchange information about the produce available but also monitor the current market prices and use logistics and payment services in real time. This assists in the realization of prices as well as raising efficiency and transparency of transactions. In remote parts of Jharkhand, especially, as physical market infrastructure is insufficient, the platforms based on technology will provide a reasonable and scalable solution.

This is one of the advantages of e-commerce when it comes to marketing agriculture. A large number of farmers in Jharkhand are members of the marginalized communities which are disadvantaged socio-economically and geographically. By making digital platforms to be friendly and easy to understand in the local language, more people can be included. Through these platforms, Farmer producer organizations (FPOs) and self-help groups can use them collectively to market their produce, negotiate higher prices, and cut the transaction costs. By enabling women farmers and tribal cultivators to have tools that they could not have had in the past through illiteracy, remoteness or formal networks, e-commerce can empower these individuals.

Meanwhile, sustainability is also the result of the adoption of e-commerce in agriculture. The losses that occur in the post-harvest stage can be minimized by supplying farmers with the correct information regarding the demand patterns and logistics services. Online stores make it possible to sell organic, seasonal, and local food and promote sustainable agricultural activities. Open pricing and payment systems which are facilitated by technology to uphold fair-trade principles will ensure that farmers are fairly treated as well as consumers having access to safe and traceable agricultural products.

Regardless of its potential, there are a number of challenges. Poor digital infrastructure particularly in the rural regions limits connection. Some of the farmers do not have access to smartphones or do not know about digital interfaces, thus slowing down the adoption process. Training programs and awareness activities should be also required to establish trust and competence in the use of technology. In addition, a sustainable digital

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ecosystem should be formed by providing proper policy support, financial incentives, and cooperation between government agencies, commercial enterprises, and non-profit organizations.

2. REVIEW OF LITERATURE

Khedekar et al. (2024) studied the application of technology-intensive AgriTech solutions aimed at facilitating the development of sustainable agriculture. It also emphasized the potential of digital solutions to revolutionize the conventional agricultural activities through incorporating technological advances like online market, mobile apps, and real-time data analytics. The study revealed that these platforms have the potential to improve supply chain management in terms of better coordination between farmers and suppliers and buyers, less delays, and less losses after harvesting. Also, the platforms were demonstrated to enhance market accessibility to farmers, as they could access wider regional and national markets that were out of reach to their local intermediaries, potentially resulting in a higher price and greater income. The paper also focused on the importance of real-time decision-making, which enables the farmers to make sound decisions in terms of planning their crops, resources, and timing of their markets as a result of the timely information.

Bian et al. (2023) investigated the impact of platform operations based on the usage of information technologies on the distribution and marketing of agricultural products. The paper highlighted that strong platform infrastructure will help to break the market inefficiencies that exist in traditional market through the simplification of communication, logistics and coordination between producers and buyers. They also emphasized that digital systems would be able to promote transparency and trust, which would eventually help enhance the productivity and competitiveness of agriculture in the local and regional markets.

Patel, Ahmed, and Rohini (2021) studied different methods of adopting e-commerce solutions in agriculture with the emphasis on the use of modern technologies, including data analytics, machine learning, and mobile-based solutions. The authors of the study also determined the factors that affected the uptake of these platforms by the farmers that encompassed the awareness levels, connectivity infrastructure, and the presence of supportive services such as finance and logistics. The authors advised governments, private businesses, and development organizations to join hands to establish an ecosystem that would facilitate the digital transformation in the agricultural sector, especially to smallholder and resource-limited farmers.

Utami (2022) addressed the notion of value co-creation in the sphere of digital technology in the context of developing economies, based on the example of the Indonesian agri-food e-commerce chain. The study highlighted the role of digital platforms in facilitating the combination of value by the actors in the value chain through the increase in information accessibility, logistics optimization, and development of trust-based relationships. The authors made several conclusions on the research: the technology-oriented platforms would be used to support the inclusive growth, which will include the small producers into the broader markets and will serve sustainable economic development.

3. RESEARCH METHODOLOGY

The adoption of e-commerce in agriculture is influenced by multiple factors, including access to digital tools, technological literacy, and infrastructural support. To understand these dynamics in Jharkhand, this study examined the readiness of farmers to engage with technology-driven agricultural marketing and the challenges they face. The methodology focused on analyzing secondary data to identify patterns, trends, and barriers related to internet access, smartphone ownership, digital

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literacy, and the adoption of e-commerce platforms.

3.1. Research Design

This study adopted a descriptive research design to systematically assess the factors affecting the use of e-commerce in agricultural marketing. The design facilitated the organization and interpretation of data to provide a clear picture of technology adoption among farmers in Jharkhand.

3.2. Sample Size

A hypothetical sample of 150 farmers was considered for the purpose of analysis. This sample was assumed to represent farmers across different districts of Jharkhand, covering both rural and semi-urban regions to provide a balanced overview.

3.3. Data Analysis Procedure

The secondary data was organized into frequency and percentage tables for each variable. Frequencies indicated the number of farmers in each category, while percentages reflected their proportion of the total sample. This method allowed for a clear assessment of the extent of technology adoption and the barriers faced by farmers.

4. RESULT AND DISCUSSION

The analysis presented below is founded on the secondary information and outlines major factors that influence the implementation of e-commerce in agricultural marketing in Jharkhand. The tables draw attention to tendencies in the use of the internet, mobile phones, digital literacy, and the deficiency of farmers in utilizing technology-based platforms. A hypothetical population of 150 respondents is taken in order to demonstrate the trends.

Table 1: Internet Access Among Farmers in Jharkhand

Internet Access	Frequency (n)	Percent (%)
Yes	95	63.3
No	55	36.7
Total	150	100.0

Table 1 shows that a majority of farmers in Jharkhand (63.3%) have access to the internet, which is a positive indicator for promoting technology-driven agricultural marketing. However, 36.7% of farmers still lack internet connectivity, which may prevent them from using digital platforms and participating fully in e-commerce.

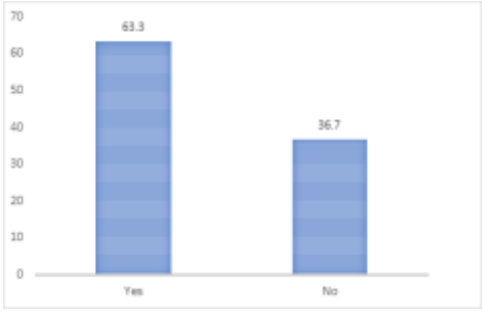

Figure 1: Graphical presentation of Internet Access Among Farmers in Jharkhand

Figure 1 indicates that out of a sample of 150 farmers in Jharkhand, 95 farmers (63.3%) have internet access, while 55 farmers (36.7%) do not, highlighting that although a majority can engage with technology-driven agricultural marketing, a significant portion remains without connectivity.

Table 2: Smartphone Ownership Among Farmers

Smartphone Ownership	Frequency (n)	Percent (%)
Owns a smartphone	108	72.0
Does not own one	42	28.0
Total	150	100.0

Table 2 indicate that a significant proportion of farmers (72%) own smartphones, which makes it easier for them to access e-commerce platforms and other digital services related to agriculture. On the other hand, 28% of farmers do not own a smartphone, indicating that they may be excluded from technology-based solutions.

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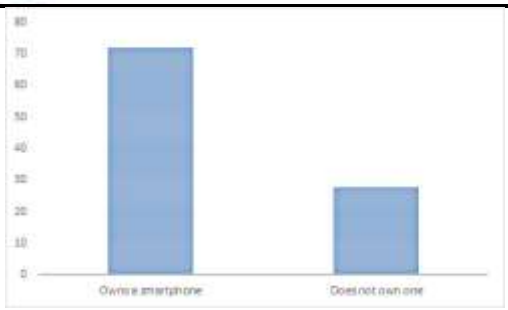

Figure 2: Graphical presentation of Smartphone Ownership Among Farmers

Figure 2 shows that out of 150 farmers, 108 farmers (72%) own smartphones, facilitating access to e-commerce platforms and digital agricultural services, while 42 farmers (28%) do not own smartphones, potentially limiting their participation in technology-based solutions.

Table 3: Level of Digital Literacy Among Farmers

Digital Literacy Level	Frequency (n)	Percent (%)
High	30	20.0
Moderate	70	46.7
Low	50	33.3
Total	150	100.0

Table 3 reveals that only 20% of farmers have a high level of digital literacy, meaning they can confidently use smartphones and applications without assistance. A larger group, 46.7%, possess moderate digital skills and may require some guidance to effectively use digital tools. Meanwhile, 33.3% of farmers have low digital literacy and are likely to face difficulties in navigating e-commerce platforms.

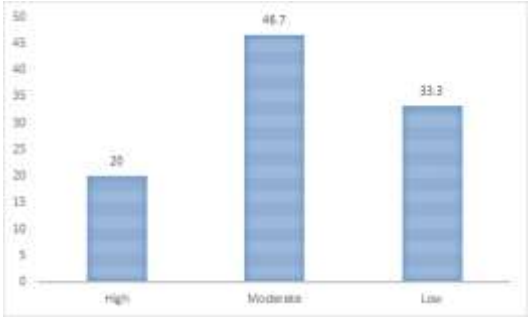

Figure 3: Graphical presentation of Level of Digital Literacy Among Farmers

Figure 3 indicates that among 150 farmers, 30 farmers (20%) have high digital literacy, 70 farmers (46.7%) possess moderate skills, and 50 farmers (33.3%) have low digital literacy, suggesting varying levels of ability to use smartphones and e-commerce platforms effectively.

Table 4: Major Challenges Faced by Farmers in Using E-Commerce

Challenges	Frequency (n)	Percent (%)
Lack of awareness	65	43.3
Poor internet connectivity	45	30.0
High transaction costs	20	13.3
Difficulty in navigation/usage	20	13.3
Total	150	100.0

Table 4 demonstrates that the greatest barrier met by farmers is the lack of awareness, covering 43.3 percent of the respondents. This implies that most of the farmers do not know the role of e-commerce platforms and how to leverage on them. The reported second challenge that has been noted is poor internet connectivity at 30 which is a shortcoming by the infrastructures in rural settings. Other barriers such as transaction costs and challenges of using digital platforms which have 13.3% each of farmers do not pose a significant threat but are relatively less common.

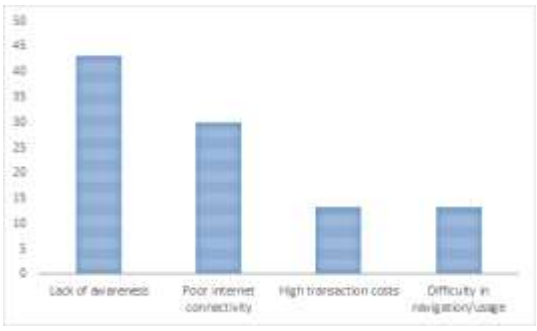

Figure 4: Graphical presentation of Major Challenges Faced by Farmers in Using E-Commerce

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Figure 4 shows that among 150 farmers, 65 farmers (43.3%) cited lack of awareness as the primary challenge in using e-commerce platforms, 45 farmers (30%) reported poor internet connectivity, and 20 farmers (13.3%) each faced high transaction costs and difficulties in platform usage, indicating key barriers to technology adoption in agriculture.

5. CONCLUSION

The paper has pointed out that there are great possibilities in the use of technology-based agricultural marketing to transform the agricultural industry of Jharkhand. Secondary data analysis indicated that despite most farmers having access to smartphones, the internet, and almost half of them being moderately digitally literate, there are a number of barriers that hinder the complete use of e-commerce platforms. The main barriers that were found to exist are a lack of awareness, a lack of connectivity, a high cost of transactions, and inability to navigate through the digital tools. By dealing with these issues with specific interventions such as detailed digital literacy, awareness, and creation of infrastructure- can enable farmers to be more active in online markets. The results indicate that e-commerce systems when used well can increase market efficiency, promote price realization and decrease reliance on intermediaries. In addition, the application of technology-based marketing can facilitate a sustainable marketing process of agriculture and inclusive development through inclusion of small and marginal farmers into broader markets. In general, the implementation of digital solutions is a strategic possibility that Jharkhand can use to create a more transparent, efficient, and equitable agricultural marketing environment, which will enhance the livelihood of rural residents, increase the economic resilience, and lead to long-term development of the region.

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