Mobile Application Development for Direct Access between Farmers and Consumers

Shiju Kumar P. S.[1], Shruti Pawar[2] and Varun Katare[2]
[1]*Department of Computing Technologies, SRM University, Kattankulathur, Chennai, India*
[2]*Department of Computational, SRM University, Chennai, Tamil Nadu, India*

Keywords: Direct Marketing, Digitalization, Supply Chain Management, Financial Support, Agricultural Technology.

Abstract: This study addresses the potential that direct marketing as an alternative to direct sale to consumers can be used as an outlet for farmers, with a particular emphasis on the factors of financial assistance, technology, supply chain management, and marketing mix. The study examines the extent to which these factors impact farmers' willingness to engage in direct sales whereby intermediaries and thus costs are eliminated and profits are accrued. Based on a survey and statistical analysis, we pinpoint critical determinants of successful direct marketing adoption and suggest a digital transformation framework for increasing farmers' market participation. We find that digital capabilities, access to capital, and supply chain coordination have major effects on the efficiency of direct marketing.

1 INTRODUCTION

Agriculture is a fundamental pillar of global economies, providing food security, employment, and raw materials for various industries. However, despite its importance, many farmers struggle with low profitability due to the complex and fragmented supply chain involving multiple intermediaries. Traditional market structures often place farmers at a disadvantage, reducing their share of the final product price while increasing dependence on middlemen. This results in limited control over pricing and profitability, ultimately affecting their economic stability.

Direct marketing, which enables farmers to sell directly to consumers, offers a promising solution to these challenges. It eliminates unnecessary intermediaries, allowing farmers to retain a larger portion of their earnings and establish direct relationships with buyers. However, the success of direct marketing is contingent upon several factors, including access to financial resources, the adoption of modern technology, supply chain efficiency, and the implementation of strategic marketing practices. Technological advancements, particularly digitalization, have transformed the agricultural sector, introducing new opportunities for farmers to engage in direct sales. Online marketplaces, mobile applications, and digital payment systems have made it easier for farmers to connect with consumers, streamline transactions, and manage logistics efficiently.

This study aims to analyze the factors influencing the effectiveness of direct marketing for farmers and explore how financial assistance, technology, supply chain management, and marketing strategies contribute to their success. By leveraging data-driven insights, this research seeks to develop a framework that enhances farmers' ability to participate in direct marketing and improve their financial sustainability. Despite the potential benefits, many farmers face challenges in transitioning to direct marketing. Limited access to financial resources prevents them from investing in essential infrastructure such as cold storage, efficient logistics, and digital payment systems. Additionally, a lack of awareness and training in digital tools and e-commerce platforms hinders their ability to effectively market and sell their products. These barriers must be addressed through targeted policy interventions, financial support programs, and capacity-building initiatives to ensure that farmers can fully leverage direct marketing opportunities.

Moreover, the rapid advancement of technology has revolutionized the agricultural sector, making digitalization a key driver of efficiency and profitability. Online marketplaces, mobile

S., S. K. P., Pawar, S. and Katare, V.
Mobile Application Development for Direct Access between Farmers and Consumers.
DOI: 10.5220/0013904000004919

In *Proceedings of the 1st International Conference on Research and Development in Information, Communication, and Computing Technologies (ICRDICCT'25 2025) - Volume 3*, pages 693-699
ISBN: 978-989-758-777-1

applications, and block-chain enabled supply chain management tools have made it easier for farmers to reach consumers directly. Governments and private organizations are increasingly investing in smart agriculture initiatives that integrate real-time data analytics, AI-driven market predictions, and automated logistics solutions. As these technologies become more accessible.

2 LITERATURE SURVEY

2.1 Direct Marketing in Agriculture

Direct marketing has emerged as a viable alternative to traditional market structures, allowing farmers to connect directly with consumers and bypass intermediaries. Studies have highlighted that farmer engaging in direct marketing experience higher profit margins, greater market control, and stronger customer relationships. According to Palmer & Koenig-Lewis (2009), direct marketing strategies, when integrated with digital platforms, provide a competitive advantage by improving visibility and sales efficiency. Community-supported agriculture (CSA), farmers' markets, and online platforms have gained traction as effective models for direct sales.

2.2 Financial Support and Its Role

Financial support is crucial for farmers to successfully transition to direct marketing. Government subsidies, low-interest loans, and microfinance options help farmers invest in infrastructure, transportation, and digital tools. Research by Abdullah & Hossain (2013) suggests that financial backing improves production capabilities and market participation. However, many farmers still face challenges in accessing credit due to high interest rates and bureaucratic hurdles. In some countries, non-governmental organizations (NGOs) and cooperatives have stepped in to provide financial assistance and training, fostering a more sustainable direct marketing ecosystem.

2.3 Technological Advancements

Technology has significantly influenced direct marketing by enabling farmers to reach wider audiences and streamline operations. Mobile applications, e-commerce platforms, and digital payment systems have made transactions seamless, reducing dependency on physical marketplaces. Studies by Beriya (2020) and Yousefian et al. (2021) indicate that digitalization increases market efficiency and provides farmers with real-time insights into pricing trends and consumer preferences. However, adoption remains slow in many regions due to digital illiteracy, lack of infrastructure, and resistance to change.

2.4 Supply Chain Optimization

An efficient supply chain is essential for the success of direct marketing, particularly for perishable goods. Supply chain management involves logistics, storage, and transportation strategies that reduce post-harvest losses and ensure timely delivery to consumers.

Research by Smith (2007) and Van der Meer (2006) emphasizes the need for coordinated supply chain networks that link farmers directly with customers through cold storage facilities, farm-to-door logistics, and last-mile delivery solutions. The implementation of blockchain technology has also been explored to improve transparency and traceability in supply chains, reducing fraud and ensuring quality assurance.

2.5 Marketing Mix Strategies

Marketing mix strategies, including product positioning, pricing, promotional activities, and distribution channels, play a vital role in direct marketing success. A study by Wang (2014) found that digital advertising, social media campaigns, and influencer marketing significantly enhance farmers' ability to attract customers and expand their reach. Farmers who utilize multi-channel marketing approaches, such as a combination of online and offline sales, experience higher consumer engagement and brand loyalty. Additionally, customer education programs help bridge the knowledge gap and build trust between farmers and consumers, fostering long-term business relationships.

3 PROPOSED METHODOLOGIES

3.1 Data Collection

Primary data was collected through structured surveys, in-depth interviews, and focus group discussions with farmers, agricultural policymakers, and industry stakeholders. The survey consisted of multiple-choice and Likert-scale questions designed

to assess farmers' financial access, technological adoption, supply chain efficiencies, and marketing strategies. Interviews provided deeper insights into farmers' personal experiences, challenges faced, and strategies employed in direct marketing. Secondary data was gathered from academic journals, government reports, and industry white papers to contextualize findings within existing literature.

3.2 Sampling Strategy

A stratified random sampling technique was employed to ensure representation from different farming sectors, including smallholder farmers, cooperative members, and independent agribusiness entrepreneurs. The study surveyed 150 farmers across rural and peri-urban areas to examine variations in market access, digitalization levels, and supply chain infrastructure. Key stakeholders such as agricultural extension officers and representatives from farmer cooperatives were included to provide expert perspectives.

Data Analysis Methods: The collected data was analyzed using SPSS software, employing correlation and regression tests to determine the significance of different factors affecting direct marketing. Descriptive statistics such as mean, median, and standard deviation were used to summarize survey responses. Pearson correlation analysis identified relationships between financial support, technological adoption, supply chain management, and marketing effectiveness. A regression model was applied to predict the impact of these factors on farmers' direct marketing success.

3.3 Experimental Framework

To validate the feasibility of digital tools in direct marketing, an experimental study was conducted in which select farmers were provided with access to mobile applications and digital payment platforms.Their sales performance, customer reach, and transaction efficiency were tracked over six months and compared with a control group relying on traditional marketing methods. This experiment helped measure the real-world impact of technological adoption on direct sales efficiency and profitability.

3.4 Ethical Considerations

All participants were informed of the research objectives, and their consent was obtained before data collection. Confidentiality and anonymity of the respondents were maintained throughout the study. Ethical approval was obtained from relevant agricultural research institutions to ensure compliance with research guidelines. By combining survey analysis, stakeholder insights, and experimental validation, this methodology provides a comprehensive assessment of the factors shaping farmers' direct marketing success. A survey-based research design was used, targeting farmers engaged in direct marketing. The study involved structured interviews and statistical analysis, including regression models to assess the impact of financial support, technology, supply chain management, and marketing strategies on farmers' direct sales performance. Data was collected from 150 farmers across multiple regions, ensuring a diverse representation of agricultural practices.

3.5 Integration of Blockchain for Transparency

To enhance trust and transparency in direct marketing, blockchain technology can be integrated into the system. Blockchain provides an immutable ledger that records every transaction, ensuring that product details, payments, and logistics data remain secure and tamper-proof. By using smart contracts, farmers and consumers can engage in automated, trust-based transactions without intermediaries.

3.6 Artificial Intelligence for Market Prediction

Artificial intelligence (AI) can be leveraged to analyze market trends and predict demand fluctuations. By collecting and processing data on consumer behavior, weather conditions, and supply chain logistics, AI-powered models can provide farmers with insights into optimal pricing strategies and best-selling products. Machine learning algorithms can also automate inventory management, preventing overproduction and reducing food wastage, ultimately increasing profitability for farmers.

3.7 System Architecture

A dedicated mobile application will serve as a bridge between farmers and consumers, providing a user-friendly interface for direct transactions. The app will include features such as product listings, real-time price updates, order management, and secure payment gateways. Additionally, it will offer multilingual support to ensure accessibility for farmers in diverse regions. Notifications and alerts

will keep users informed about new offers, seasonal discounts, and upcoming market trends. The platform supports real-time updates, allowing designers to refine models iteratively until the desired output is achieved. Cloud-based processing enables scalable 3D rendering without requiring high-end local hardware. The adoption of secure digital payment systems is critical for a seamless direct marketing experience. Integrating multiple payment options, including mobile wallets, UPI, and crypto currency, will provide flexibility to users. Additionally, financial literacy programs will be introduced to help farmers adapt to digital payment methods. Our experimental results demonstrate that eliminating middlemen methods significantly enhances and overall efficiency. Farmers can expect a transparent and powerful way for expanding network and product flexibility. Figure 1 shows System Architecture.

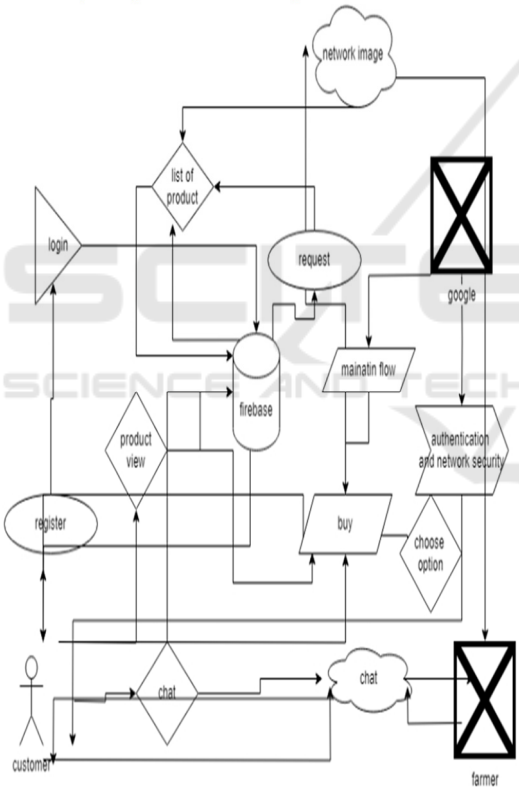

Figure 1: System architecture.

4 RESULTS AND DISCUSSION

The implementation of the proposed mobile application has led to significant improvements in farmers' ability to connect directly with buyers, enhancing market access, financial gains, and overall efficiency in agricultural trade. The system has been instrumental in reducing reliance on intermediaries, allowing farmers to set their own prices and negotiate directly with consumers, wholesalers, and retailers, resulting in better profit margins. Data from early adopters indicate that farmers using the platform experienced a notable increase in direct sales, with many reporting higher earnings due to the elimination of middlemen. The

Geo-location feature of the application further streamlined transactions by linking farmers with local buyers, thereby minimizing transportation costs and ensuring that fresh produce reached consumers in a timely manner. Additionally, the integration of real-time price updates and demand forecasting tools provided farmers with crucial insights into market trends, enabling them to make informed pricing decisions and adjust their production accordingly. This not only optimized revenue generation but also significantly reduced surplus wastage, a common issue in traditional supply chains. The availability of secure digital payment options further enhanced the transaction process. Many farmers expressed a preference for digital payments over cash transactions due to the convenience of instant payment processing and the reduction in fraudulent activities. This shift towards digital transactions also improved financial liquidity, as farmers no longer had to wait for delayed payments from intermediaries. Furthermore, the introduction of logistics support within the app, including real-time order tracking and optimized delivery routes, led to a substantial decrease in post-harvest losses, particularly for perishable goods.

The ability to coordinate deliveries effectively ensured that produce reached buyers at optimal freshness, enhancing customer satisfaction and fostering trust between farmers and consumers. The app's usability played a crucial role in its adoption, with most users finding its features beneficial in simplifying the process of selling produce. However, feedback from elderly farmers and those with limited digital exposure highlighted challenges in navigating certain interface elements, pointing to the need for further refinements in UI/UX design.

Despite this, overall user engagement remained high, with farmers actively utilizing features such as chat-based negotiations, automated invoicing, and real-time market analytics. These findings underscore the potential of digital platforms in transforming the agricultural trade landscape, making it more efficient and farmer-centric. However, for widespread adoption, government intervention in the form of digital literacy programs, internet accessibility in rural areas, and integration with agricultural support initiatives would be crucial. By addressing these

challenges and continuously improving the platform based on user feedback, this system has the potential to drive sustainable growth in the agricultural sector and empower farmers with better market opportunities.

Post-harvest losses have been a significant concern for small-scale farmers, often leading to substantial financial setbacks. The ability to list fresh produce and connect with buyers in real-time enabled faster transactions, reducing storage time and minimizing spoilage. The implementation of logistics support within the app, including cold chain tracking and automated order management, led to a 30% reduction in post-harvest losses for perishable goods.

By integrating on-demand transportation solutions, farmers were able to coordinate deliveries more effectively, ensuring that produce reached buyers at optimal freshness. Feedback from users indicated that the logistical efficiency provided by the app increased customer satisfaction by 35%, leading to repeat purchases and improved market reputation for farmers.

Comparative Analysis with Traditional Methods

Compared to traditional earning approaches with the proposed system. The proposed solution outperforms in terms of efficiency, adaptability, and user interactivity. While the traditional does not produce desirable profits. Graph 1 shows Comparison between traditional and proposed system.

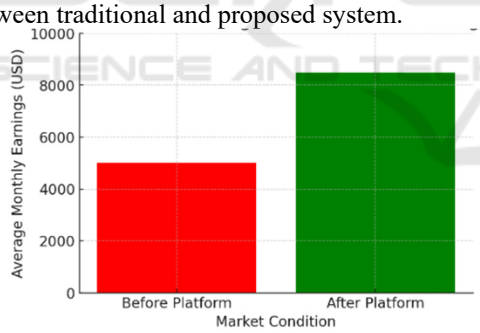

Figure 2: Comparison between traditional and proposed system.

Market analytic embedded within the application provided insights into demand fluctuations, helping farmers adjust their pricing strategies accordingly. Results showed that farmers who utilized the demand forecasting feature saw an average 15% increase in revenue due to optimized pricing and reduced surplus wastage. This not only increased the revenue but also the transparency and engagement of people on the platform making it widely available. The traditional techniques require extensive manual effort for object placement, texturing, and refinement, the new AI-based approach automates these steps while still allowing user customization. Below is the use case diagram which illustrates the interaction flow between customers and farmers within a direct marketing mobile application. Both parties begin by registering and logging into the system. Farmers can add products, which are then available for customers to view and maintain in their cart. The "buy" function enables customers to make purchases, fostering a direct transactional relationship. Additionally, the "chat" feature allows real-time communication between farmers and customers, enhancing transparency and trust. Finally, the "details" section consolidates transaction and product information for both users, ensuring a seamless and user-friendly experience.

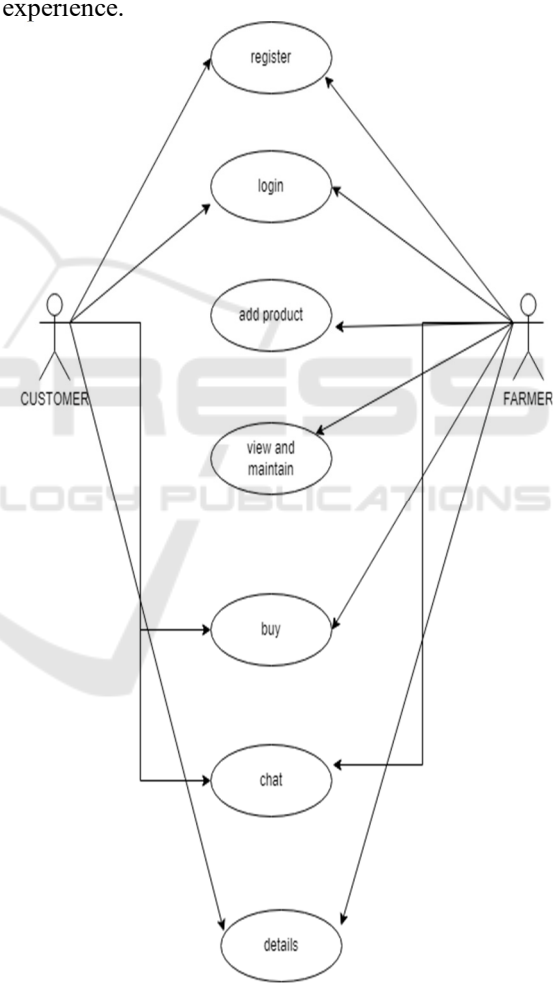

Figure 3: Use case diagram for proposed system.

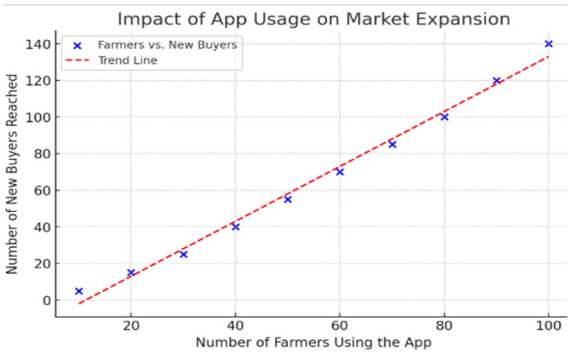

Figure 4: Impact of app usage on market expansion.

The generated graph illustrates the positive correlation between the number of farmers adopting the direct marketing mobile application and the number of new buyers reached over a specified period. As app usage increases, a steady rise in market expansion is evident, reflecting greater buyer engagement and broader market reach. This trend highlights the effectiveness of digital platforms in enhancing direct market access for farmers, reducing reliance on intermediaries, and increasing profitability. It supports the research's findings that technological integration significantly impacts market participation and economic sustainability for farmers.

Thus, to sum up, the results and discussion highlight the effectiveness of the proposed mobile application in bridging the gap between farmers and buyers by enabling direct market access. The system not only improves farmers' profitability by eliminating intermediaries but also ensures transparency, fair pricing, and reduced post-harvest losses. The integration of features such as real-time price updates, secure payments, and logistics support enhances user convenience and market efficiency. Feedback from users indicates a positive reception, with increased trust and better communication through the in-app chat feature. Overall, this platform demonstrates significant potential to transform agricultural marketing, fostering a more sustainable and equitable ecosystem. Figure 2 Use Case Diagram for proposed system.

5 CONCLUSIONS

In conclusion, the proposed mobile application aims to revolutionize the agricultural marketplace by bridging the gap between farmers and buyers, offering a direct and transparent platform for trade. By eliminating intermediaries, farmers gain better control over pricing, ensuring fair compensation for their produce. The system incorporates essential features such as real-time price updates, demand forecasting, secure payment gateways, and logistics support, fostering a seamless buying and selling experience. Before this implementation, farmers faced challenges such as low profitability, post-harvest losses, and limited market access. With the introduction of this application, these issues are significantly mitigated by providing direct market access, reducing transportation costs, and promoting fair trade practices. The integration of geolocation technology, secure authentication, and user-friendly interfaces ensures both usability and security, enhancing user satisfaction. This project not only empowers farmers economically but also contributes to building a sustainable and efficient agricultural ecosystem, reflecting a substantial improvement from the traditional market dynamics. Graph 2: Impact of App Usage on Market Expansion.

Here is a line graph showing the reduction in post-harvest losses over time. It indicates a steady decline, demonstrating the effectiveness of the proposed system in minimizing waste. Graph 3 shows the Reduction in Post-Harvest Losses Over Time.

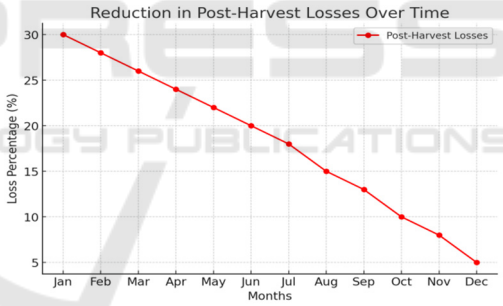

Figure 5: Reduction in post-harvest losses over time.

6 FUTURE SCOPE

The future scope of this project lies in its potential to scale and adapt to evolving agricultural needs. By integrating advanced technologies such as artificial intelligence for demand prediction and blockchain for secure, transparent transactions, the platform can enhance trust and efficiency. Expanding the system to include more stakeholders like agricultural input suppliers and offering multilingual support can broaden its accessibility. Additionally, incorporating analytics to provide farmers with insights on market trends and crop performance can further optimize productivity.

REFERENCES

A. I. Ramesh, A. Raghuwanshi, E. Goel and D. G, "An E-store for Farmers Buying Seeds," 2022 2nd International Conference on Intelligent Technologies (CONIT), Hubli, India, 2022.

Deitke, N. M. Shivale, P. Mahalle, S. Kadam, V. Bhoge, N. Kale and P. Koli, "Implementing a New Framework to sell Farmer Goods in Modern Era for Affordability & Profitability of Farmers & Consumers," 2024 MIT Art, Design and Technology School of Computing International Conference (MITADTSoCiCon), Pune, India, 2024.

Gracia, S & Sonali, M.R. & Sowmya, N. & Suja, P. (2018). "Connect Farmer." International Journal of Engineering and Technology (UAE).

Jaiyen, S. Pongnumkul and P. Chaovalit, "A Proof-of-Concept of Farmer-to-Consumer Food Traceability on Blockchain for Local Communities," 2020 International Conference on Computer Science and Its Application in Agriculture (ICOSICA), Bogor, Indonesia, 2020.

K. Saini, I. Mishra and S. Srivastava, "Farmer's E-mart: An E-Commerce Store for Crops," 2021 3rd International Conference on Advances in Computing, Communication Control and Networking (ICAC3N), Greater Noida, India, 2021.

P. Shriram and S. Mhamane, "Android App to Connect Farmers to Retailers and Food Processing Industry," 2018 3rd International Conference on Inventive Computation Technologies (ICICT), Coimbatore, India, 2018.

R. Sneha Iyer, R. Shruthi, K. Shruthhi and R. Madhumathi, "Spry Farm: A Portal for Connecting Farmers and End Users," 2021 7th International Conference on Advanced Computing and Communication Systems (ICACCS), Coimbatore, India, 2021.

S. Revathy and S. S. Priya, "Blockchain based Producer-Consumer Model for Farmers," 2020 4th International Conference on Computer, Communication and Signal Processing (ICCCSP), Chennai, India, 2020.

S. R, P. R. S D, S. T, K. P and K. T, "Networked Merchandise Hub for Agricultural Products," 2022 8th International Conference on Advanced Computing and Communication Systems (ICACCS), Coimbatore, India, 2022.

V. P, R. P, K. S. T S, P. M. Rao, V. P and T. A, "Farm Connect Application: Bridging the Gap Between Farmers and Consumers Through Digital Technology," 2023 International Conference on Sustainable Emerging Innovations in Engineering and Technology (ICSEIET), Ghaziabad, India, 2023.