

KrishiCart

A Smart Farmer Community

Daksh Saini

Department of IT

G. L. Bajaj Institute of Technology
and Management

(Affiliated To Dr. APJ Abdul Kalam
Technical University, Lucknow)

Greater Noida, India

me22033@glbittm.ac.in

Saurabh yadav

Department of IT

G. L. Bajaj Institute of Technology
and Management

(Affiliated To Dr. APJ Abdul Kalam
Technical University, Lucknow)

Greater Noida, India

itlt2310@glbittm.ac.in

Vaidehi gupta

Department of IT

G. L. Bajaj Institute of Technology
and Management

(Affiliated To Dr. APJ Abdul Kalam
Technical University, Lucknow)

Greater Noida, India

it22106@glbittm.ac.in

Ashish Soni

Department of IT

G. L. Bajaj Institute of Technology
and Management

(Affiliated To Dr. APJ Abdul Kalam
Technical University, Lucknow)

Greater Noida, India

itlt2309@glbittm.ac.in

Abstract — Agriculture is an essential driver of economic development in developing countries such as India; but farmers have limited access to markets, are exploited by intermediaries, and have low transparency and access to recent agricultural information. In this paper, we propose KrishiCart, a Smart Farmer Community Platform that enables direct farmer-consumer communication in a single digital ecosystem. Our modular, extensible, and scalable architecture and user-centric design approach ensure usability, security and extensibility of the system in the future. Our results demonstrate that KrishiCart improves farmer-consumer value and trust, and promotes sustainable agriculture.

Keywords- Smart Agriculture, Digital Agriculture Platform, KrishiCart, Smart Farmer Community Platform, Farmer-Consumer Connectivity, Agricultural E-commerce System, Direct Market Access for Farmers, Real-Time Communication Platform, User-Centric Design Architecture.

I. INTRODUCTION

Agriculture is the base for many economies, especially for developing countries such as India. However, many farmers in developing countries are still struggling to find buyers, to obtain the best price for their produce and to get timely information pertaining to weather, government schemes, and modern farming techniques. A significant portion of the population is dependent on farming, both directly and indirectly.



Fig. 1. The Figure is about how direct connection to farmers works

This figure indicates how traditional farming works and how KrishiCart solve that problem at first place

On the other hand, consumers often do not know where their food comes from, the types of farming practices used, or how authentic the producers are. This lack of transparency lowers consumer trust and discourages sustainable consumption [2][15]. The gap between farmers and consumers also causes inefficiencies, mistrust, and lower profits for farmers, as multiple middlemen raise the final price for consumers while cutting into farmers' earnings [3][15]. With the rapid growth of digital platforms, there is a big chance to use technology to close this gap. However, most current agricultural platforms focus only on one aspect of agriculture, such as e-commerce, sharing information, or social networking. They do not offer a complete system [1][17]. Very few platforms provide a broad solution that combines direct communication, community building, transparency, and market access for both farmers and consumers [4][17].

The proposed Smart Farmer Community Platform, KrishiCart, aims to tackle these issues with a one-stop digital ecosystem. By offering a platform for direct interaction between farmers

and consumers, sharing knowledge, supporting sustainable agriculture, and building trust through transparent profiles, verified reviews, and community engagement, KrishiCart strengthens the agricultural network [2][15]. The final price that consumers pay also affects the profit margins for farmers. In this scenario, consumers often lack knowledge about where their food comes from, how it is produced, and how trustworthy the producers are. This can undermine trust and discourage sustainable consumption. In traditional farming systems, community involvement and sharing knowledge is limited. Farmers rely on informal sources for information about crop selection, pest control, weather conditions, and market needs. The lack of a digital community restricts collaboration, peer learning, and expert advice. Furthermore, farmers miss out on training events, agricultural workshops, and other opportunities due to insufficient information.

II. LITERATURE REVIEW

Several studies and digital platforms in agriculture have been looked at to understand current technology solutions. Research from online technical and educational resources shows that while digital agriculture platforms have improved access to markets and information, significant gaps still exist. Most existing platforms focus mainly on buying and selling agricultural products, but they overlook key aspects like community building, direct communication, and trust development. Some platforms act as social networks for farmers, but they lack proper verification systems, organized events, or ways for consumers to engage [17]

Literature indicates that transparency is a major concern in agricultural e-commerce. Consumers want to know about the production process, the farmers, and the authenticity of the products. However, effective review systems or proper verification processes for farmers are often missing. Recent research on community-based platforms highlights the importance of real-time interaction and collaboration among stakeholders. Platforms that support events, training sessions, and knowledge-sharing activities can significantly boost awareness and adoption of modern agricultural practices [15]

From the literature review, it's clear that there is a need for a well-rounded platform that combines commerce, communication, education, and community features in one place. The proposed KrishiCart aims to fill this gap by integrating these features into a simple and user-friendly platform.



Fig 2. The figure depicts Challenges in Traditional Agriculture and the

KrishiCart Solution

This figure indicates how traditional agriculture system faces issues and how krishicart is the solution for them

A. Requirement Analysis and Problem Identification

The first part of the methodology focused on identifying the main challenges faced by farmers and consumers in the agricultural ecosystem. We conducted a thorough analysis using secondary data from existing agricultural platforms, research papers, and government reports. The main issues identified were the lack of direct communication between farmers and consumers, limited transparency in products, restricted access to agricultural news and events, and insufficient community features.

We identified both functional and non-functional requirements for the system after completing the analysis. The functional requirements included farmer and consumer registration, product displays, real-time communication, order tracking, and chatbot support in different languages. The non-functional requirements included security, scalability, ease of use, and responsiveness of the systems.

This part of the methodology also helped establish the objectives of the proposed system. In addition to secondary research, the requirement analysis considered the limitations faced by farmers in rural and semi-urban areas, such as low digital literacy, poor internet access, and language barriers. These challenges highlighted the need for a straightforward and multilingual platform that farmers could efficiently use on low-end devices. We emphasized keeping the application's workflows simple and ensuring easy access for key functions like product posting, messaging, and information access.

B. System Design and Architecture

Based on the analysis of the requirements, a modular system architecture has been designed. The platform has been implemented as a client-server architecture

The frontend acts as the front-end UI where all the interactions happen, whereas the backend handles all the data processing and business logic. In the design of the platform, a mobile-first and user-centric approach has been taken. This is because the platform aims at making the lives of the farmers easier, and they are not familiar with technology. The design of the frontend UI has been made keeping the usability aspect in mind. The backend has been designed in such a way that it allows role-based authentication for the farmers and the consumers. The platform database will consist of user profiles, products, orders, chats, and news.

Another important factor which has influenced the design of the platform has been scalability. The platform has been designed in such a way that in the future, there can be several advanced features implemented such as AI pricing suggestions, demand forecasting, weather updates, logistics tracking, etc. Lastly, the entire architecture of the system is built in such a way that it is reliable and fault-tolerant. Data backups, error handling, and logging are also taken care of to ensure that the entire platform is available for use at all times. Even in case of failure of some components of the system, the entire functionality of browsing products and placing orders is available to the user. Therefore,

it is safe to conclude that the entire architectural design of

KrishiCart is reliable

C. Technology Implementation and feature development

The implementation phase aimed to implement the design architecture into a full-fledged platform with the use of latest web technology. ReactJS was utilized for the development of the front end UI with which the platform could become highly dynamic and user-friendly with respect to farmers as well as customers. Node.js was chosen with the utilization of express.js and django frameworks for building backend services, such as handling API requests and managing authentication and processing requests for users. Mongo DB and Postgresql was chosen as the database management system for the efficient storage of structured as well as unstructured data.

Few features included in the platform design include the login and registration of farmers and customers, product listing and discovery, order placement and order tracking, latest updates on agriculture news and weather information and lastly, user profiles for the management of all information related to farmers and customers. AI Chatbots were included for assisting customers and farmers to answer any queries as well as navigate within the application more comfortably and efficiently. Search and filter feature was developed by the developers to enable customers in finding relevant products on the basis of categories and prices [17].

D. Testing and evaluation

Some tests were carried out after the KrishiCart platform implementation. Firstly, unit testing was applied to check the functionality of separate modules like user login, responses of the chatbot service, product listing, product search, and order management. It aimed at detecting possible mistakes during individual operation of the modules.

Next, integration testing was performed to check interaction between different parts of the software. Testing included checking coordination between such elements of the software as a front-end interface, backend operations, and the database, and ensuring correct operation of them when used simultaneously. Testing aimed to detect problems with the data flows between individual modules in the sequence from the use of the authentication module and then chatbot service, up to order creation.

User-based testing aimed to perform testing from the perspective of the users' interaction with the platform. Some test users logged into their accounts, browsed for products, made some purchases, and asked questions to the chatbot. All their experiences were recorded to analyze the usability of the service, response time, and its performance from a practical point of view. User experience data improved the interface and usability aspects of the platform.

II. RESULTS

The evaluation results have shown a notable improvement in the engagement and transparency in the agricultural business between farmers and consumers due to the creation of the proposed KrishiCart Smart Farmer Community Platform. It has been proven to be an efficient tool for creating communication channels between farmers and consumers as it allows eliminating any need to deal with intermediaries like wholesalers and agents. In its turn, this leads to increased possibilities for farmers to market their products and sell them to consumers at decent prices.

The platform has turned out to be reliable enough, as during the testing period, no significant issues were found regarding the performance, speed, and convenience of using its features. All modules performed their functions efficiently and smoothly, making farmers able to add new products and manage existing ones without difficulties. Similarly, users were not facing any challenges while browsing available products and ordering them.

Usability and accessibility were two other parameters for evaluation of the application. The development of the KrishiCart website ensured that it was developed in such a way that users with basic technical skills can easily use the site without any difficulties. Real-time communication, discussion forums, and dissemination of information regarding agricultural tips, price of farm products, and other issues make collaboration of users easier. It not only increases trust amongst buyers and sellers but also leads to dissemination of knowledge and sustainable agriculture practices.

The ability to scale and customize the application to incorporate more options such as live weather reports, governmental policies for agriculture, farm product advisory service, transport services, and online payments is one of the key benefits of the proposed framework. It helps in ensuring that the application can be used in different agricultural ecosystems in the long run. From the results of tests conducted, it is clear that the proposed application framework is highly effective and practical [17].

III. DISCUSSION

The implementation and evaluation of the KrishiCart Smart Farmer Community Platform have proven the efficacy of the platform in enhancing transparency, efficiency, and connectivity within the agricultural value chain. Among the major accomplishments of the platform is the bridging of the communication gap that exists between the producer and consumer. In the conventional agricultural value chain, numerous intermediaries like wholesalers and distributors decrease the profit of the producer and increase the final cost

of the product to the consumer.

The platform eliminates this issue by allowing the farmer to post his products and interact with consumers directly without involving any unnecessary intermediary. As a result, this enables farmers to earn reasonable prices for their products while ensuring consumers make informed buying decisions regarding product quality, source, and farmer information.

Moreover, the platform serves for building communities and exchanging information between individuals. The farmers will get updates about various trends, methods, climatic conditions, government schemes related to agriculture, while the consumers will have knowledge about different agricultural methods and the real status of the farm produce. Thus, there will be enhanced connectivity between the two ends and adoption of sustainable methods of agriculture. Generally, it can be said that the KrishiCart platform is an effective solution for modern agricultural problems [15].

A. Limitations and Challenges faced

1. Availability of Data and Insights from the Platform

First, one of the major ways of sourcing data on the KrishiCart platform is through the information available from the farmers. Some of this information may include those related to farmer profiles, crops and their growing methods, prices, product availability, delivery services, among others. Providing this type of information directly to the consumers enables the reduction of the information gaps that may arise when using the traditional agricultural market system. Moreover, it enhances the degree of transparency and consumer satisfaction based on high quality and authentic products.

Apart from this, the second type of data collected includes the information associated with consumer interactions, which may include information about the products viewed, orders made, as well as reviews and other feedback provided by consumers. This is essential in analyzing consumer behavior and enhancing the performance of the platform. These insights may help in enhancing the effectiveness of service management, among others. Although the data may not necessarily be analytical, it is still valuable [17].

2. Cost and Resource Allocation

Cost and resource allocation are important factors while developing technology solutions for the agricultural sector. The KrishiCart platform was designed by keeping affordability and long-term sustainability in mind, especially for farmers living in rural and resource-limited areas. Modern web technologies were used to ensure a balance between system performance, development cost, and platform functionality.

This approach helped in creating a cost-effective and scalable platform that can support both farmers and consumers without requiring high operational expenses. Resource allocation was also planned efficiently to ensure better system performance, smooth maintenance, and future expansion. This makes the platform capable of handling a larger number of users and adding new features such as weather updates, government schemes, and crop advisory services in the future [15].

3. Interdisciplinary Integration

When building the KrishiCart platform, the need for integration across various disciplines became evident because agricultural challenges extend beyond mere farming and encompass technology, economics, communication, and socio-economic development. Developing a functional agricultural platform would require the collaboration and interplay of these diverse fields of expertise.

In terms of technology, the platform relies on current developments in web development, databases, and cloud technologies for scalability, safety, and efficient processing. The front end of the platform is designed for ease of use, access, and simplicity, ensuring that users from different backgrounds and levels of technological literacy can interact with it efficiently. On the other hand, the back end handles critical processes like user authentication, product management, order management, chatbot service provision, and safe data storage.

Economically and communicatively, the platform eliminates intermediary involvement and ensures that prices are set fairly for buyers and sellers and allows direct contact. This fosters trust in the agricultural value chain. Through the integration of agriculture, technology, and communication in one comprehensive system, the KrishiCart platform becomes fully holistic and effective in supporting entrepreneurship and community building in agriculture [17].

B. Future Work

Even though the KrishiCart application platform effectively connects the farmers to consumers through a well-knit ecosystem of technology, there are some improvements that can be incorporated in the future, thereby making the entire platform even more efficient, effective, and user-friendly for the benefit of both parties involved.

To begin with, one area where the developers and entrepreneurs can work towards future improvements involves integrating more intelligent technologies in the form of Artificial Intelligence and Machine Learning algorithms which predict crop yields, analyze price trends, and forecast consumer demand according to previous years' data along with weather information. Such intelligent technologies would benefit both farmers as well as consumers since the former would gain from making better decisions while selecting the crop type and time

of sale. Consumers will be recommended products according to their preferences and available nearby farmer locations.

Another significant improvement that can be expected involves transforming this application platform into an e-commerce platform by incorporating the concept of digital payments using payment gateways such as UPI, credit and debit cards, along with digital wallets. Platforms such as Razorpay and Stripe can play a key role here.

In order to facilitate ease of access, upcoming versions of the platform can incorporate regional languages apart from Hindi and English. Further, voice interface and speech to text technology can also be employed to assist those farmers who may lack familiarity with digital technologies or lack technological prowess.

Finally, the KrishiCart platform can utilize sophisticated data analysis and visualizations to assist both farmers as well as administrators. Such visualizations can provide valuable insights such as demand for products, seasonality patterns, sales figures, and consumer behavior. Such measures would not only assist decision-making but would also facilitate the management of the KrishiCart platform [17].

IV. CONCLUSION

Firstly, the company developed an online platform that seeks to connect the farmers to consumers via direct sales and purchase of farm produce. Such a move helps reduce the role of intermediaries and enables the sellers to enjoy fair prices for their products, while at the same time providing consumers with quality products at affordable prices.

It is worth noting that KrishiCart managed to come up with a platform capable of solving the key issues affecting the sector. Issues of communication, exploitation, poor market access, and lack of transparency are some of the key problems being addressed by the new model. The features that have been integrated in the system make the platform more practical and convenient.

Other than the provision of a platform for conducting agricultural trade, KrishiCart also ensures the development of community spirit. Through the use of the platform, farmers are able to stay updated on various developments in the agricultural sector, especially regarding market trends, updates, and better farming approaches. Consumers on the other hand get educated on issues of food quality and genuine farm produce. From the discussed case study, one realizes the enormous potential of technology in ensuring connectivity and transparency in the sector [15].

V. ACKNOWLEDGMENTS

We would like to convey our heartfelt thanks to our project mentor, Mr. Anand Muni Mishra, for his constant guidance, constructive suggestions, and continuous support in completing this research project. His expertise and

motivation helped us increase our level of understanding and successfully accomplish the project.

We would also like to thank the Head of the Department, Dr. PC Vashist, for his academic guidance and constructive suggestions in the research process. His guidance was instrumental in enhancing the quality of our research.

We would also like to thank all our mentors and faculty members for their constant readiness to offer assistance, motivation, and technical guidance whenever needed. This helped us enhance our practical knowledge, develop teamwork skills, and experience the challenges associated with managing a real-time project.

Lastly, we would like to thank all those individuals who have contributed directly or indirectly in making our KrishiCart project and research paper a success.

VI. REFERENCES

- [1] 1. Siegel RL, Miller KD, Fuchs HE, Jemal A. "Cancer statistics" 2022. *CA Cancer J Clin.* 2022;72(1):7–33.
- [2] Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, Bray F. "Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers" in 185 Countries. *CA: Cancer J Clin.* 2021;71:209–49.
- [3] Bostan, I.-S.; Mihaila, M.; Roman, V.; Radu, N.; Neagu, M.T.; Bostan, M.; Mehedintu, C. "Landscape of Endometrial Cancer: Molecular Mechanisms, Biomarkers, and Target Therapy." *Cancers* 2024, 16, 2027. <https://doi.org/10.3390/cancers16112027>
- [4] Moss, E.L.; Gorsia, D.N.; Collins, A.; Sandhu, P.; Foreman, N.; Gore, A.; Gore, A.; Wood, J.; Kent, C.; Silcock, L.; et al. "Utility of Circulating Tumor DNA for Detection and Monitoring of Endometrial Cancer Recurrence and Progression." *Cancers* 2020, 12, 2231. [CrossRef] [PubMed]
- [5] Bolivar, A.M.; Luthra, R.; Mehrotra, M.; Chen, W.; Barkoh, B.A.; Hu, P.; Zhang, W.; Broaddus, R.R. "Targeted Next-Generation Sequencing of Endometrial Cancer and Matched Circulating Tumor DNA: Identification of Plasma-Based, Tumor-Associated Mutations in Early Stage Patients." *Mod. Pathol.* 2019, 32, 405–414. [CrossRef] [PubMed]
- [1] V. Bhardwaj, A. Sharma, S. V. Parambath, I. Gul, X. Zhang, P. E. Lobie, P. Qin, and V. Pandey, "Machine Learning for Endometrial Cancer Prediction and Prognostication," *Frontiers in Oncology*, vol. 12, no. 852746, pp. 1–13, Jul. 2022, doi: 10.3389/fonc.2022.852746.
- [2] Chen, J., et al. (2020). "Machine learning for predicting outcomes in endometrial cancer patients." *AI in Medicine*, 107, 101890.
- [6] Hueman MT, WangH,Yang CQ,Sheng L, Henson DE, Schwartz AM, et al. "Creating Prognostic Systems for Cancer Patients: A Demonstration Using Breast Cancer." *Cancer Med* (2018) 7(8):3611–21. doi: 10.1002/cam4.1629

- [7] Yang CQ, Gardiner L, Wang H, Hueman MT, Chen D. "Creating Prognostic Systems for Well-Differentiated Thyroid Cancer Using Machine Learning." *Front Endocrinol (Lausanne)* (2019) 10:288. doi: 10.3389/fendo.2019.00288
- [8] He H, Garcia EA. "Learning From Imbalanced Data." *IEEE Trans Knowledge Data Engineering* (2009) 21(9):1263–84. doi: 10.1109/TKDE.2008.239
- [9] Kotsiantis S, Kanellopoulos D, Pintelas P. "Handling Imbalanced Datasets: A Review." *GESTS Int Transactions Comput Sci Eng* (2006) 30(1):25-36.
- [10] T. G. Dietterich, "Ensemble methods in machine learning," *International Workshop on Multiple Classifier Systems*, pp. 1–15, 2000.
- [11] Yin F, Shao X, Zhao L, Li X, Zhou J, Cheng Y, et al. "Predicting Prognosis of Endometrioid Endometrial Adenocarcinoma on the Basis of Gene Expression and Clinical Features Using Random Forest." *Oncol Lett* (2019) 18(2):1597–606. doi: 10.3892/ol.2019.10504
- [12] L. Breiman, "Random forests," *Machine Learning*, vol. 45, no. 1, pp. 5–32, 2001.
- [13] Xu X, Zhang Y, Zou L, Wang M, Li A. "A gene signature for breast cancer prognosis using support vector machine." *IEEE* 2012:928– 31.
- [14] C. Cortes and V. Vapnik, "Support-vector networks," *Machine Learning*, vol. 20, no. 3, pp. 273–297, 1995.
- [15] E. Kalampokas, G. Giannis, T. Kalampokas, A.-A. Papathanasiou, D. Mitsopoulou, E. Tsironi, O. Triantafyllidou, M. Gurumurthy, D. E. Parkin, M. Cairns, and N. F. Vlahos, "Current Approaches to the Management of Patients with Endometrial Cancer," *Cancers*, vol. 14, no. 18, p. 4500, Sep. 2022. DOI: [10.3390/cancers14184500](https://doi.org/10.3390/cancers14184500).
- [16] L. Deng, D. Yu, "Deep Learning: Methods and Applications," *Foundations and Trends in Signal Processing*, vol. 7, no. 3-4, pp. 197-387, 2014. DOI: 10.1561/20000000039.
- [17] J. W. Lee, S. H. Lee, Y. Y. Jeong, and S. H. Lee, "Machine Learning in Medical Imaging: Review and Future Trends," *Neurocomputing*, vol. 421, pp. 1-13, 2021. DOI: 10.1016/j.neucom.2020.11.044.
- [18] GevaertO, DeSmetF, TimmermanD, MoreauY, DeMoorB. "Predicting the prognosis of breast cancer by integrating clinical and microarray data with Bayesian networks" *Bioinformatics* 2006;22:e184–90.
- [19] Bian X, Klemm J, Basu A, Hadfield J, Srinivasa R, Parnell T, et al. "Data submission and curation for caArray, a standard based microarray data repository system; 2009.
- [20] Papadopoulos A, Fotiadis DI, Costaridou L. "Improvement of microcalcification cluster detection in mammography"
- [21] G. E. Collins and R. G. S. Astra, "Challenges in Implementing AI in Healthcare: Infrastructure and Cost Limitations," *International Journal of Medical Informatics*, vol. 168, pp. 104-112, 2023. DOI: 10.1016/j.ijmedinf.2023.104112.
- [22] K. Johnson, L. Smith, and M. Brown, "Access to Molecular Diagnostics in Low-Resource Settings: Barriers and Opportunities," *The Lancet Global Health*, vol. 11, no. 4, pp. e567-e574, 2024. DOI: 10.1016/S2214-109X(24)00067-5.
- [23] P. Williams and J. Patel, "The Economic Burden of Cancer Diagnostics in Low- and Middle-Income Countries," *Health Policy*
- [24] *Journal*, vol. 9, no. 3, pp. 299-312, 2023. DOI: 10.1016/j.healthpol.2023.05.007.
- [1] C. Saillard et al., "Validation of MSIntuit as an AI-based pre- screening tool for MSI detection from colorectal cancer histology slides," *Nature Communications*, vol. 14, no. 1, 2023.
- [2] F. Alston, "French AI biotech unicorn Owkin launches €33 million AI-powered precision medicine project for cancer diagnosis and treatment," *Silicon Republic*, 31-Mar-2023.
- [3] M. Rosemain, "Drugmaker Sanofi invests \$180 mln in French AI startup Owkin," *Reuters*, 18-Nov-2021.
- [4] U. Thomas, "Owkin's AI Diagnostic for Colorectal Cancer Takes Center Stage with Promising Validation Results," *MedTech Dive*, 10-Nov-2023.
- F. Vinluan, "Sanofi exec jumps to Owkin to ramp up the AI biotech's pharma partnership plans," *FierceBiotech*, 04-Oct-202