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Small Business Empowerment Strategy in the Agricultural Sector Through Digital Entrepreneurship

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Abstract
This study looks at how digital entrepreneurship is being used by small enterprises in the agriculture industry to empower them. It focusses on how this is affecting market access, production efficiency, and bolstering competitiveness. The advent of digital transformation has presented small enterprises with novel prospects to surmount customary constraints, including restricted availability of markets, finance, and technology. This research employs a qualitative methodology and a case study approach to investigate how small agricultural firms might use digital technologies, like e-commerce platforms and the Internet of Things (IoT), to increase market access and productivity. In-depth interviews with small business owners, technology suppliers, and other stakeholders were used to gather data. Direct observation and document analysis were also used. The results of this study show that small enterprises' operational efficiency and revenue are greatly increased when digital entrepreneurship is implemented. Collaboration with a range of stakeholders, including the government and academic institutions, and sufficient digital literacy have shown to be crucial for the effective execution of this plan. This study also emphasises how crucial it is to create both domestic and global business networks in an effort to increase market penetration and boost the competitiveness of small enterprises in the agriculture industry. In order to increase the sustainability and competitiveness of small enterprises in the agriculture sector, this study makes recommendations based on its results for policy makers and industry participants to assist the widespread adoption of digital entrepreneurship.

Keywords:
Small business empowerment; Digital entrepreneurship; Digital transformation; Agricultural sector; E-commerce.

1. INTRODUCTION

One of the key elements in helping small businesses overcome obstacles and become more competitive across a range of industries, including agriculture, is the digital transformation. The swift advancement of digital technology has resulted in several transformations, providing small enterprises with ample prospects for expansion. In this process, the use of digital entrepreneurship is crucial, particularly for empowering small enterprises in the agriculture sector that frequently encounter a variety of challenges. The foundation of digital transformation theory is a topic of much discussion in related literature. This theory highlights how traditional methods of functioning in a variety of organizations—both public and private—can be altered by digital technology. Mannayong's (2024) research indicates that digital transformation encompasses more than just transferring offline operations to online platforms; it also entails significant adjustments to the operational framework of organisations. This entails adjusting the operational procedures and organisational structure in addition to opening up new business opportunities and offering substantial additional value to enterprises. The implementation of digital entrepreneurship tactics in the agriculture industry might offer

practical answers to the different problems small enterprises frequently encounter. Restricted market access is one of the main obstacles. Small businesses frequently struggle to expand their market reach because they lack the necessary infrastructure and relationships. Through the use of digital marketing, small businesses may reach a wider audience more effectively and efficiently. Digital marketing, for instance, enables manufacturers to communicate with customers directly via internet channels, decreasing their dependency on middlemen in the market and enabling them to provide goods at more affordable costs. One type of digital marketing approach that is particularly pertinent for small firms in the agriculture industry is interactive and integrated marketing. Local and global consumer reach can be expanded for small enterprises through the use of social media, email marketing, and e-commerce platforms. Additionally, digital marketing gives small businesses the chance to get insightful customer information that they can utilise to enhance their advertising campaigns and merchandise. According to Anjani (2023), digital marketing fosters closer ties between manufacturers and consumers in addition to boosting revenues. Digital transformation makes it possible for modern technologies like the Internet of Things (IoT) to be adopted in agriculture in addition to digital marketing. The Internet of Things (IoT) allows devices and sensors to be connected over the internet, making it possible to monitor and control many elements of agriculture in real time. For example, sensors can be used to track temperature, humidity, and plant nutrient levels in an Internet of Things (IoT) smart hydroponic system. The required actions, such adding water or nutrients, can then be determined by analysing the data that these sensors have acquired. This technology boosts agricultural output in addition to efficiency, which will eventually result in more revenue for small enterprises. According to Caniago (2023), implementing IoT in agriculture can maximise production and lower operating costs, which is very advantageous for small farmers. Furthermore, collaborations between cooperatives and microbusinesses, as well as community economic empowerment, are crucial. Because they are based on the concept of collectivism, cooperatives can help small firms become more competitive by acting as strategic partners. Better access to resources, markets, and business networks can be had through cooperatives. Microbusinesses can lower prices and acquire more negotiating power in the market by joining cooperatives and benefiting from larger economies of scale. According to Syabrinildi (2024), local communities can gain economically from the synergy between microbusinesses and cooperatives, including higher incomes and more engagement in economic activities. Sustainability is another area where digital change is beneficial. Small firms in the agriculture industry can manage natural resources more effectively and sustainably by using digital technologies. For instance, IoT-enabled precision agricultural equipment enables the accurate application of pesticides, fertilisers, and water in accordance with plant requirements. In addition to raising agricultural output, this also lowers waste and adverse environmental effects. Enhancing management is crucial for protecting the environment and promoting sustainable agriculture.

Using digital entrepreneurship to empower small enterprises in the agricultural sector is crucial to addressing the different obstacles that small company players, particularly those in rural areas, confront. Small and medium-sized businesses (SMEs) in the agriculture industry frequently struggle with restricted finance, restricted market access, and a lack of knowledge about contemporary technology. Thus, diverse stakeholders must collaborate in measures meant to support this empowerment. (Mannayong, 2024). Creating a local business network with an emphasis on locally produced goods is an essential component of this empowerment process. Small firms can help each other and reach new markets by supporting one another through a robust business network. Digital platforms facilitate more efficient promotion of locally produced goods by farmers and small business owners, giving them access to a larger market. In this instance, digital technology plays a critical role in bolstering small firms' positions in both local and global marketplaces. In 2022, Firmansyah et al. A major part of this empowerment strategy is also played by government programs. The government can help by enacting laws that encourage SMEs to embrace digital technology. For instance, the government can make technology skills and the digital infrastructure required to support small-scale agricultural business operations more easily accessible. Projects like the post-COVID-19 increase in coconut production in Teluk Jira village demonstrate how the correct policies may support small enterprises in their recovery and expansion in the face of global obstacles. A further boost to the financial expansion of small enterprises might come from laws that encourage the creation of regional goods and exports. (Anjani, 2023) One important factor in empowering small businesses, particularly those run by women, is the implementation of specific programs like the Sakinah Mandiri Micro Business Waqf Bank. This initiative offers training and support to help firms grow in addition to making funding more accessible. Women who own small and micro companies can therefore be more financially independent and able to make greater contributions to the well-being of their communities and families. Another crucial element of the economic empowerment approach is the cooperation between microbusinesses and cooperatives. Small firms can collaborate, share resources, and reach new markets with the help of cooperatives. Small enterprises can boost their productivity and competitiveness in the wider market in this way. Additionally, cooperatives can be very helpful in granting small firms access to the finance and technology they need to expand. (Caniago, 2023). It is impossible to overlook the significance of sharia-based small and microbusinesses in reducing poverty. Businesses that follow sharia law are frequently more welcome in communities where business is conducted according to Islamic precepts. Sharia principles can be incorporated into digital entrepreneurship models to help small and micro enterprises grow their clientele and forge closer bonds with their local

communities. These initiatives promote more inclusive economic growth in addition to assisting in the reduction of poverty. By Sabrinildi (2024).

In order to create a thorough theory of small company empowerment in the agriculture industry, we must take into account the different tactics and methods that have been investigated and used in diverse contexts. Numerous studies have offered insightful information about how MSMEs (micro, small, and medium-sized companies) might be strengthened in the agriculture industry. The significance of MSME empowerment for enhancing sustainability and growth in the agriculture industry is one topic that is frequently discussed. It is crucial to empower MSMEs in the agriculture sector since, particularly in rural areas, these small enterprises play a significant role in bolstering the local economy. Through enabling MSMEs, we contribute to the growth of the rural economy overall as well as the survival of these small enterprises. According to Swasono (2023), the agriculture industry may grow and become more sustainable with the support of MSME empowerment. Using MSMEs as a bridge to connect rural and urban communities is another aspect of the MSME empowerment plan. According to Galaso (2022), MSMEs can play a significant role in bridging the gap between rural and urban areas, ultimately fostering economic growth in both. The revenue of farmers and MSMEs in rural areas can be increased by more easily marketing agricultural products from such areas in urban areas thanks to improved links between the two. Additionally, initiatives to combat poverty must also focus on economic development through MSME empowerment. According to Risal and Siradjuddin (2022), enabling MSMEs in the agriculture sector can effectively reduce poverty, particularly in rural areas. Supporting MSMEs with technology, finance, and training can boost their production, which will raise rural communities' standard of living and income. The Asset-Based Community Development (ABCD) method to community empowerment has also shown promise in fostering creativity and overcoming obstacles, particularly in times of crisis like the COVID-19 pandemic. Diantika (2023) demonstrated that this strategy enables communities to leverage environmental resources and local knowledge to support their agricultural enterprises. The study also emphasised the significance of business tactics, like SWOT analysis, in assisting MSMEs in the agriculture industry to endure and prosper, particularly throughout challenging times. According to Soegoto et al. (2022), MSMEs can more effectively assess their opportunities and threats as well as their strengths and weaknesses by utilising a SWOT analysis. This aids in their development of more effective plans for dealing with obstacles and seizing opportunities. Encouraging particular groups, such women working in agriculture, is also a major priority. According to Haryono et al. (2018), empowering women through agricultural endeavours can contribute to the growth of profitable enterprises and the decrease of poverty. Women are essential to agriculture in many regions, yet they frequently lack equitable access to resources and employment possibilities. We can help women contribute more to the household and community economies by empowering them through initiatives. Women starting small cooperatives is another strategy to combat gender disparity in the agriculture industry. According to Theeuwen et al. (2021), women can collaborate to build cooperatives that will strengthen their bargaining power in the marketplace and improve their access to the resources they require. This makes women more self-reliant and able to weather financial hardships.

2. RESEARCH METHOD

This study examines in-depth how digital entrepreneurship empowers small firms in the agriculture industry using a qualitative method and case study approach. Data for this study were gathered using a variety of methods. Initially, in-depth interviews with small business owners who have used digital technologies in the agricultural industry were carried out. In order to obtain a wider viewpoint, this interview also included associated parties like government officials, digital technology suppliers, and entrepreneurship specialists. Researchers also made firsthand observations to observe how these small firms use digital technologies on a regular basis. This remark aids in comprehending the practical impact of technology on business processes. A variety of pertinent papers, such as marketing materials, business reports, and relevant government legislation, were also examined by the researchers. The examination of these documents yields more data that can be utilised to improve the findings of the study. To further solidify the theoretical underpinnings of this investigation, a literature assessment of earlier studies on digital entrepreneurship and MSMEs' empowerment in the agriculture sector was carried out. After that, a thematic technique was used to analyse the data, which entails coding the data in order to pinpoint the major themes that surface. The analysis's findings are then combined to create a narrative that explains how MSMEs in the agriculture sector can benefit from digital entrepreneurship. This study used a data triangulation method, comparing the findings from multiple data sources that have been gathered, to assure the validity and trustworthiness of the conclusions. It is anticipated that this method will offer a precise and transparent image of the plan for enabling MSMEs in the agriculture industry through digital entrepreneurship.

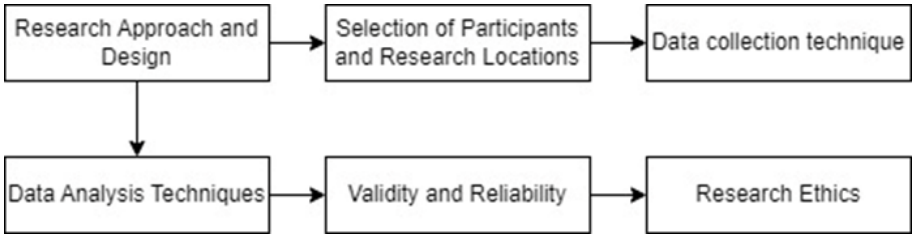

Figure 1. Research Method

The research technique is specifically developed to offer a thorough and extensive comprehension of how digital entrepreneurship contributes to the empowerment of MSMEs in the agriculture sector. By employing a systematic qualitative methodology, this study aims to generate comprehensive and valuable insights to inform the formulation of digital entrepreneurship policies and practices in the agricultural industry. This study is anticipated to enhance the competitiveness and sustainability of Micro, Small, and Medium Enterprises (MSMEs) in Indonesia.

3. RESULTS AND DISCUSSION

The study findings indicate that the adoption of digital entrepreneurship has a substantial beneficial effect on small firms operating in the agriculture sector. One of the main tactics mentioned is the utilisation of e-commerce platforms, which enable farmers and agribusiness entrepreneurs to access a broader market. This enables them to decrease their reliance on conventional intermediaries and enhance their earnings. Moreover, the utilisation of digital technology such as the Internet of Things (IoT) and data analytics enables small enterprises to effectively oversee and enhance their production processes. These technologies provide more accurate monitoring of soil, weather, and crop conditions, therefore enhancing yields and product quality. Another approach is leveraging social media and digital marketing, enabling small firms to enhance the effectiveness of their product promotion. Small entrepreneurs can utilise internet marketing to establish their brands and connect with consumers in a more direct and effective manner.

3.1. Improving Digital Literacy

Digital literacy is crucial for small business owners to effectively and promptly adjust to the constantly changing technology landscape. In the current era of digitalisation, it is imperative to possess the skills to comprehend, obtain, and employ digital technology proficiently, as it is no longer a choice, but a pressing necessity. Small businesses lacking sufficient digital literacy often fall behind in competition, struggle to reach broader markets, and are unable to leverage technology to enhance operational efficiency. Small business owners must receive structured and thorough digital literacy training in order to acquire the necessary knowledge and skills. This training program encompasses a wide range of topics, starting with fundamental knowledge of digital devices and extending to the utilisation of sophisticated technologies like e-commerce, social media management, and data analysis. This training enables small business owners to overcome earlier constraints, such as a deficiency in technological comprehension, and gain greater confidence in managing their firms in the digital realm. Moreover, enhancing digital literacy enables small business proprietors to avail themselves of many internet resources that might facilitate the expansion of their businesses. By possessing strong digital literacy skills, individuals are able to effortlessly obtain the most up-to-date information, monitor market trends, and effectively utilise a wide range of digital technologies to enhance productivity and foster innovation. In the end, enhancing digital literacy will enhance the competitiveness of small firms and enable them to attain long-term success in a progressively competitive economy.

Table 1. Entrepreneurship Data

Data Category	Description	Types of Data Collected	Key Indicators
Digital Literacy Level	Measuring the level of digital literacy of small business actors before and after training	1. Digital literacy scores based on tests or surveys 2. Understanding of digital device usage	1. Average score before and after training 2. Percentage increase in understanding of digital technology
Participation in Training	Participation in digital literacy training programs	1. Number of small business actors who participated in the training 2. Demographic profile of participants (age,	1. Number of participants who attended and completed the training 2. Demographic distribution of participants

		gender, business sector, etc.)	
Impact of Training on Small Businesses	The effect of training on the use of digital technology in business	1. Increased online sales 2. Number of new customers through digital platforms 3. Operational efficiency	1. Percentage increase in online sales 2. Number of new customers after training 3. Reduction in time or operational costs after technology adoption
Limitations Faced	Challenges faced by small business owners before receiving training	1. Technical issues before training 2. Technology adoption costs 3. Internet access	1. Percentage of participants reporting technical limitations prior to training 2. Percentage of participants reporting cost as a barrier 3. Percentage of participants with limited internet access
Feedback from Training Participants	Evaluation from participants about the training	1. Participant satisfaction level 2. The most useful or needing improvement aspects	1. Average participant satisfaction score 2. Recommendations for training improvement based on survey
Business Performance after Digital Literacy	Measuring business performance before and after increasing digital literacy	1. Business turnover 2. Market expansion 3. Number of online transactions	1. Increase in turnover after training 2. Percentage of market expansion after technology adoption 3. Increase in the number of online transactions
Access to Online Resources	Use of online resources after training	1. Types of online resources accessed 2. Categories of applications or services most frequently used	1. Frequency of use of educational platforms, analytical tools, customer management applications, etc. 2. Distribution of use per category of online resources

This table provides a more detailed and structured overview of the types of data that can be collected to assess and measure the impact of increasing digital literacy on small business actors.

3.2. Utilization of E-Commerce Platforms

E-commerce platforms have become essential tools for promoting the expansion and effectiveness of small agriculture businesses. E-commerce platforms facilitate direct sales of products from enterprises to customers, bypassing the typically lengthy and complex traditional distribution system. By having direct access to a broader market, agricultural firms may now contact consumers in other regions, both locally and globally, that were previously inaccessible through traditional marketing approaches. Utilising e-commerce platforms for promoting agricultural products offers numerous substantial advantages. Firstly, this platform enables small enterprises to enhance their market penetration more effectively. By utilising e-commerce platforms, agricultural products can be marketed and distributed to multiple locations without relying on intermediaries or conventional distributors. This not only decreases the expenses associated with distributing items but also accelerates the time it takes for products to be delivered to consumers, enabling fresh products to reach consumers with enhanced quality. E-commerce systems offer enhanced flexibility in managing inventories and setting prices. Businesses may efficiently control their inventory in response to fluctuating market demand. In addition, they have the capability to make immediate pricing modifications by analysing sales data and consumer patterns. This confers a competitive edge, as enterprises may promptly and precisely address market demands, in contrast to conventional approaches that frequently require more time to adapt pricing or marketing plans. E-commerce enables firms to leverage a wide range of digital marketing tools offered on the platform. For instance, e-commerce platforms can utilise promotional features, discounts, or loyalty programs to entice a larger consumer base. Furthermore, firms can utilise data analytics offered by e-commerce platforms to gain insights into market trends and consumer preferences. This data is extremely important for enhancing marketing tactics and maximising the efficiency of sales campaigns. Small firms can

decrease their reliance on local marketplaces, which are sometimes restricted and unpredictable, by utilising e-commerce platforms. Agricultural firms can mitigate the risks of demand changes in the local market by expanding their access to consumers in other areas or even other countries through internet sales. Market diversity can enhance income stability for organisations by reducing their reliance on a single market. E-commerce platforms offer businesses the chance to establish and develop their own unique brands. E-commerce platforms provide small businesses with the opportunity to market their items in a more polished and organised manner. Users have the ability to establish an internet-based retail platform that accurately represents their unique brand image, incorporating distinctive logos, detailed product descriptions, and visually appealing, top-notch photographs. This contributes to the establishment of consumer confidence and the enhancement of the shopping experience. Furthermore, the utilisation of e-commerce platforms can enhance the operational efficiency of small agricultural firms. By implementing an integrated system on the e-commerce platform, business entities can streamline and mechanise a wide range of business operations, including order administration, payment processing, and shipping. This not only decreases the amount of work but also minimises the likelihood of human mistakes in operational management.

Table 2. E-Commerce Data for Small Businesses in the Agricultural Sector

Data Category	Data Types	Description	Key Indicators
Sales Data	Sales Volume	Total number of agricultural products sold through e-commerce platforms.	- Number of units sold per product - Percentage increase in sales
Sales Data	Sales Value	Total revenue from online sales of agricultural products.	- Total revenue per period - Average sales value per transaction
Sales Data	Best Selling Products	The most sold type of agricultural product.	- List of highest selling products - Percentage contribution of best selling products to total sales
Customer Data	Customer Profile	Customer demographic information (age, gender, location, product preferences).	- Customer distribution by demographics - Product preference trends
Customer Data	Purchase Frequency	How often do customers purchase agricultural products.	- Number of purchases per customer per period - Percentage of customers with repeat purchases
Customer Data	Average Transaction Value	The average amount of money spent by a customer per transaction.	- Average value per transaction - Distribution of transaction value
Inventory Data	Product Stock	The amount of product stock available in a warehouse or storage facility.	- Stock quantity per product - Average stock turnover time
Inventory Data	Stock Turnover	The speed of stock turnover from the time goods are received until they are sold.	- Average time stock is in the warehouse - Percentage of products that run out quickly
Inventory Data	Expired Products	Product data that is approaching or has passed its expiration date.	- Number of expired products - Value of losses due to expired products
Marketing Data	Site Traffic	The number of visitors who access an online store or product page.	- Number of visits per period - Traffic sources (organic, paid, referral, etc.)
Marketing Data	Conversion Rate	The percentage of visitors who make a purchase after visiting an online store.	- Visitor vs buyer ratio - Conversion percentage per marketing campaign
Marketing Data	Promotion Campaign	The effectiveness of digital marketing campaigns such as paid advertising, discounts, or special offers.	- Campaign ROI - The number of sales related to the promotion
Marketing Data	SEO Analysis	The performance of online stores in	- Keyword ranking

		search engines, including the keywords used by customers.	- Organic traffic from search engines
Shipping Data	Delivery time	The average time it takes to deliver a product to a customer.	- Delivery time per area - Percentage of on-time delivery
Shipping Data	Shipping costs	Product shipping costs, including those borne by the customer and shipping subsidies.	- Average cost per shipment - Distribution of costs between customers and the company
Shipping Data	Product Return Rate	The percentage of products returned by customers after purchase.	- Percentage of products returned - Reasons for product returns
Payment Data	Payment Methods	The type of payment method most frequently used by customers (credit cards, e-wallets, etc.).	- Percentage of payment method usage - Payment preference trends
Payment Data	Failed Payment Rate	Percentage of transactions that failed due to payment issues.	- Number of failed transactions - Main causes of payment failure
Payment Data	Transaction Completion Time	The time it takes to process payments from customers.	- Average payment processing time - Percentage of transactions processed within a certain time
Customer Satisfaction Data	Product Reviews and Ratings	Ratings given by customers to the agricultural products they buy.	- Average product review score - Number of reviews per product
Customer Satisfaction Data	Customer satisfaction	Data from surveys or direct feedback regarding customer satisfaction with products and services.	- Average customer satisfaction score - Number of complaints received
Customer Satisfaction Data	Customer Loyalty	Percentage of customers who make repeat purchases at an online store.	- Percentage of repeat customers - Frequency of repeat purchases
Platform Performance Data	Site Uptime	The time a website or e-commerce platform operates without interruption.	- Percentage of uptime - Amount of downtime and its duration
Platform Performance Data	Site Speed	The time it takes to load an online store page.	- Average page load time - Impact of site speed on conversions
Platform Performance Data	Transaction Security	The level of security applied in the payment process and protection of customer data.	- Number of security incidents - Percentage of secure transactions
Operational Data	Order Process Efficiency	The time required from receipt of order to delivery of product.	- Average order processing time - Percentage of orders processed within a certain time
Operational Data	Use of Technology	Use of Technology	- Technology adoption rate - Technology effectiveness on operational efficiency

The table presents a more organised framework and comprehensive information regarding the e-commerce data that may be gathered and examined by small enterprises in the agricultural industry.

3.3. Network Development and Collaboration

Networking and collaboration are essential foundations for promoting innovation and ensuring long-term growth in the small business sector. Efficient cooperation among small enterprises, technology vendors,

governmental organisations, and educational establishments not only enhances the internal capabilities of each entity but also generates synergistic effects that can enhance overall competitiveness. Networking and collaboration are essential in this environment as they may establish an ecosystem that fosters innovation, facilitates access to resources, and promotes sustainable growth.

The collaboration between small businesses and technology providers facilitates the exchange of knowledge and technology, which is crucial for enhancing operational efficiency and expediting the adoption of innovation. Technology vendors can offer customised solutions to meet the specific requirements of small enterprises, including software for managing operations, tools for analysing data, and platforms for conducting online commercial transactions. Through this partnership, small enterprises can utilise technology that they may struggle to create independently due to limited resources and expertise. Furthermore, technology suppliers derive advantages from receiving direct input from small firms, which can be utilised to enhance their goods and services. Government agencies are essential in facilitating networking and collaboration. Governments can facilitate assistance by implementing policies that promote cooperation between the private and public sectors, such as offering tax benefits to small enterprises that invest in technology, allocating funds for research and development (R&D), and implementing training initiatives aimed at enhancing digital proficiency. Government agencies can promote networking and collaboration by establishing industrial clusters or business incubators, which provide opportunities for small enterprises to exchange knowledge, experiences, and resources with other players in their respective industries. Academic institutions also play a crucial role in fostering networks and collaboration. Small businesses can gain access to cutting-edge research and technologies by partnering with universities and research institutions. Academic institutions can offer the necessary knowledge and technical guidance to tackle the difficulties encountered by small firms. Moreover, partnering with academic institutions can provide small firms with the chance to participate in collaborative research endeavours, fostering the development of groundbreaking solutions and enhancing their competitiveness within the market. Cultivating robust networks is crucial for establishing enduring links among small enterprises, technology vendors, government entities, and academia. These networks facilitate expedited and more efficient transmission of information, hence simplifying the process for small enterprises to adjust to market and technical fluctuations. Effective networking enables small firms to discover potential collaborations, such as joint initiatives, strategic partnerships, or research partnerships, that can enhance their ability to innovate and expand. Effective teamwork can assist small firms in overcoming the diverse obstacles they encounter when managing their operations.

By engaging in collaboration with technology suppliers, small firms can effectively address challenges associated with internal technology development. Additionally, partnering with government organisations can facilitate access to the necessary financial and non-financial resources required for business growth. Engaging in partnerships with academic institutions can assist small firms in acquiring the necessary expertise and competencies to effectively compete in the international market. Nevertheless, in order to guarantee the efficacy of this collaboration, it is imperative that all parties involved demonstrate dedication. Both parties must possess a comprehensive comprehension of the objective of the partnership, as well as their individual obligations in achieving that aim. Furthermore, it is crucial to build efficient and open communication channels to ensure that all parties may participate to the collaboration in the most effective way and reap its benefits. Over time, the establishment of robust networks and collaborations can foster a more vibrant and inventive corporate ecosystem. Participation of small firms in these collaborations will provide them with enhanced access to the technology, resources, and knowledge required for their growth and development. In the end, this will enhance the competitiveness of small firms in both domestic and foreign markets, while also promoting inclusive and sustainable economic growth. Network development and collaborations can have wide-ranging positive effects, including boosting employment, enhancing the quality of products and services, and bolstering innovation capabilities in several economic sectors. Investing in the creation of networks and collaborations not only benefits small firms, but also yields long-term advantages for the economy.

3.4. Discussion

This study emphasises the substantial influence of implementing digital entrepreneurship on small enterprises in the agricultural industry. Utilising digital technology, such as e-commerce platforms, has demonstrated the ability to expand market access, enabling farmers and agribusiness entrepreneurs to decrease reliance on conventional middlemen and enhance profit margins. Moreover, the implementation of cutting-edge technology such as the Internet of Things (IoT) and data analytics has facilitated the optimisation of production processes for small enterprises. These technologies provide the live monitoring of soil, weather, and crop conditions, consequently enhancing the quality of harvests and overall production efficiency. Digital literacy is recognised as a crucial factor in facilitating the effective execution of digital entrepreneurship. This study demonstrates that small enterprises possessing sufficient digital literacy are more capable of adjusting to swift technological advancements, accessing broader markets, and employing technology to enhance their operational efficiency. Small company actors require structured and comprehensive digital literacy training to overcome current technology obstacles and gain confidence in conducting their operations in the digital age. E-commerce platforms offer several advantages for small

enterprises, such as enhanced inventory control and pricing flexibility, as well as the opportunity to contact consumers in various places without relying on conventional distribution channels. The platform also enables small businesses to leverage diverse digital marketing techniques, like promotions, discounts, and loyalty programs, to enhance the efficacy of their marketing campaigns and broaden their market penetration. Furthermore, by utilising an e-commerce platform, small enterprises can diminish their reliance on frequently volatile local markets and establish a more robust brand presence through a polished and organised online store. Establishing networks and partnerships among small firms, technology suppliers, government agencies, and academic institutions is considered a crucial foundation for promoting innovation and fostering sustainable growth. This relationship facilitates the exchange of knowledge and technology, which is crucial for enhancing the competitiveness of small enterprises. The government plays a pivotal role in facilitating this collaboration by implementing policies that promote investment in technology and offering training programs that specifically target the enhancement of digital skills. Academic institutions also contribute by offering up-to-date research and technical consulting, which can assist small firms in overcoming the obstacles they encounter while adopting digital technology.

4. CONCLUSION

This study emphasises the significance of incorporating digital entrepreneurship to enhance the performance of small firms in the agriculture sector. The adoption of digital transformation has emerged as a key driver for small firms to confront difficulties and enhance competitiveness across all sectors, including agriculture. The swift advancement of digital technology has ushered in numerous transformations, presenting small firms with a plethora of fresh prospects for expansion. The incorporation of digital entrepreneurship is crucial in this endeavour, particularly in empowering small agricultural firms that have frequently encountered numerous challenges. The objective of this study is to investigate the utilisation of digital technology by small agricultural firms to enhance production, efficiency, and market reach. This study demonstrates how small enterprises can overcome traditional constraints, such as restricted market access and financing, by utilising digital technologies such as e-commerce platforms and the Internet of Things (IoT). E-commerce enables small firms to directly access a larger consumer base, bypassing intermediaries that typically decrease profit margins. Furthermore, IoT technology enables small company entities to effectively oversee and control production processes, hence enhancing the calibre and volume of their harvests. The adoption of this technology enhances operational efficiency and enables small enterprises to swiftly innovate and respond to market developments. Furthermore, digital literacy plays a crucial role in enabling small company operators to effectively harness this technology. Small company actors require comprehensive digital literacy training to acquire a thorough understanding and effective utilisation of digital technologies. This will enable them to effectively compete in an ever more competitive market. Collaboration among the government, technology providers, and academic institutions is crucial in order to effectively deploy digital entrepreneurship. The government plays a crucial role in formulating policies that facilitate the implementation of digital technology, together with the essential infrastructure. Academic institutions can assist by offering the essential research and technical assistance to aid small enterprises in overcoming obstacles in adopting digital technologies. The utilisation of digital entrepreneurship has the capacity to significantly enhance the efficiency and competitiveness of small agricultural firms. Small enterprises can achieve more adaptability to technological and market changes, leading to more equitable and sustainable economic growth, with the appropriate support from many stakeholders. This study affirms that the incorporation of digital technology is not merely a choice, but a pressing necessity for small enterprises seeking to remain pertinent and competitive in this digital epoch.

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