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The Role of Digital Communication in Improving the Efficiency of Plantation Management

Yose Andre Sinuhaji[1*]
[*1]Institut Teknologi Sawit Indonesia
Correspondent: sinuhaji.4@gmail.com

Abstract

Plantation management in Indonesia plays an important role in supporting the national economic sector. Digital transformation has brought significant changes through the implementation of digital communications such as mobile applications, web-based systems, and cloud platforms. This technology speeds up workflows, improves data-driven decision-making, and facilitates coordination between stakeholders. This study uses a qualitative descriptive method to analyze the impact of digital communication in improving plantation operational efficiency. The results show that digitalization allows for more effective resource management, reduced operational costs, and increased productivity. However, there are challenges in the form of low digital literacy of field workers, limited internet infrastructure, and the need for technology training. In addition to supporting operational efficiency, digital technology also contributes to environmental sustainability by minimizing the use of excess chemicals. Successful digital transformation requires collaboration between governments, the private sector, and stakeholders to develop digital infrastructure, provide intensive training, and increase motivation for technology adoption. This research emphasizes that digitalization is a strategic step that not only strengthens the plantation sector but also supports economic and environmental sustainability in Indonesia.

Keywords: Digital Communication, Plantation

INTRODUCTION

Plantation management in Indonesia has a very important role in the national economic sector, with key commodities such as palm oil, rubber, coffee, and sugarcane dominating the global market. Along with the development of information technology, plantation management has also undergone a significant transformation, one of which is through the application of digital communication. Digital communication, which involves the use of various information technology platforms such as social media, mobile applications, and web-based management systems, is expected to improve operational efficiency and productivity in plantation management. In this context, the use of digital technology is not only limited to communication between individuals, but also includes system integration that can speed up workflows, facilitate data-driven decision-making, and improve coordination among stakeholders.

The use of digital communication technology in plantations has a significant impact in various aspects, ranging from human resource management, crop monitoring, to supply chain

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management. In traditional plantation management systems, communication is often limited to oral or written communication that takes place directly in the field or in face-to-face meetings. Although effective to some extent, these systems have limitations in terms of speed, accuracy, and coverage of information. The use of digital technology allows for more accurate and fast data collection, as well as facilitating the distribution of important information in real time.

The use of ICT in agricultural extension has the potential to improve the performance of extension workers, expand the range of services, and enable extension workers to provide more appropriate and effective solutions (Thamrin M et al, 2023) According to research by Rahayu (2016), the implementation of information and communication technology (ICT) in the agricultural and plantation sectors has been proven to significantly improve operational performance. ICT enables efficiency in production data management, monitoring plant conditions, and planning and budget management. This has an effect on reducing operational costs and increasing plant productivity. With the digitization of plantation management, plantation managers or owners can more easily access information related to the development of their land and crops. Decisions made based on more timely and accurate data tend to produce more optimal results.

One of the important aspects of digital communication is the ability to connect various parties involved in plantation management, be it managers, field workers, suppliers, or consumers. In this context, digital communication also allows collaboration between various parties to achieve the same goal, which is to increase the efficiency and sustainability of plantations. Efficient communication not only reduces the chances of errors or miscommunication, but also ensures that every action taken in plantation management is based on correct and up-to-date information.

For example, the use of mobile-based applications to monitor crop conditions in the field can provide farmers or plantation workers with direct information about plant health status, soil moisture, or fertilization needs. This makes it easier for workers to take the necessary actions in a faster time and in a more scalable way. In addition, the adoption of information technology in the bookkeeping of palm oil products has helped improve the efficiency and accuracy of the recording process.

The importance of reporting on the books of palm oil products can be seen in its ability to provide accurate and up-to-date information to company management and farmer groups. Therefore, it is recommended that companies and farmer groups continue to improve their bookkeeping systems, strengthen internal controls, and respond quickly to changes in the business environment. (Arta, 2024)

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However, although there are many advantages that can be obtained from the implementation of digital communication, there are challenges in its implementation. One of the main challenges is the low rate of technology adoption among field workers, especially in remote areas. In addition, the existence of limitations in adequate internet infrastructure and difficulties in training the use of technology are obstacles that must be overcome. According to Syafitri (2024), digital transformation is important for every private sector and government sector that is highly dependent on systems, ICT, strategies, and human resources.

A study conducted by Banudi (2017) also revealed that this information and communication technology can be used by as many Indonesian farmers or even farmers in the world so that their farmer productivity increases, and is used as a tool for agricultural development, as well as for their livelihood welfare.

In addition, the use of digital technology in plantations can also help in improving environmental sustainability. Digital communication allows for better monitoring of the use of chemicals and pesticides, so that excessive use that has the potential to damage the environment can be avoided. Based on research conducted by Lumbanraja (2024), the application of artificial intelligence has the potential to provide added economic value, especially in the plantation sector.

The importance of digital communication in improving the efficiency of plantation management is also reflected in various related literature that shows that technology can speed up the decision-making process and increase accuracy and transparency in resource management. Given the importance of the plantation sector's role in the Indonesian economy, the effective use of digital communication is an unavoidable need.

Research Methods

This study uses a qualitative descriptive approach to analyze the role of digital communication in improving the efficiency of plantation management. Qualitative research is research that intends to understand the phenomenon of what the research subject experiences such as behavior, perception, motivation, action, etc., holistically, and by way of description in the form of words and language, in a context (Moelong 2007). The qualitative descriptive method was chosen because this study aims to describe and understand the phenomena that occur in plantation management, especially related to the use of digital communication technology in its operations.

Results

1. Plantation Management Transformation through Digital Communication

Digital communication has brought a significant transformation in plantation management in Indonesia. Digital technologies, such as mobile applications, web-based systems, and cloud platforms, have become key tools in improving operational efficiency.

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Mobile App: Used by field workers to monitor crop status, soil moisture, and fertilization needs. Information obtained directly (real-time) allows for quick and measurable action. Web-Based System: Provides managers with access to production and field activity data, facilitating strategic decision-making based on accurate data. Cloud Platform: Used to store and share data securely, so that all stakeholders can access information at any time without geographical barriers. The use of this technology increases flexibility and speed in plantation management, resulting in a more efficient workflow.

2. Operational Efficiency

Digitalization has a significant impact on the efficiency of management in various aspects, including: Resource Management: Digital technology allows for more effective management of fertilizers, pesticides, and labor. Rapid Decision Making: Real-time data helps managers make more timely decisions. Reduced Operational Costs: Digital systems reduce the need for manual interaction and physical document management.

3. Stakeholder Collaboration and Integration

Digital communication facilitates coordination between various parties, such as managers, field workers, suppliers, and consumers. Effective Collaboration: Digital technology ensures all parties work with the same information, reducing miscommunication. Supply Chain Management: Information related to logistics and distribution can be monitored in real-time, reducing delays and improving the efficiency of resource use.

4. Challenges in Implementation

Despite the many benefits obtained, the implementation of digital communication faces several challenges: Technology Adoption by Workers: The low level of digital literacy among field workers is a major obstacle. Infrastructure Limitations: Uneven internet networks in plantation areas hinder the maximum application of technology. Technology Training and Education: The lack of intensive training for workers makes implementation go slowly.

5. Environmental Sustainability

The use of digital communication also supports environmental sustainability by: Chemical Monitoring: The use of chemicals such as fertilizers and pesticides becomes more controlled, reducing the risk of environmental pollution. Resource Use Efficiency: Accurate data helps managers in planning the use of natural resources wisely.

DISCUSSIONS

Digital Transformation in Plantations

This research confirms that digital communication has brought about a major transformation in the plantation sector, in line with the findings of Henderlan (2024), which states that sensor technology allows accurate measurements of various important parameters

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such as soil moisture, air temperature, soil nutrient density, and even plant health by using sensors that are installed directly in the field or plants. Monitoring the data obtained from this technology allows farmers to make more precise and faster decisions, such as efficient irrigation arrangements, fertilization as needed, or timely pest handling.

Operational Efficiency and Productivity

Digital communication technology allows for increased efficiency at various levels of plantation management. For example, a web-based application used to monitor oil palm plantations. This increase in efficiency also includes aspects of supply chain management. Real-time traceable information allows for logistics optimization, so that raw materials or crops can be delivered on time.

Collaboration and Connectivity

Digital communication allows for better coordination between the various parties involved in plantation management. This creates more effective collaboration.
However, to ensure that collaboration runs smoothly, the system used must be acceptable to all parties. Therefore, in addition to the technical aspects, the success of implementation depends on human readiness, including training to improve workers' digital literacy.

Challenges and Solutions

The implementation of digital communication in the plantation sector faces challenges that cannot be ignored, especially related to: Technology Readiness: Uneven digital infrastructure in many rural areas requires serious attention. Governments and the private sector need to invest in the development of internet infrastructure in remote areas. Human Resource Readiness: Digital literacy of field workers is a major obstacle. Ongoing training and education are needed to ensure workers are able to adapt to new technologies. Worker Motivation: In addition to technical training, it is important to increase worker motivation in adopting technology through incentives or reward programs. As explained by Syafitri (2024), digital transformation is important for every private sector and government sector that is highly dependent on systems, ICT, strategies, and human resources.

Environmental Impact

The use of digital communication also supports environmental sustainability by minimizing the excessive use of chemicals. Real-time data allows for better monitoring of environmental impacts, so that management can take preventive measures to reduce the risk of pollution.

This is in line with the findings of Rachmawati (2020), namely becoming a millennial farmer who implements smart farming is 1) farmers who are proficient in digital technology (digital farmers), 2) on-farm activities are capital-intensive activities with technology and innovation, 3) innovation-based processing (agroindustry) to increase the competitiveness

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and added value of agricultural products, and 4) marketing is more efficient by utilizing digital-based technology.

Implications for Policy

The results of this study show the need for policies that support digital transformation in the plantation sector, including: Improving Digital Infrastructure: The government must work with internet service providers to expand the reach of digital infrastructure to remote areas. Continuing Training Program: Intensive training for field workers to improve digital literacy. Technology Adoption Incentives: Provide incentives to plantation owners who effectively implement digital technologies.

Case Study of the Application of Technology in Oil Palm Plantations

As a concrete example, Innovation by Indrabayu (2024) shows that the use of SMART DRONE allows for more efficient surveillance on plantation land, improving the identification of problems in cocoa plants quickly and accurately. With intelligent drones connected to computer vision systems, monitoring plant conditions can be carried out in more detail and effectively. However, the success of this implementation requires the support of a strong digital infrastructure and a commitment from all parties to adopt new technologies.

CONCLUSION

The conclusion of this study emphasizes the importance of digital communication in improving the efficiency of plantation management in Indonesia, which is a strategic sector in the national economy. Digital transformation through technologies such as mobile applications, web-based systems, and cloud platforms has brought significant changes in plantation operations. This technology enables real-time data management, improves accuracy in decision-making, and facilitates coordination between stakeholders such as managers, field workers, suppliers, and consumers.

In the operational aspect, digital communication helps optimize resources, including the use of fertilizers, pesticides, and labor. With accurate data, managers can design more efficient strategies, reduce operational costs, and increase productivity. In addition, digital integration in the supply chain allows for real-time monitoring of logistics, reducing delays, and ensuring the smooth distribution of raw materials and crops.

The success of digital communication also lies in closer collaboration between various parties. This technology ensures everyone works with the same information, reduces the potential for miscommunication, and creates synergies to achieve sustainability and efficiency. An example of the application of this technology can be seen in oil palm plantations, where web-based systems allow for more effective and scalable management of agricultural inputs.

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However, the implementation of digital communication is not separated from challenges. The low level of digital literacy among field workers and the limitation of internet infrastructure in remote areas are the main obstacles. In addition, the readiness of human resources and worker motivation also affect the success of technology adoption. Therefore, the development of digital infrastructure and continuous training are essential to overcome these obstacles. Incentives are also needed to encourage the adoption of technology by plantation owners.

On the other hand, digital communication supports environmental sustainability by monitoring the use of chemicals such as fertilizers and pesticides in a more controlled manner, so that the risk of pollution can be minimized. By utilizing data efficiently, plantation management can plan for more prudent use of natural resources, supporting sustainability and productivity.

In conclusion, digital transformation is an urgent need in plantation management in Indonesia. Government policy support, infrastructure development, and increasing workers' digital literacy are the keys to the successful implementation of digital communication in this sector.

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