



Research Paper

An Integrated Platform Innovation in the Sustainable Agribusiness Ecosystem (Case Study: Tani Link as a Knowledge-Based Communication Media)

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Abstract

The research aims to analyze the Tani Link platform as a communication media innovation that contributes to a sustainable agribusiness ecosystem. Additionally, it explores how science communication, such as communication media innovation, can strengthen sustainable agribusiness practices. The approach employed in this study was a case study by analyzing the concept and implementation of the Tani Link platform of the digital ecosystem in sustainable agribusiness. Primary data collection was conducted through interviews with three informants, such as the Director of Tani Link, the Tani Link Information Technology Manager, and the beneficiaries of the Tanilink TV broadcast. In addition, the collection of secondary data was performed through document studies on the Tani Link integrated platform (application, website, and YouTube channel @TanilinkTV). The results of the study indicate that Tani Link was an integrated and knowledge-based platform for building a sustainable agribusiness ecosystem transparently, comprehensively, and democratically. Additionally, the research provided empirical insights into the integration of communication media, technology, and information systems to support sustainable agribusiness, economically, socially, and environmentally.

Keywords

Tani Link; integrated platform; media; science communication; sustainable agribusiness

1. INTRODUCTION

According to the Brundtland Report, sustainable development is conceptually an effort to achieve a better life in the present without sacrificing the needs of future generations (Crowther and Aras, 2008). The concept is based on anticipatory thinking to prevent the depletion of existing natural resources because of development that solely pursues economic growth. Therefore, sustainable development has now become a new paradigm that synergizes economic, social, and environmental aspects (Suparmoko, 2020). Integration of economic, social, and environmental aspects in planning and managing sustainable development is significant to achieve ecological integrity (Jabareen, 2008).

Some efforts to achieve sustainable development goals should be continuously developed and improved by actors through sustainability communication. Sustainability communication will serve as a means to provide understanding, persuasion, and campaigning for various aspects of sustainable development so that the public can participate in development programs (Godemann, 2011). Sustainability communication can also maintain the principles of sustainable development, provided that interested elements have an equal and fair position in the development

process (Arifin and Ardhiyansyah, 2020).

Sustainability communication can integrate various approaches to improve community well-being and its relationship with the environment. These approaches include environmental communication, risk communication, and science communication. Environmental communication is an attempt to increase public sensitivity to environmental signals, enabling them to act in ways that are relevant to human well-being and the natural environment (Godemann, 2011). Risk communication is an approach in sustainability communication that presents information, provides persuasion, and delivers messages strategically for mitigation purposes for communities affected by a development project (Godemann, 2011). In contrary, science communication contributes to the process of communicating scientific and technological knowledge to the community to achieve a better life (Godemann, 2011).

In detail, one of the strategic issues in sustainable development is how to respond to the challenges of sustainable agribusiness development in the digital age. Davis and Goldberg, as cited by Rodriguez-Orozco, defined agribusiness as any actions, activities, and processes involved, from agricultural supply chains and on-farm production pro-

cesses to the storage, processing, and distribution of agricultural products (Rodríguez-Orozco et al., 2021). Meanwhile, advances in information and communication technology (ICT) should be utilized for agribusiness development in Indonesia. Erlinnawati and Purwanto argued that effective integration between ICT and the agribusiness sector can lead to sustainable agriculture (Erlinnawati and Purwanto, 2024).

Sustainable agribusiness can be understood as a green agribusiness that can increase the consumption of agricultural products based on environmental and technological concerns, and efforts to maintain stable production through the empowerment of nature, livestock, and humans (Efendi, 2016). In terms of the concern of technological development for sustainable agribusiness development, ICT can accelerate farmers' access to relevant agricultural information. It can also increase productivity and economic efficiency (Erlinnawati and Purwanto, 2024).

Technology in agribusiness encompasses the production process and marketing, with key characteristics of databases, connectivity, automation, and integration (Gangwar and Jadoun, 2023; Leitão et al., 2024). The utilization of this technology requires attention to both technical and human resource aspects. This development is expected to encourage sustainable agribusiness with precise systems and data-driven decision-making. Ultimately, this innovation aims to increase global competitiveness and sustainable economic growth.

In the production process, technology can provide data, such as humidity, light intensity, temperature, pH, and soil texture. This data can be used to accurately determine plant nutrient requirements. In doing so, available resources can be optimally utilized according to needs and can reduce unnecessary costs by eliminating wasted resources. Furthermore, this effort is a sustainable measure that supports precision and green agriculture (Brewster et al., 2019; Dadi et al., 2021; Gangwar and Jadoun, 2023). In addition, the usage of technology in the production process also opens up opportunities to increase crop yields through real-time monitoring systems. These systems enable farmers to detect problems early, such as rapid weather changes and pests or disease attacks, so that preventive measures or treatment can be implemented promptly.

Technological developments allow the automatic collection and processing of agricultural data (Brewster et al., 2019; Dadi et al., 2021; Gangwar and Jadoun, 2023). The collected data is more precise thanks to the use of measurable sensors. Data processing is performed using automated computing, resulting in calculations with minimal human error. Farmers can cultivate larger areas of land quickly with limited manpower. Furthermore, the agricultural system can operate flexibly. Farmers are no longer required to be physically present on the farm, as technology enables automated remote control.

In addition to data-driven and automated production,

connectivity is a crucial aspect. This connectivity enables synchronization between systems because the interconnected data and collaboration between parties are essential (Dadi et al., 2021; Gangwar and Jadoun, 2023). Every automated data collection system is interconnected. A connected data processing system ensures proper synchronization between these systems, where each piece of data influences the other. This synchronization allows for rapid adjustments. Furthermore, this process ensures that the elements of production remain well-coordinated. Beyond system connectivity, technology-based agriculture also offers opportunities for collaboration between agricultural actors. Sharing information, farmers can build a mutually supportive data network. In this context, agriculture is viewed not only as an individual activity but also as a social activity, where the mutual need between farmers is crucial (Genova et al., 2020; Lin et al., 2021; Wedajo and Jilito, 2020). This collaboration can include sharing best practices, market data, and risk mitigation strategies based on shared experiences.

The automated and data-based connected production system integrates data in the production, storage, and marketing processes to form an integrated data (Brewster et al., 2019; Gangwar and Jadoun, 2023). Optimizing integrated data not only increases production but also allows for harvest control, allowing storage to be tailored to market needs. Meanwhile, agricultural yield data can also be accessed in real time by the market, enabling the distribution of agricultural products to consumers.

The integration of technology in agribusiness is strengthened by the presence of agribusiness finance technology (agri-fin-tech), such as technology-based financial service innovations designed specifically for the agricultural sector (Aziz et al., 2024). Agri-fintech provides access to microfinance, data-driven crop insurance, and a platform for buying and selling agricultural products, inputs, and services. This technology not only supports smallholder farmers in obtaining financial support and protection against risks such as crop failure, but also provides access to broader markets, enabling them to increase productivity and expand their distribution networks.

Today's challenges in developing digital platforms are how to overcome the lack of management commitment, human resource capacity, inadequate infrastructure, high operational costs, and socio-cultural barriers (Erlinnawati and Purwanto, 2024). Specifically, three studies conducted in low-income, developing, and developed countries found that the biggest challenge lies in supporting information technology infrastructure. Information technology infrastructure can be defined as a shared technological resource that provides a platform for information system applications. IT infrastructure consists of investments in hardware, software, and services such as consulting, education, and training (Laudon and Laudon, 2007).

Saidu et al. set forth several challenges in implement-

ing ICT in the agribusiness sector in developing countries, namely inadequate ICT facilities and infrastructure, lack of resources, and electricity supply (Saidu et al., 2017). Meanwhile, the research by Ahsan et al. argued that in terms of the barriers, challenges, and requirements for the usage of ICT towards sustainable agribusiness in Bangladesh, mobile devices, internet connectivity, advanced ICT applications, and farmer databases are the most important supports needed for SAAO (sub-assistant agricultural officers) skills-based extension activities (Ahsan et al., 2022). In an advanced country in the agribusiness sector, such as China, ICT infrastructure also poses challenges. China is progressing in agribusiness development, for example, through structural reforms on the agribusiness supply side, breakthroughs in rural reform, progress in urban-rural integration, improvements in rural public services, and social initiatives. Furthermore, there has been progress in poverty alleviation and agricultural trade. Therefore, China has been able to address the challenges of ICT implementation in agribusiness and rural areas by strengthening internet infrastructure, improving information services, and rapidly implementing big data technology (Qu et al., 2018).

This research uses the Tani Link platform in Indonesia as a case study. The Tani Link was chosen because it offered an integrated platform, such as an Android-based application, a website, and a YouTube channel. Furthermore, the Tani Link is affiliated with Business Watch Indonesia, a media organization focused on sustainability, agriculture, and the environment. Several digital platforms focused on agriculture and business issues exist in Indonesia, such as TaniHub, Agromaret, Eratani, and others. However, these applications mostly focus on the marketing and business aspects of agriculture. The uniqueness of the Tani Link platform is its integration of several integrated and knowledge-based media platforms.

The research of Delima et al. showed that the challenges in adopting information technology in the agribusiness sector in Indonesia are the readiness of human resources and technological infrastructure (Delima et al., 2016). Taking the case study of Tani Link, the researchers aim to explain how the integrated platform innovation of Tani Link can serve as a communication medium for sustainable agribusiness, and highlight how this innovation has had a positive impact on platform users and its challenges. The results of this study are expected to complement the empirical insights into the phenomenon of digital platform implementation in agribusiness in Indonesia from previous studies that focused on the context of developing countries in Africa (Saidu et al., 2017), poor countries (Bangladesh) (Ahsan et al., 2022), and developed countries (China) (Qu et al., 2018). Theoretically, the researchers aim to explain to what extent Tani Link contributes as a medium of science communication to deliver scientific and technological knowledge to the public to achieve sustainable development goals in the agribusiness sector.

2. METHOD

The research employed a case study method. This method was an empirical way to examine contemporary reality in a real-life context (Yin, 2003). A case study assisted the researchers in gaining an in-depth understanding of a phenomenon without having to separate the phenomenon and its context (Baxter and Jack, 2015). The measures taken in the research using a case study were to define and limit the case, data collection, and data analysis (Carter, 2020).

The case study analyzed was Tani Link, an integrated platform for innovative communication media within the sustainable agribusiness ecosystem. Primary data collection involved in-depth interviews with three informants, such as two persons from Business Watch Indonesia, the platform's developers. The first informant was the Director of Tani Link, and the second was Tani Link's Information Technology (IT) manager. The third interview, conducted as a triangulation tool, was conducted with beneficiaries of Tanilink TV's broadcast.

The interview phase included guideline development, implementation, and probing. Probing included the initial platform concept, future projections for Tani Link development, previous evaluations of Tani Link, and the consequences of the transformation from the original Si Tani platform to the new Tani Link platform, such as farmers' ability to use the new application, literacy level, and user data security. Secondary data was also collected through the application, website, and Youtube channel @TanilinkTV. The first interview was conducted online with the Director of Tani Link. Probing interviews were conducted offline with the Director of Tani Link and the IT manager, and triangulation interviews were conducted offline with the operational manager of Telaga Nursery, a beneficiary of Tanilink TV coverage. Each interview lasted approximately two hours.

After the data were collected, analysis was conducted through the stages of transcription, manual coding, thematic categorization, analysis, and interpretation. This research employed descriptive and intrinsic analysis techniques. Descriptive case studies aimed to provide a detailed description of a particular phenomenon within a real-life context (Carter, 2020). In this context, a descriptive case study was used to further illustrate the innovation of Tani Link's communication media technology in supporting a sustainable agribusiness ecosystem. Meanwhile, the intrinsic nature of data analysis lies in its focus, such as the unique and specific nature of Tani Link. Tani Link is unique because it seeks to connect producers, distributors, suppliers, buyers, and the financial sector in a single platform. Tani Link was also unique for its diverse features, including information sharing, product marketing, proper post-harvest handling, Q&A, the latest agricultural information, agricultural business analysis, and financial management.

3. RESULTS AND DISCUSSION

3.1 Results

3.1.1 Description of Business Watch Indonesia (BWI)

BWI is a non-profit organization founded in 2002 in Solo, Central Java. The organization collaborates with national and international donor agencies for research and advocacy activities in various fields, focusing on sustainability. In addition, BWI provides mentoring for young people and women, such as mentoring female farmers to become entrepreneurs. BWI also established PT Kertabumi as a corporate unit that implements sustainable agribusiness practices in accordance with BWI programs (Widyastuti et al., 2025). Additionally, BWI is a holding organization establishing the Tani Link platform.

In the nutritional improvement sector, BWI has a program to raise farmers' awareness of the importance of nutrition. Then, in the sustainable commodities sector, BWI motivates and facilitates farmers in developing sustainable commodities. Furthermore, in the youth and gender empowerment sector, BWI provides opportunities for young people to participate in sustainable development. Meanwhile, in the sector of climate change mitigation and adaptation efforts, BWI builds adaptation and mitigation programs to mitigate the impacts of climate change. Accordingly, in the sustainable landscapes sector, BWI strives to realize a sustainable landscape program. Meanwhile, in the CSR sector, BWI monitors and encourages the formation of laws on the positive implementation of CSR impact (Business Watch Indonesia, 2017).

The program in various sectors is directed towards BWI's vision, such as to introduce a new perspective on democratic economic governance, with the mission of building accountability of business power and encouraging the realization of ethical business (Business Watch Indonesia, 2017; Wulandari, 2019). Democratic business is an economic endeavor that prioritizes the well-being of farmers. This well-being will be achieved if farmers can connect directly with consumers through a marketing process without intermediaries, thus creating an ethical business (Wulandari, 2019).

These programs cover several sectors, including tea, soybeans, palm oil, and forestry. In the tea sector, the Lestari Program was launched and implemented in 2007 through Lestari certification, facilitating Indonesian tea producers in addressing the challenges of climate change and quality and quantity issues by building a sustainable system based on principles of increasing tea productivity, considering social and environmental aspects. BWI is one of the actors initiating sustainability initiatives in the Indonesian tea sector (Maria and Chattopadhyay, 2015).

In the soybean sector, BWI, together with the Central Java Agriculture and Horticulture Office and other stakeholders, formulated a guideline document for soybean sector development in Central Java. In this sector, BWI also

developed demonstration plots in Wonogiri, Boyolali, and Klaten as a learning tool for farmers. Furthermore, in the palm oil sector, BWI collaborated with PT. Perkebunan Nusantara III provides support for a sustainable palm oil industry development program. This program focuses on improving farmers' skills and knowledge about the importance of implementing sustainability principles, strengthening farmer associations, and promoting good agricultural practices.

Furthermore, in the forestry sector, BWI develops a program raising public awareness of land conservation. This program, located in the Mount Merapi area, involves the community, village government, government agencies, and other stakeholders. In this program, BWI conserves native vegetation in Mount Merapi National Park and plants woody plants. These activities are accompanied by socialization of responsible behavior, strengthening group management for environmental and water conservation, and piloting low-carbon agriculture (Business Watch Indonesia, 2017).

Evaluation of these programs is conducted internally at BWI using Key Performance Indicators (KPIs). Each program has a specific annual target, which is measured by KPIs. Tani Link is also evaluated in internal meetings to determine the extent to which targets have been achieved. For example, the KPI for the app was installed by 100,000 users in 2025. Currently, it has reached over 100,000 users.

The existence of Tani Link is essential to support BWI's programs. For example, in the tea sector. This sector was the initial focus of the Tani Link platform, as BWI has a partnership with tea farmers. Tea farmers' products, such as tea and other processed agricultural products, are promoted through Tani Link.

3.1.2 Description of Tani Link Integrated Platform

Tani Link is essentially a media platform designed for the agribusiness community, providing agricultural information and features for marketing agricultural products, with the overarching tagline of "agribusiness community." Particularly, Tani Link is an integrated platform comprising an application, website, and social media platforms.

Tani Link was launched in 2018 as an Android-based application. Previously known as SiTani, the platform was developed into Tani Link. This development was a response to the need for modernization in the agricultural sector, particularly through grants received by the Indonesian Institute of Agricultural Technology (BWI) to support the Indonesian Sustainable Tea Industry Program and the Sustainable Landscape Program in Central Java. The key focus of SiTani was initially as a database of farmers, including information on their names, addresses, and maps of their managed land (Pratama, 2022). Figure 1 is a snapshot of SiTani before its transformation into Tani Link.

This database is not only useful for mapping the distribution of farmers and the land they cultivate, but also

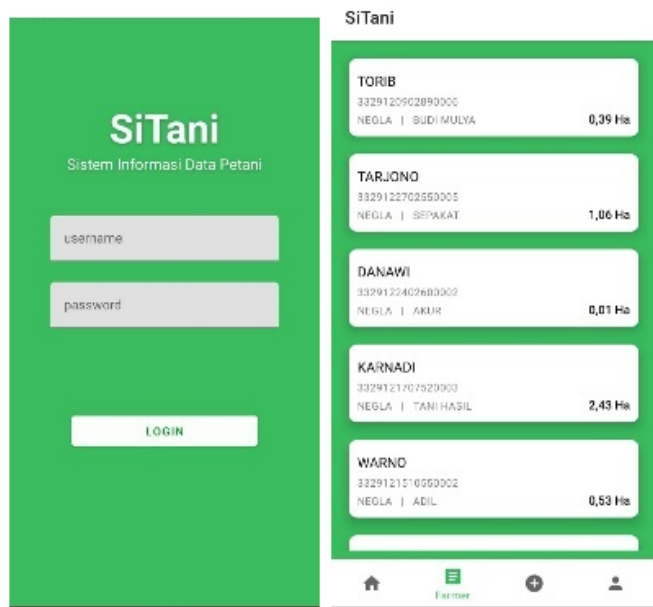


Figure 1. A Snapshot of SiTani before transforming into Tani Link (Pratama, 2022)

serves as the first step in integrating technology into agricultural information systems management. In the subsequent developments, SiTani is increasingly equipped with additional features to meet farmers' needs for up-to-date information and capacity building in agricultural business management. Furthermore, SiTani implements more inclusive technology by facilitating communication between farming communities. Some features of SiTani are fundamentally aimed at increasing the efficiency and productivity of agricultural businesses and promoting the importance of data management in decision-making.

The transformation of SiTani into Tani Link marks a significant step towards a comprehensive digital ecosystem. Previously, SiTani was primarily a database service for farmers. After development, Tani Link expanded its services beyond farmers to reach the wider community involved in the agribusiness sector. This platform has become an integrated platform with the mission of serving as a hub for knowledge and information sharing related to agriculture. This is similar to the initial concept of the Tani Link platform: knowledge-based tools.

Tani Link's new platforms consist of three media, such as (<https://app.tanilink.com/>) application, (<https://tanilink.com/>) website, and the Youtube channel of @Tanilink TV.

Tani Link – Android-based digital application

The Tani Link app is an Android-based digital application platform designed to connect farmers, buyers, and other stakeholders in a single platform. In a more modern form, Tani Link integrates various features such as Agri Group,

Agri Plaza, News & Articles, Q&A, Financial Management, and Agricultural Business Analysis. These features not only offer practical solutions for farmers but also provide strategic insights to support sustainable agricultural businesses. From this app, users can search for agricultural information, including planting season information, commodity price updates, agricultural management, and marketed products (Widyastuti et al., 2025).

Figure 2 is a snapshot of the Tani Link application in Android.

Tani Link website (<https://tanilink.com/>)

The Tani Link website is essentially a medium that functions to support and complement the Android-based, mobile Tani Link application for those using laptops or personal computers. As a complement, the Tani Link website contains a comprehensive menu, including products, product offerings, partnerships, a blog, questions and answers, and a business directory. Furthermore, the website's initial appearance provides information about the platform's benefits, which can provide information on various agricultural products and tools, and enable direct trade between farmers and buyers through a sustainable platform. (<https://tanilink.com/>).

The website shows that Tani Link has partnered with 240 assisted villages, 40,000 farmers, 15,000 hectares of land, and 700 Micro, Small, and Medium Enterprises (MSMEs) to market its products. This partnership was established in 2018. The website also supports the application through a blog that provides news, articles, and business inspiration. As a form of support for the application, the Tani Link website also provides information on the benefits of building a partnership through Tani Link. Partnerships with Tani Link will maximize profit potential through data and technology. Furthermore, partnerships with Tani Link also provide businesses with the advantage of obtaining products at competitive prices. Products offered include agriculture and plantations, horticulture, fertilizers and agricultural inputs, as well as livestock and fisheries (<https://tanilink.com/>).

Meanwhile, the business directory section states that Tani Link is a platform that connects various parties in the agribusiness ecosystem—producers, distributors, suppliers, buyers, the financial sector, and agricultural stakeholders—to collaborate and cooperate. This will open up new opportunities for marketing products through broader market reach, competitive pricing, and guaranteed supply for buyers (<https://tanilink.com/>).

Figure 3 is a snapshot of the Tani Link website.

Tani Link TV (YouTube Channel: @Tanilink TV)

Tani Link TV, through its YouTube channel @TanilinkTV, is a digital information platform that supports the app due to its inability to present information in video format. This channel contains various cultivation and agribusiness information. In addition to providing information, Tani

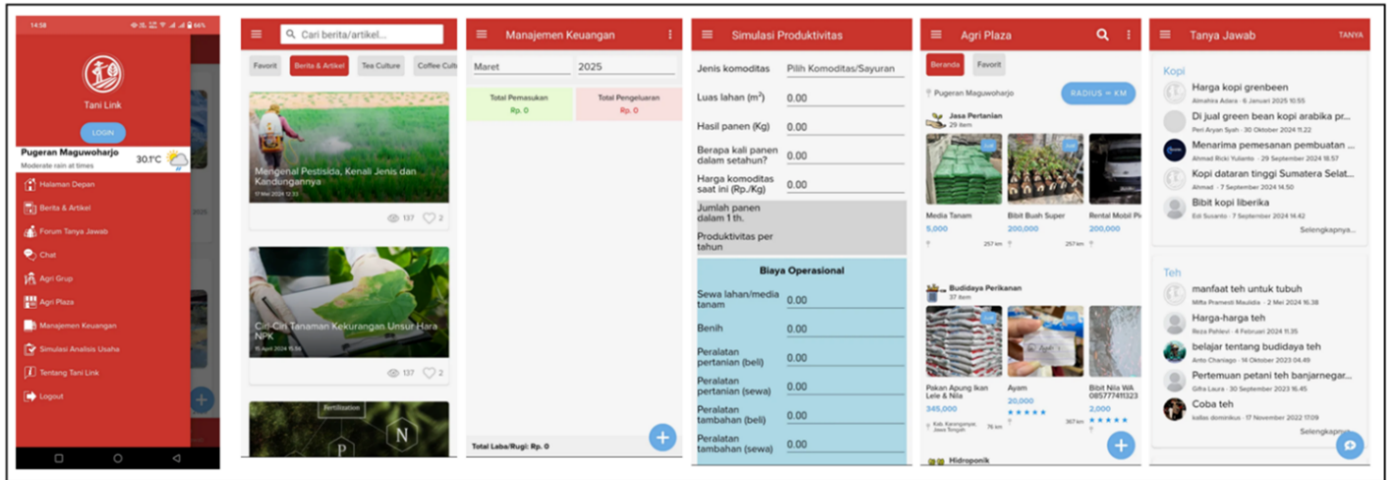


Figure 2. A Snapshot of the Tani Link Application in Android



Figure 3. A Snapshot of Tani Link in tanilink.com

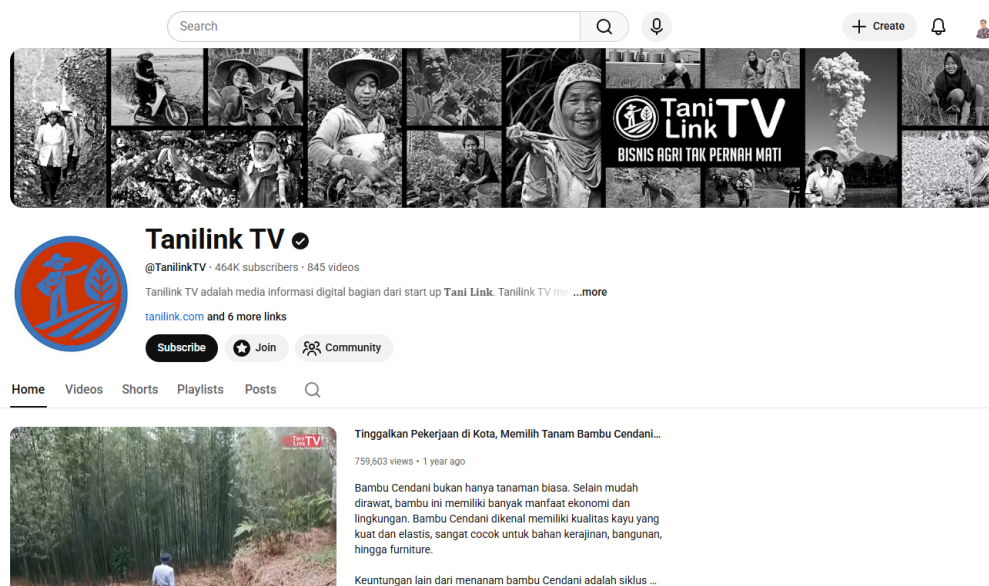


Figure 4. A Snapshot of Tanilink TV (Youtube channel)

Link TV also serves as an educational platform for farmers on good agricultural practices, with a channel page consisting of a homepage, videos, shorts, playlists, and posts (<https://www.youtube.com/@TanilinkTV>).

Figure 4 is a snapshot of YouTube channel: @Tanilink TV.

3.2 Discussion

3.2.1 Tani Link as Communication Media Innovation of Sustainable Agriculture in the Agribusiness Ecosystem

Tani Link in the Context of Sustainable Agribusiness

Substantially, Tani Link was a digital platform based on a commitment to sustainability in the agricultural sector, supporting green farming and increasing the consumption of agricultural products. Interviews with BWI revealed that Tani Link aimed to empower farmers through a technological approach that promotes fairness and sustainability. Therefore, Tani Link was not simply a marketplace or an application that connected farmers and buyers; rather, it was an integrated platform for creating a sustainable agribusiness ecosystem.

In the context of sustainable agribusiness, Tani Link intended to contribute to reducing crop waste due to inefficient distribution. The efficient supply chain built connects producers, distributors, and buyers within a digital ecosystem through the Agriplaza feature. Furthermore, GAP (Good Agriculture Practices) and GHP (Good Handling Practices), the unique features of Tani Link, were expected to reduce crop waste due to poor post-harvest handling. Furthermore, it could also reduce the risk of food surplus and waste through a more accurate market demand mapping system, allowing for more precise distribution of crops.

Additionally, Tani Link, with its Agriplaza feature, was targeted to empower farmers and promote economic sustainability through a fairer trading system with broader access to markets without harmful intermediaries. Furthermore, to provide access to agricultural information, the Latest Agricultural Information feature, containing news, agricultural articles, weather forecasts, and commodity price information, was available. Tani Link also built a discussion community that helped farmers to implement more efficient agricultural practices through a Question-and-Answer Space. Through this space, farmers were educated on sustainable agricultural practices by implementing sustainable farming methods, such as the utilization of organic fertilizers, water-efficient irrigation techniques, and crop diversification to maintain ecosystem balance, as well as the latest insights regarding sustainability trends. Thus, farmers not only increased their harvests but also maintained environmental sustainability.

Tani Link's contribution target in the sustainable agribusiness and related features can be seen in the Table 1.

Tani Link's biggest challenge was its impact on community economic growth, development, and its relationship to ecological aspects. While conducting this research, Tani Link could only calculate growth based on data stored in the platform system, such as the farmer database and registered users. Measuring the impact on community economic growth and its relationship to ecological aspects remained a challenging task. Nevertheless, considerable feedback was received from platform users through personal reviews, stories, and information provided through various channels, such as comments, reviews, personal contacts, WhatsApp chats, and meetings with assisted farmer circles.

Though the measurement of economic and ecological impacts was still in its early stages, the presence of Tani Link by BWI was seen as having provided benefits for farmers and agribusiness actors. Informants from Telaga Nursery, as a beneficiary of the platform, stated that the coverage by Tani Link TV on the Itoh Super longan nursery, broadcast on the @Tanilink TV Youtube channel, had a positive impact, such as increasing market accessibility and increasing recognition among large growers. Within a month, the YouTube channel that broadcast the coverage was viewed by almost 1 million people. In addition, hundreds of beneficiaries were contacted daily to order seedlings and ask for assistance. Previously, Telaga Nursery in its marketing used conventional media, such as print media and appearing on the @Tanilink TV YouTube channel. Informants had succeeded in becoming increasingly popular through social media. BWI had beneficiaries of more than 200 thousand farmer families in West Java, Central Java, and Lampung for 22 years (2002-2024) (Widyastuti et al., 2025).

In terms of empowerment and knowledge dissemination with digital platforms, limitations were found due to low digital literacy among farmer users in rural areas, so they could not access information and insights about agriculture provided by Tani Link. Similarly, it was in line with the research results by Rachmatsyah, arguing that one of the main obstacles to technology-based empowerment programs was the low level of digital literacy (Rachmatsyah, 2025). By considering the limited human resources in using digital platforms, such as the Tani Link application, BWI provided support services through WhatsApp media channels and meetings with assisted farmer circles by the farmer community.

Contribution of Tani Link to Agribusiness Technology Development

Agriculture played a vital role in the economy, but the sector still dealt with various challenges that often resulted in suboptimal yields. These optimization challenges were primarily due to farmers' limited access to information on the latest agricultural technologies, the availability of production factors such as seeds and fertilizers, and market price fluctuations (Aflah et al., 2023).

Moreover, these various limitations had traditionally

Table 1. Tani Link's Contribution Target in the Sustainable Agribusiness and Related Features

No.	Features	Contribution to Sustainable Agribusiness
1.	Agriplaza	<ul style="list-style-type: none"> • Reducing crop waste • Developing supply chain efficiency • Creating a fairer trading system
2.	GAP & GHP	<ul style="list-style-type: none"> • Measuring good agricultural practices • Reducing crop waste • Reducing the risk of food surplus and waste
3.	Updated Agriculture Information	<ul style="list-style-type: none"> • Providing news, agricultural articles, weather forecasts, and commodity price information
4.	Question-and-Answer Space	<ul style="list-style-type: none"> • Educating farmers on sustainable agricultural practices to increase yields and preserve the environment • Establishing communities' discussions that help farmers implement more efficient agricultural practices

Source: Primary data, Tani Link application (<https://app.tanilink.com/>), Tani Link website (<https://tanilink.com/>)

been addressed through the presence of middlemen (brokers). In the agricultural system, middlemen played a role from the production process to marketing (distribution) (Aflah et al., 2023; Patel and Shrimali, 2023; Widuri and Noviyanti, 2024). At the production level, middlemen provided agricultural inputs, such as fertilizer and seeds, and directed farmers to plant according to market needs. In addition, middlemen also procured assistance, such as capital to farmers, based on estimated harvest yields as collateral. This system made it easier for farmers to obtain capital, although it was often accompanied by less transparent calculations. Capital could be loans, for which the maximum amount was based on the middleman's estimate of the harvest yield. Capital could also be a sum of money that would be deducted from the harvest at a later date ('ijon' system). During the harvest season, middlemen also played an important role in distribution and marketing by purchasing farmers' crops to resell in the wider market at a significant profit. This was important for farmers to ensure that their crops could be sold before they rotted. The role of middlemen was central to accommodating these harvests.

From the description above, the middlemen clearly had an important role in agribusiness. This condition could lead to farmers' dependence on middlemen, which could cause several negative impacts, such as excessive intermediaries, lack of transparency and traceability, and price manipulation due to lack of transparency (Aflah et al., 2023; Patel and Shrimali, 2023). The large number of middlemen in delivering information often caused asymmetrical information to farmers. In addition, these middlemen were also related to the distribution of goods from farmers to consumers through several parties. This long distribution channel caused high costs, reduced farmers' profits, and often resulted in uncompetitive prices of agricultural products in the market.

Moreover, the lack of transparency in the distribution chain had a serious challenge. Weaknesses in traceability, or the ability to trace the origin and journey of agricultural products, led to various issues, such as excessive price markups by intermediaries. This situation was often exacerbated by the lack of credible sources of information for both farmers and consumers, resulting in less informed decisions in the production and marketing processes. Price manipulation was also a major challenge in the agricultural sector. Farmers' ignorance of market conditions—including consumer needs, price trends, and global market information—made them vulnerable to exploitation. In many cases, farmers lacked a strong bargaining position, forcing them to accept prices set by intermediaries, though these prices were often far below the true market value (Aflah et al., 2023; Patel and Shrimali, 2023).

Consequently, this situation highlighted the need for strategic steps to improve the distribution chain efficiency, strengthen transparency, and provide farmers with better access to information. Technological support, such as digital platforms and data-driven solutions, was a key to addressing these issues. The Tani Link application offered digital technology-based services to empower farmers through supply chain efficiency, enabling them to interact directly with consumers. Using this application could significantly increase farmer profits by reducing costs at each stage of distribution.

The Agri Plaza feature in the Tani Link application, functioned as a digital marketplace, could be used to connect farmers or producers directly with markets or end users. Equipped with this feature, Tani Link could cut down on the lengthy distribution channels, which had been a major cause of high distribution costs and low profits for farmers. This feature allowed farmers to market their crops directly without relying on middlemen or other interme-

diaries. Furthermore, it not only improved distribution efficiency but also provided farmers with the opportunity to obtain fairer prices, reduce excessive markups, and simultaneously strengthen their bargaining position in the market.

Due to the existence of Tani Link, farmers could leverage digital technology to overcome previously insurmountable obstacles and to expand their businesses. For example, the Agri Group feature enabled direct communication between farmers in various regions, while Agri Plaza served as a marketplace, opening up greater opportunities for marketing agricultural products. Tani Link provided financial management tools that helped farmers more efficiently record expenses and income. Further, the Agricultural Business Analysis feature allowed users to calculate costs, profits, and even the break-even point of their business. This demonstrated that Tani Link was not only a technology platform but also a key supporter in realizing more measurable and sustainable agriculture.

This transformation demonstrated that digitalization in the agricultural sector involved not only the application of technology but also a shift in culture and perspectives in agricultural management. Tani Link was expected to be a concrete example of how technology could be used to strengthen farmers' capabilities while supporting the sustainability of the agribusiness ecosystem. Having sustainable innovation and increased outreach, Tani Link would become a model for future agricultural sector development.

In detail, Tani Link increased transparency in agricultural transactions by providing real-time access to market price information for farmers and potential buyers. This transparency supported the creation of trust between sellers and buyers, which was the foundation of buying and selling activities. Furthermore, Tani Link also ensured product quality through a transparent system. Transparency in the production process was a key to building data-driven agriculture, not just in sales. It also provided transparency in the production process by sharing information related to agricultural inputs openly for public access. The clarity of information enabled farmers to make more informed decisions in the production and marketing processes. Having digital technology features, Tani Link could overcome challenges such as a lack of transparency, price manipulation, and ignorance of market conditions. This application also supported smallholder farmers who often struggled to access broader markets. It was hoped that this application would bring significant transformation to the agricultural sector, creating a more efficient, transparent, and sustainable ecosystem.

The transparency and access to information offered by Tani Link extended to various aspects, including easy interaction with agricultural experts such as academics, agribusiness practitioners, or agricultural consultants to obtain targeted solutions. This feature allowed users to ask specific questions according to their needs, whether

related to cultivation techniques, crop problem solutions, or harvest marketing strategies. Having direct access to experts, farmers could obtain fast and precise solutions to their problems through effective steps, without having to wait long or search for unverified information. This interaction also provided a platform for collaboration between academics and agribusiness practitioners to share knowledge and experience. Academics could provide research-based perspectives, while practitioners shared real-world experiences. This created a more dynamic and solution-oriented agricultural ecosystem. Through this feature, farmers not only received information but also were empowered with knowledge. Thus, they could implement more efficient and sustainable agricultural practices and were better prepared to face challenges in the agricultural sector.

In addition to discussion forums with experts, Tani Link also provided a space for farmers to collaborate through a question-and-answer feature. Users could share experiences and tips, and discuss agricultural innovations with the broader agribusiness community. Farmers could share personal experiences about the various challenges and solutions they encountered in the field. This collaboration created a more inclusive agribusiness ecosystem, where traditional knowledge and modern innovations could complement each other. Farmers could also share tips and tricks they had used to increase productivity and efficiency. This shared knowledge could become a valuable asset and be immediately applied by other farmers. The platform also opened up opportunities for farmers to discuss various agricultural innovations, including new technologies, superior seed types, and modern cultivation methods. These discussions helped farmers to stay up to date with developments in the agricultural sector and adopt innovations relevant to their local conditions.

The question-and-answer feature in Tani Link not only assisted in information sharing but also expanded the agribusiness community network. Connected with farmers from various regions, users could build mutually beneficial relationships, such as sharing markets, supporting joint marketing, or forming farmer groups to strengthen bargaining power. This collaboration between farmers could build solidarity in dealing with common challenges, such as climate change or fluctuating market prices. Supporting each other and sharing solutions, farmers could create more sustainable agricultural practices and improve the overall well-being of the community. This feature not only increased efficiency but also strengthened a sense of community among farmers.

Moreover, the question-and-answer feature, both between farmers and experts and among fellow farmers, was further enhanced through the app's integration with the @TanilinkTV YouTube channel. Through this platform, Tani Link presented informative content about agricultural innovations and cultivation techniques in video format. Displaying an interactive visual approach, TanilinkTV pro-

vided access to knowledge that could be accessed anytime, so it could expand the outreach of agricultural education to farmers in various regions. The content presented on TanilinkTV was not only informative but also inspiring. The success stories of farmers motivated others to continuously develop and try new approaches in cultivation and marketing. Furthermore, information about the potential of village agriculture could open insights into how to maximize local resources to create greater economic opportunities.

The Tanilink TV platform served not only as a business platform but also as a driving force for building a technology-based agricultural information ecosystem. This ecosystem aimed to empower farmers with relevant and applicable knowledge, ultimately assisting them in dealing with global challenges. Tani Link provided technology-based education, enabling farmers to adopt more efficient and green methods that supported long-term productivity while preserving the environment.

3.2.2 Innovation Forms in the Tani Link

The media is one element of communication. In sustainability communication, some theories have explained the media's contribution to sustainability efforts, specifically related to efforts to raise awareness of sustainable development. In today's digital era, where new media can disseminate information in various fields, new media can become an element that can strengthen the presence of traditional media. For example, in the agricultural development sector, face-to-face extension activities can be supported by agricultural education through new media, while traditional marketing can be strengthened through digital applications.

The details depicted that new media could transform the communication process, such as the ease of conveying information through new media, making the communication process more efficient. In sustainable agribusiness, new media then played a role as an element that could make the ecosystem run more effectively and efficiently.

Similarly, Tani Link, in terms of sustainable agribusiness, was an innovation that strengthened traditional media in the medialization process, such as the process of distributing and conveying information on sustainability topics, such as ecological and economic aspects that will affect agricultural practices. Scientific and technological knowledge was important to communicate to achieve community welfare by providing solutions to every challenge (Gode-mann, 2011). In the context of agricultural development, ICT innovation could address sustainability issues faced by communities in the agribusiness sector.

Additionally, Tani Link was constantly being developed to keep pace with advances in ICT (Information Technology), allowing BWI to continuously innovate within the digital ecosystem for sustainable agribusiness. For example, the Tani Link platform was a feature development of a previous application, the Farmer Data Information System (SiTani). The SiTani application was used to simplify data

management, but the challenge faced by SiTani was that farmer data collection was conducted manually, without tools to expedite the data collection process. It resulted in time-consuming farmer data collection. There were difficulties in inputting valid data and updating data. Therefore, it was necessary to develop an Android-based application that could improve the data collection system and become a more comprehensive agribusiness communication medium. Being a communication medium, Tani Link offered additional features to meet farmers' needs for the latest agricultural information and communication needs between farmers. It could be said that the features in Tani Link were essentially an effort to increase the efficiency and productivity of agricultural businesses, as well as to introduce the importance of data management in decision-making. Therefore, the key innovation contained in Tani Link was being a center for knowledge and sharing agricultural information.

In the future, the Tani Link platform would be further developed to leverage technological advancements, particularly artificial intelligence (AI), in the agricultural sector. It was because the utilization of artificial intelligence in developing Tani Link in the agricultural sector could significantly impact farmer efficiency and productivity. Having AI, the system could analyze weather data, cropping patterns, and soil conditions to provide more accurate harvest predictions, enabling farmers to better plan production and reduce the risk of crop failure.

In the research, interviews revealed information about the future direction of Tani Link's development. AI would be used to improve farmers' access to personalized agricultural information and services. Utilizing historical farmer data, the system could provide more specific recommendations regarding seed selection, fertilizer methods, or cultivation techniques best suited to their land conditions. Furthermore, an AI-based chatbot would be developed as a virtual assistant that could provide real-time answers to various agricultural issues. Therefore, farmers would no longer need to rely solely on extension workers. Tani Link could address the challenge of a lack of management commitment within the agribusiness ecosystem, for example, related to the presence of agricultural extension workers in farming communities. Sometimes, extension and mentoring for farmers was not optimal due to a shortage of extension workers (Widuri and Noviyanti, 2024).

However, BWI had several challenges due to the transformation from SiTani to Tani Link. First, the internet was inadequate for the usage of the new application in rural areas. Second, farmers had lack of ability to use email to register. Third, there was an issue of mobile device compatibility for installing the application. Tani Link management sought solutions to address these challenges. One strategy was to provide digital literacy to farmers. Training included installation instructions, assistance in user groups, and overcoming difficulties in using the application. Furthermore, BWI also employed the lowest Android standard to adapt

to the devices widely owned by potential users. However, it was not easy, considering that Google demanded the compatibility of the application with the latest features.

The Tani Link platform still relied on Google because the application was available on the Google Play Store (Widyastuti et al., 2025). Another challenge for Tani Link was making the platform scalable. Thus, it could grow according to business needs, yet was hampered by funding. Tani Link's existence was still supported by BWI programs. In the future, BWI would make several features into revenue-generating units, such as GAP (Good Agriculture Practice) and Agricultural Business Analysis, to finance Tani Link's development.

Nevertheless, Tani Link remained a unique and relevant integrated platform with sustainability. Tani Link served not only as a storefront but also as a knowledge-based platform for sustainable agribusiness. This differed from other agritech platforms, such as Agromaret and TaniHub, which were more marketplace oriented. It had to be noted that the marketplace provided by Tani Link did not offer a billing system; it served solely as a showcase for marketed products, allowing sellers and buyers to communicate and transact outside the system. Moreover, it was because Tani Link's focus was more on knowledge and tools to support sustainable agriculture; the transaction process was directed outside the platform; management complexity was avoided; and user data security was maintained.

4. CONCLUSION AND SUGGESTION

The Tani Link integrated platform is an innovative communication medium that provides information, knowledge, and tools for implementing agricultural practices through features that educate farmers on efficient, environmentally friendly, fair, inclusive, and democratic farming practices, as well as empower them to create an inclusive agribusiness ecosystem. Tani Link's media consists of an app, website, and YouTube channel.

In the context of sustainable agribusiness, Tani Link is targeted to contribute to reducing crop waste, supply chain efficiency, creating a fairer trading system, reducing the risk of surplus and food waste, providing agricultural news articles, weather forecasts, commodity price information, and providing education for farmers, as well as building a discussion community that can help farmers in implementing more efficient agriculture. The features available for this are Agriplaza, GAP & GHP, Latest Agricultural Information, and Question-and-Answer Space.

Currently, Tani Link deals with several challenges, such as (1) in the aspect of measuring economic and ecological impacts, (2) empowerment of platform-based farmers, (3) internet networks that have not been adequate for the utilization of applications in rural areas, (4) demands from Google to make applications compatible with the latest features, (5) funding for platforms that are supported by other

BWI programs. The strategy used by BWI to face these challenges is mentoring farmers with digital literacy, using the lowest Android standard, and creating the GAP and Agricultural Business Analysis features as income-generating units.

However, Tani Link has a unique and relevant positioning in sustainability, such as being knowledge-based and providing tools for implementing sustainable agricultural practices. Furthermore, Tani Link has a positive impact on program beneficiaries.

To address limitations in measuring economic and ecological impacts, it is recommended that the platform be further developed, such as the Green Calculator, a local platform that can assist businesses and MSMEs and monitor the green level of business activities. Meanwhile, Tani Link is recommended to shift to a more independent infrastructure with independent financing.

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