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Financial-Based Digital Technology Transformation Adapter to Increase the Sustainability of Agribusiness Farmers Sustainable Manner in Indonesia

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ABSTRACT: The importance of financial-based digital technology system transformation in the Agribusiness system to improve the welfare of farmers and entrepreneurs. It is hoped that this digital technology system can be more advanced and sustainable, especially with the Agrofarmers logo, and needs to be implemented sustainably to empower the use of digital technology. The method used in this research is a symmetric descriptive qualitative method with a digital financial information technology system approach that is relevant for farmers and agribusiness entrepreneurs in Indonesia. The contribution of this research is to increase the knowledge and skills of farmers in managing agribusiness by using relevant information technology facilities in their daily business transactions efficiently and effectively. This research is limited to discussing financial-based digital technology transformation to increase the productivity of superior agribusiness farmers in West Java Province in Indonesia in a sustainable manner. The benefits of research for farmers in particular are expected to increase their capacity to use digital technology tools. Financially based and well networked, efficient, effective, good, and correct, so that in the future it is hoped that the productivity of their agricultural products and agribusiness results can increase optimally, maximally, and sustainably. The expected results are that farmers, in particular, and agribusiness entrepreneurs can understand technological transformation.

Keywords: Transparency, Digital Technology, Agrobusiness, Farmers, Sustainability.

INTRODUCTION

Agricultural functions as aprovide roffood, and bioenergy. Seeing the enormous potential for development of the agribusiness sector in Indonesia, basic knowledge regarding transparency regarding the use of digital technology to the maximum is needed to improve farmers' ability to manage their business well, efficiently, effectively, and optimally. The activity of farmers is inseparable from the process of all financial transactions, especially in carrying out activities in the agricultural business sector for processing goods, purchasing materials, and processing agricultural

industrial products. All of this requires very sophisticated and fast digital financial technology facilities to support the performance of farmers in Indonesia. Financial conditions cannot be separated from the need for effective and efficient transportation services for sales transactions, which are routine activities for players in the agricultural industry sector and agribusiness sector in Indonesia.

One of the weaknesses of Indonesia's agriculture is that it is still based on natural resources, so the added value is still minimal for increasing agricultural productivity optimally. Finance for the Agricultural sector is very important in order to realize Indonesia's dream of becoming a food basket in the world. Ina national Labor force survey conducted by the Central Bureau of Statistics, 20. 62% of young people in Indonesia worked in the Agricultural and sectors in August, 2020, an increase compared to the previous period which was 28, 43% internet and have opportunity to become an early adopter of digital technology in the agricultural sector (Arianti, 2020; Mankiw, 2013; UNCTAD, 2022; World Bank, 2014), The Impact Of The Covid 19, Pandemic On Micro, Small and Medium Enterprise: Market Access Challenges and Competition Policy: UNCTAD: JENEWA, SWISS (2022), (Saragih, 2021), The Phenomena of using electronic money as a means of payment in the Digital era, We all know that the majority of Indonesia's population currently has a live hood as farmers and is currently growing along with the development of industry and community needs, many agrobusiness sector industries have emerged which produce food, drink, health products and other products that can be consumed by the Indonesian people. According to the Central Bureau of Statistics (2018), The Impact the covid 19, Pandemic on Micro, Small and Medium Enterprises: Market Access Challenges and competitions policy, UNCTAD; JENEWA, Swiss, (MB-IPB, 2015; Saragih, 2021), Structural transformational of Indonesia farming business and farmers Central Statistics Agency (BPS), Postgraduate Program in Business Management (MB) IPB. The phenomena of using electronic money as a means of payment in the digital era, (Salim et al., 2019), Determinant analysis of productivity on rice management in Indonesia (Salim et al., 2022), Determinant of Technologycal innovation on the income of Urban farming Farmers in the digital Economy Era (Susilastuti, 2017), Poverty Reduction models: Indonesia Agricultural Economics approach for agro, agrotropica, (Susilastuti, 2017) Susilastuti (2017), poverty model of Indonesia agricultural economics (Susilastuti, 2018), Application of information technology on potato productivity (Suwarni & Handayani, 2021), MA Development of Micro, Small and Medium enterprises (MSMEs) to strengthen the Indonesia Economy, Covid 19, can be managed strategy, the number of households involved in agricultural business reached 27, 68 milion farming household which are divided into several subsectors ranging from rice, secondary crops, horticulture, plantations, forestry, animal husbandry, to cultivation, fisheries. In the last few years, digital transformation has emerged as an important focus for the progress of agriculture businesees. The sector encompasses various activities, including plantation crop production, food crop cultivation, horticultural crop farming, and farmer trade, all of which exert notable positive impacts on the economic growth of agriculture (Purba, 2023).

Numerous studies underscore the role of agricultural sector growth in poverty reduction, job

creation, and income enhancement within local communities (Afriyanti et al., 2023), Indonesia's initiatives to fortify the resilience of its agricultural supply chain extend beyond local impacts, presenting broader implications for the digital era for the Asean region as a whole (Delfiyanti, 2023). The combination of resuming strategies and the application of digital technology has enormous potential for encouragement. It is very important to encourage very positive environmental and social developments while ensuring the existence and sustainability of the life in the longterm. The things that support the activities mentioned above are continuing to transform the agricultural sector and collaborating with financial based digital system such as:

1. Agricultural 1 technology system services based on accurate, efficient, effective financial transactions that are safer, faster, and cheaper in line with the challenges of the digitalization era.
2. Needs whose importance is prioritized are quality public services for farmers, agricultural entrepreneurs, and business people/agribusiness industry in the agricultural sector and agricultural agribusiness.
3. Financial transactions are faster, more economical, and cheaper, and are in demand by customers, especially in the agricultural and agribusiness fields and sectors.

Enabling agricultural sector actors to integrate sustainable practices into increasingly complex digital technological advancement systems that follow current demands such as modern agricultural technology operating systems, resources efficiency data analysis, internet of things (IoT) and computing systems, improving the quality of advanced technology facilities and making decisions on advances in digital technology for the agricultural sector and agricultural agrobusiness in a sustainable manner, (Kleinert, 2021), Digital transformation empiris, (Hubeis, 2020), Digitalization of MSMEs in the contect of a sustainable economy on opportunities and challenges of implementing the industrial revolution 4. 0 on the Indonesia Economy during the covid 19 Pandemic (Holmstrom & Partanen, 2014), Digital manufacturing based series supply chain transformation for complex product supply chain management, (Grujic & Grujcic, 2021), The Strategy of increasing production competitiveness in food industry of the Republic of Srpska by stimulating A New Product development, Gobble, MM Digitalization and innovation, Res Governance Technology (2018) (Gobble, 2018). Utilization of Blockchain technology, financial blockchain, transparency, and ensuring ethical resources, healthy and safe agricultural practices. Carrying out agricultural and trade transactions as well as producing agricultural products and agrobusiness results in an adequate, sustainable manner, a very high level of trust and responsibility is needed, especially for stakeholders, in meeting all the ever-increasing consumer requests and needs, and services sustainably.

The latest development of a system that is capable of storing accurate data using digital technology facilities based on financial technology, for example, the use of QRIS for farmers, agriculture producers with certain logo combinations that are updated in collaboration with management parties who serve transactions for farmers activities and make it easier for farmers to carrying out transactions for their daily activities, of course those with the AGROFARMERS logo, for example, which allows farmers and Agrobusiness enterprenenurs and Agricultural producers to use them in

transactions specially for the Agricultural business sector only.

Table 1. Potential types of digital services in the field of agricultural land, the financial-based agricultural agribusiness sector, that are possible to develop in Indonesia.

Type of digital service	Service benefits for farmers
1. Merchant presented the mode QRIS Digital queues	Transactioncanminimize
2. Customer Presented Mode QRIS AGRIFARMER to all merchants.	Easy to be accepted by

Data Source: Processed by the first author (October, 2024)

Table 2. Potential use of financial-based digital technology services

No	Potential use of digital services	Corn Farmers, rice farmers, sugar cane farmers, soybean farmers.	Agrobusiness farmers	Farmers of MSMEs
1	Digital transaction service network system	Regular and special farmers	Transactionpractices, practices	Practices of agrobusiness services in conducting business transactions and practices of MSME farmers in carrying out MSME business transactions
		(Digital financial Farmers)	(DigitalFinancial Farmers)	(DigitalFinancialFarmers)
2	Target marketfor agricultur alcommodity production strategies	Producerand consumer	Producer, consumer, government, public	Producers, consumer, Public , MSMEs
		(Digital Financial)	(Digitalfinancial)	(Digital Financial)
				Professional (Potensial)
3	Digital means of financial farmers' transactions	High	High	High
4	Agricultural and agribusiness opportunities in Indonesia in the Horticulture commodity sector	High	High	High

No	Potential use of digital services	Corn Farmers, rice farmers, sugar cane farmers, soybean farmers.	Agrobusiness farmers	Farmers of MSMEs
	(For example, chiliesand shallots)			

Data Source: Data processed by researchers (September-October, 2024)

The importance of increasing financially based digital technological transformation to support the agricultural sector and agricultural agribusiness, which is more productive and favorable in a sustainable era in the future in Indonesia.

Have farmers, agrobusiness farmers, and entrepreneurs in the agricultural and agrobusiness sector in Indonesia used financial-based digital technology transformation services optimally and optimally in their daily business activities in Indonesia?

Especially for farmers who are involve the agricultural industry sector optimally and optimally in its daily activities, use financial-based digital technology services optimally and sustainably.

For farmers and agrobusiness farmers in particular, it is hoped that they will increase their capacity in using financial and networked digital business technology facilities well, efficiently, and effectively, well and correctly so that in the future it is hoped that the productivityof their agricultural products and agribusiness results can increase optimally, maximally, and sustainably.

The agricultural census shows that in 2013 (ten years ago), the number of agricultural households (RUTP) was 26. 1 million. Diversification is one of the life strategies of poor farmers in order to increase income and reduce the risks of farming. Agricultural census in 2013 then showed that there were 31. 7million farmers and 26. 14 million RUTP in Indonesia. Numerous studies emphasize the critical role of digitalization in strengthening agricultural supply chain resilience. Digital technology enables real-time monitoring of farming processes, facilitating proactive decision-making and risk management in response to disruptions (Ebinger & Omondi, 2020). Prioritizing infrastructure improvement, technological advancement, and trade cooperation, the government aims to support economic growth and food security across the region (Miryanti & Linggarwati, 2014). For instance, in Indonesia, agriculture contributes approximately 14% to the country's GDP (Central Bureau of Statistics, 2018; Purba, 2023). The 2013 agricultural census showed that the average RUTP income reached 26, 561millionper year, around an average of IDR 2 million/month. Poverty studies related to farming and international research carried out in depth in several developing countries were coordinate within the Cronics poverty Advisory Network, and funded by The United States government and implemented by The Overseas Development Institue (ODI), (Matt et al., 2015), Strategy transformation digital by information system, (Lusardi & Mitchell, 2014), (Nidar, 2012), (Miller, 2009), (Rahma, 2018), Medan City Society's perception of Financial Technology users

(Fintech). The British Emire (ODI, 2016a; Dwakar, 2016), (Donaldson & Preston, 1995), Stakeholders theory of the company, Conceptsof evidence academic determination manage, (Della Costa & Alam, 2022), Study methodology for Micro, Small and MEdium Enterprises in Brazil J Evolution Brazil (2022), (Efelmann & Haug, 2019) defining transformation as a resylt of experth governor interviews, (Gobble, 2018), Digitalization and Innovationof Res Government Technology, (Grujic & Grujcic, 2021), (Holmstrom & Partanen, 2014), Digital manufacturing based service supply chain transformation for complex product supply chain management, (Hubeis, 2020), Digitalization of MSMEs in the context of a sustainable economy (Webinar presentation) webinar on opportunities and challenges of implementing the industries revolution 4. 0 on the Indonesia Economy during The Covid 19 Pandemic, (Kleinert, 2021), (Kleinert, J., 2021), (Harris Sean Keefe Dimas; Jang Hyunmi; Min Sur Ji., 2024) Digitalization for agricultural supply chains resilience: Perspectoves from Indonesia as an ASEAN member, (Yulianti & Silvy, 2013), Attitudes of financial managers and investment planning behaviour, (Yoshikuni & Dwivedi, 2022), The role of Corporate Information System Strategy Making Strategy for Organizational Innovation Resource Orchestration Perseption. J Enterprise, Information Management, (Fatoki, 2014), Umeda, Y; Ota, J; Shirafuji; Kojima, F; Saito, M: Matsuzawa, H. Sukekawa, T Activity of exercise by Keizen as digital concept triplet, Industrial Procedia. The causes of The Failure of The New Small and Medium Enterprise in South Africa, Digital transformation. Despite its various potential benefits, the adoption of digital technology in the agricultural supply chain faces several challenges. For example, inadequate digital infrastructure, high implementation costs, and concerns regarding data security and privacy (Gupta, 2014; Kamble, 2019, Ageron et al., 2020, Song et al., 20200, Tzachor et al., 2022, Gupta et al., 2020). The Strategy of increasing Production competitiveness in the food industry of the Republic of Srpska by Stimulating a New Product Development. The results of their research generally concluded four themes in permanently alleviating poverty ; Shepherd and Scot, 2018), namely:

1. Increasing productive assets in carrying out agricultural businesses
2. Facilitate migration and the non-agricultural economy
3. Improve the education and skills of farmers and family members
4. Increasing the effectiveness of social protection in dealing with the turmoil of the live

The MB-IPB (2015) found the main determinants of farming families working and doing business in the agricultural sector as follows:

1. Land Control
2. Agricultural Income
3. Family Education and Job
4. Opportunities in the Agricultural Industry Sector

Based on research from Andaningsih (2022), The Role of Good Corporate Governance in increasing company profits and MSMEs business growth in DKI Jakarta and its surroundings. Good Corporate Governance is very important to increase company profits for the growth of SME

businesses in Indonesia, especially in DKI Jakarta and its surroundings. Transformation can be growth and development enhancing (good), but also growth and development backlogging (Bad), so it must be managed. Transformation can be chosen as economic transformation (Between Sectors), sectoral transformation among subsectors. agriculture, agricultural business transformation, and the Family) Farmers. The Process of Digital and financial-based economic transformation for local agricultural and agrobusiness is related to measuring the level of wages and income of farmers in Indonesia. (Andaningsih, 2022; Hikmah & Yuswandari, 2025) (Andaningsih, Ratih IGP, 2022) (Suprapto Agus; Ellyta 2025) Innovative Agricultural Financiang Models to Enhance Farmers' access to sustainable credit and Investment, Financial Control Behaviour As A Strategy For Small And Medium Sized Business To Survive The Covid 19 Pandemic that financial control behaviour will be evaluating financial performing of SMEs actors and to be better understand financial controlling full empowerement properly and optimally, (Andaningsih, 2021), Innovation and transformation of production cost improving the quality of agricultural resources as an acceleration solution to support business sector agricultural in Indonesia, (Andaningsih, 2021), The Impact of digital technology after the covid 19 pandemic on business accounting in companies in Indonesia (Andaningsih, 2021b), Small and Medium Sized Business Strategy Improving in Sustainability Transformation In Agrobusiness sector Industry in DKI Jakarta Area, Indonesia, (Andaningsih & Trinandari, 2022); Novita, 2022), Empowerement Of MSMEs through Financial Digitalizations, (Andaningsih & Trinandari, 2022), Innovation and transformation of production cost improving the quality of agricultural resources as an acceleration solution to support business sector agricultural in Indonesia, (Andaningsih, 2021a), The Impact of digital technology after The Covid 19 Pand on business accounting in companies in Indonesia, (Andaningsih, 2021b), Small and Mediumemic that Financial control behaviour will be to evaluating financial performance of SMEs actors and to be better understand financial controlling full empowerment properly and optimally. Therefore, strategic policies are very necessary for benchmarking and further identification in understanding the core agricultural sector and productivity in a maximal and sustainable manner in the future. Management of the agricultural sector, especially local agricultural plantations. Animal husbandry and other agricultural agribusiness sectors, takes into account the following: Sustainable development of downstream and upstream production centers based on financial technology supported by food security in certains by systems. Building a network and connectivity of Production centers and other financial-based digital technology with regions throughout Indonesia, especially regarding infrastructure and logistics systems in general. Agricultural digital technology can be defined as the application of information and communication technology through networks and applications. The aim is to assist agricultural sector actors in making decisions and utilizing resources (WorldBank, 2020). According to reports, there are 55 agricultural digital technologies in Indonesia. Recent research indicates a trend towards digitalization in the agricultural sector, driven by advancements in technologies such as the Internet of Things (IoT) and Blockchain.

According to Yang (2021), these digital technologies are generally still in the early stages. Agricultural digital technology emerged from a public and private partnership scheme (KPS) through the

Indonesia Japan Hortikultura Public, Private Partnership Project (IJHOP4), where small farmers can be connected to loan programs through blockchain technology, enabling farmer data to be stored digitally. The use of agricultural digital technology is able to provide positive changes for farmers. (McKensey data, 2020) estimates that the use of modern technology in the agricultural sector can increase economic output by up to USD 6, 6 billion per year. To improve the quality of services in the digitalization sector of agricultural agrobusiness, knowledge and transparancy financial technologya needed, especially regarding digital transaction services through the agricultural banking sector, which collaborates with strong and trusted banking sector services. Agricultural digital technology, such as Tani HUB, which connects farmers directly with consumers, can shorten the supply chain. Farmers can also reduce their dependence on economics. It is hoped that financial-based digital technology financial services for agriculture can be a solution to increase the productivity of agricultural products, especially for local village farmers and agribusiness farmers in Indonesia. (Andaningsih Ratih IGP 2022), Empowering MSMEs In The Creative Economy Of The Agrobusiness Industrial Sector In The Baranang Siang Area, Bogor City, West Java, that SMEs enterprenenurship who will increase their productivity performance in the creative economy, especially the agriculture agribusiness industry sector. Improvement of SMEs business performance through a program to strengthen SMEs empowerment through a quality creative economic networkin the agriculture sector of the agro business industry, which is maximal and productive. (Andaningsih & Trinandari, 2022a), Small And Medium Sized Business Strategy Improving in Sustainability Transformation in Agrobusiness Sector Industry in DKI Jakarta Area, Indonesia that the agricultural business needs support and a solution environment and sustainability and transformation development program that has been offered to the business world with certain characteristics. Transformation of business digital financing, the practical development sector, the business industry, and agricultural materials is one of the efforts to improve competence and skill, and is supported by the government.

Table 3. Measuring Table for the Classification of Financial-based digital technology services for Farmers in the West Java Province Region.

Data measurements and categories	Percentage rate
Low	<50%
Middle	51%-79%
High	>80%

Data Source: Data Processed by The First Author (September-November 2024)

Merchant Presented Mode (MPM)

In this mechanism, digital marketing technology uses codes. Customers will scan the code that has been provided by merchants at the shop or stock of rice barns, soybean barns, and other agricultural production barns using a smartphone. There are forms of QR Code merchant presentation mode (MPM), namely static form and dynamic form. Merchandise only needs to support one sticker or

print out the QR Code, and it's free. Merchants presented the Dynamic Mode QR, which is issued via a device such as an EDC Machine or Smartphone, and is free. Previously, first enter the customer's use of the QR Code listed. QR Code MPM dinamis is very Suitable for medium and large business scale merchants or with high transaction volumes.

Customer presented Mode (CPM). This QR Code Customer Presented Mode Mechanism can be used by every farmer and agribusiness sector farmer who wants to carry out transactions quickly and accurately. Farers and agribusiness farmers and agribusiness farmers only need to show a certain code displayed from the application payments to be scanned by merchants. Certain code is more intended for retailers. Certain codes are aimed more at merchants who require high transaction speed, such as supporting providers of raw materials for agricultural products and the distribution of agricultural production.

Criteria for farmers and farmers in the Agrobusiness sector for MSMEs, which are divided based on assets and turnover:

1. Criteria for micro businesses owned by Agrobusiness farmers who have a net worth of a maximum up to a maximum of IDR 50 Milion excludingl and buildings where the business is located, has annual sales of a maximum of IDR 300 million.
2. Small Business criteria for farmers, havea net worth of more than IDR 50 Million up to a maximum of IDR 500 million excluding land and buildings for business premises, and have a net worth of more than IDR 500 million up to a maximum of IDR 10 billion exludingl and and buildings for business premises. And have sales proceeds annually more than IDR 2. 5 billion up to a maximum OF IDR 50 billion.

MSMEs can be classified:

1. Livelihood activities are micro and medium enterprises for agribusiness farmers, which are used for employement to opportunities
2. Micro enterprises are MSMEs that have the characteristics of an agribusiness of busieness do not yet have entrepreneurial.

METHOD

The research carried out used a symmetric qualitative descriptive method which aims to understand the object being studies indepth According to Sugiyono (2013), the descriptive method is a research method used to examine the condition of objects owned scientifically (As opposed to experiments) Where the researcher is the key instrument (Mankiw, 2013), Introduction to macroeconomys (Setiawan, 2014), Qualitative research methods. In this study, a qualitative research approach was employed, utilizing semi-structured interviews to gather data from various stakeholders within Indonesia's agriculture sector. Semi-structured interviews were selected for their flexibility, allowing for a combination of predetermined questions with open-ended discussions, thereby enabling the exploration of a wide range of perspectives and emergence of unanticipated insights; Patton, 2014).

The Number of data studied was 25 people, consisting of 8 local farmers, 6 people from the Agrobusiness sectors of farmers, 5 people from the Farm, and 6people from Farmers in the MSMEs of the Agrobusiness sector. This data collection was carried out by means of direct interviews and direct observation at the location. This data analysis technique uses a symmetric qualitative descriptive method and content analysis approach. Data validation was carried out directly by checking the field at the location. According to Sekaran & Bougie (2017), the population is the entire group of people, events, or other things that will be investigated by the researcher. In this qualitative descriptive research method, the researcher took the population and respondents from MSMEs operating across the Agricultural, livestock, agribusiness, and other agricultural sectors. This symmetric descriptive qualitative method was used in this research because the research conducted focused on a state of a natural object where there searcher him self was also them in instrument in this search (Sugiyono, 2016). Innovation and Transformation of Production Cost Improving the Quality of Agricultural Resources as an Acceleration Solution to Support the Business Sector Agricultural During the Covid 19 by Andaningsih (2021b) that the transformation of business, practically the development of innovative business industry of agricultural materials, is one of the efforts to improve competence s and skills. The agriculture needs an agricultural control report of cost production and toolsa nd machinery support and solution with certain characteristics. The Impact of digital technology after the covid 19 pandemic on business accounting in companies in Indonesia, that in terms of the use of digital by (Andaningsih, 2021d), as expected by the government, companies can use digital technology such as big data, autonomous robots, cybersecurity, cloud, and augmented reality (UNCTAD, 2022). The Impact of The Covid 19, Pandemic on Micro, Small and Medium Enterprises: Market Access Challenges and Competition Policy: UNCTAD; Jenewa, Swiss, (Suwarni & Handayani, 2021), MA Development Of Micro, Small and Medium Enterprises (MSMEs) to strengthen the Indonesia Economy, Covid 19 can be managed strategy, (Bauer et al., 2018), Working life in a Hybrid world how digital transformation and agile structures impact human functioning and improve work quality and business performance. In advances in human factors, business management, and leadership (Kanyola et al., 2018). Companies must have a strategy to build a smart IT foundation and smart IT system. Thus, it is expected to increase the efficiency of the company's performance, een with the implementation of this technology, The company is able to save costs of around 12%-15%.

Use of the Digital QR Code Service Network System for Customer Profitability Potential

Networking QR Codes for Agro Farmers (Recommendations)
QR Code Users and Mobile Banking Networks in Bogor, Bekasi, and Sukabumi, West Java

Table 4. List of Financial-Based Digital Technology Users

No	Description	Amount
1.	Local Farmers	8
2.	The Agrobusiness Sector of Farmers	6

No	Description	Amount
3.	Farm	5
4.	Farmers in The MSMEs of the Agribusiness Sector	6
	Total	**25**

Data Source: The Data is processed by researchers, Oktober-November, 2024

Symmetric qualitative descriptive method with a content analysis approach. Symmetrical with certain indicators, the author did this by taking samples and interview in techniques with farmers and farmers in the agrobusiness sector. Their search conducted interviews directly in the field, represented by 25 informants, namely 8 local farmers, 6 people in the Agrobusiness sector, livestock farmers, and MSMEs in the Agrobusiness sector 6 People.

Table 5. Analysis content: Merchants presented Model Local Farmers, Agribusiness Farmers, and MSMEs Farmers.

No	Research that becomes a reference
1	QR Code Supports for local farmers makes it easier for financial-based digital technology to carry out sustainable business transactions.
2	QR Code supports services for farmers in the sustainable agribusiness sector.
3	QR Code support service for improving the efficient and effective digital business sector for MSMEs Farmers.

Data Source: Data is processed by researchers, October-November 2024

The Interview was conducted by paying attention to the following questions:

1. Do you understand QR Code as a digital financial-based technology tool to make it easier for farmers to carry out their daily activities?
2. According to you, have you received digital technology services and integrated service systems, and the best financial-based digital technology to increase the productivity of the agricultural and agribusiness sectors?
3. Have you been given basic knowledge regarding QR Code access in the form of financial-based digital network services by the local government?
4. According to you, have you had financial-based digital technology assistance as a means of progress in increasing agricultural production and increasing production in the agribusiness sector?
5. Do you have a financial-based digital technology network service system to develop agricultural businesses and the agribusiness sectors?

Interviews were conducted taking into account the following conditions with 25 informants:

1. In your opinion, do you agree with the AGROFARMERS Global QR Code facility being implemented in Indonesia to make it easier for farmers to carry out their business transactions in an effort to increase crop productivity, optimally, and sustainable agricultural results in the

future?

2. In your Opinion, do you agree that if the government provides support for QR Code networking services, for example, the AGROFARMERS code service, in carrying out daily activities, local farmers and farmers in the Agribusiness sector can develop their businesses and business networks in Indonesia and abroad?

Data samples were conducted through direct interviews from 15 October 2024 to 5 November 20234 around 10. 00 am-15. 00 pm WIB.

Table 6. Characteristics of Users of Financially Based Digital Technology Services for Superior Farmers:

No	Age	Amount of Informan	Persentage
1.	Less than < from30 years	5	20%
2.	31-50years	4	16%
3.	51-60years	6	24%
4.	Morethan>60years	10	40%
Total		25	100

Data Source: The Data is processed by researchers (November, 2024)

RESULT AND DISCUSSION

West Java has an agricultural potential distribution of 70. 5%, making the agricultural sector the backbone of the economy in West Java. However, quite a few farmers face difficulties related to price fluctuations, digital technology problems, payment systems, and purchase and sales transactions, especially regarding commodity prices, limited access to technology, markets, and information, and low productivity. A long with the development to financial based digital technology and the emergence of many innovation that can be used by farmers, both village farmers and farmers in the agribusiness sector, to help increase their competitiveness, requires financial based digital information technology such as automatic disbursments of funds, helping and facilitating transactions services for purchasing plant nutrients, to facilitate CCTV purchase transactions for monitoring crop production locations and agribusiness production results to monitoring other agricultural production. Examples of the use of agricultural technology to improve the welfare of Indonesian farmers. The limitations of the digital infrastructure of financial agriculture, such as limited internet access and unstable electricity supply in rural areas, and significant investment in financial agriculture are needed to improve digital and physical agrobusiness infrastructure in rural areas, with collaboration between the government and other stakeholders (2022), 2022;. Sustainable investmen of financial agriculture are needed in educating and training farmers on the use of digital technology in agriculture (Bocharova, 2020; Deichmann, 2016). The importance of cross-sectoral cooperation in addressing challenges in agriculture related

to climate change has been highlighted (Ammar, 2023).

However, challenges in integrating digitalization of financial services into the agricultural supply chain may hinder efforts to improve food security in affected regions (Montesclaros & Teng, 2023). Digital financial platforms can facilitate better coordination between agricultural producers and logistics providers, reducing shipping delays, optimizing transport schedules, and improving overall logistics efficiency (Amin, 2021). The first Fundamental challenge is that there is no priority scale for the adoption of digital technology in the agricultural sector by the Government. This can be seen in the strategic plan of the Ministry of Agriculture for 2020-2024, which has not yet specifically provided a strategy for adoption. Digital technology (Mercy Corps Indonesia, 2022). As a result, government support to create this program has not been limited and is not evenly distributed. Sustainable financial digital investment is needed in educating and training farmers on the use of digital financial technology in agriculture (Bocharova, 2020; Deichmann, 2016). In Indonesia, for instance, the government has launched programs such as the food estate program and the Village Owned Enterprises (BUMDes) initiatives to enhance agricultural productivity, improve farmer welfare, and ensure food security (Siborutorop, 2023). Additionally, blockchain-based platforms are gaining popularity for their ability to enhance tracking and transparency in agricultural transactions ; Yang, Wang, Guo, & Chen, 2023)

Respondent Identification: The searches interviewed were conducted with:

Sample data was collected directly and online from October 18, 2023, until October 25, 2024, around 10. 00 am-17. 00 pm.

Table 7. Analysis Table, Research results based on age level.

No	Age	Amount of Informants	Persentage
1	Less<from30	6	25%
2	31-40years	10	40%
3	51-60years	9	35%
Total		25	100%

Data Source: Data source by researcher (October, 2024)

The Table shows that the characteristics of informants who use financial technology-based digital network service systems are 25 people, of whom 6 people are under 30 years old (Thirty years old), amounting to 25% of the total informants studied. A total of 10(Ten) people with a percentage level of 40%of the total informants studied aged 31years to 40 years, and the remaining people aged 51 years to 60 years with a percentage level of 35%.

Table 8. Respodent data table for digital transaction service users in West Java Province (Representing Region)

No	Description	Amount of MSMEs
1.	Bekasi	10
2.	Bogor	8
3.	Sukabumi	7
	Total	25

The Desire and full support of farmers who want financially based digital farming technology can be carried out and implemented inrural areas, especially for smallfarmers, largefarmers, medium-sized Agribusiness farmers, and MSMEs Farmers through the following interviews.

1. Have you heard about the financial-based digital farmers technology-assisted system for farmers around where you live?
2. Is a financial-based digital farmer technology network system service support with the proposal to use the AGROFARMERS QR Code in the Agricultural sector possible and more efficient?
3. Do you agree that the local regional government provides support in the form of financially based digital farmers technology system network services to support farmers' business performance, especially in the West Java Province?
4. And do you agree that the financial-based digital technology network system can be accessed throughout Indonesia? So that it is hoped that farmers will be able to open a wide network to increase cooperation in Agricultural Production throughout Indonesia easily, transparently, and sustainably?
5. Have you provided transaction services for farmers for the purchase and sale of their harvests, both local Agricultural products and other agricultural products in the agribusiness sector, digitally online, continuously, and sustainably?
6. Are you satisfied with the QR Code digital transaction network system service if the farmers use this service to facilitate direct transactions with local farmers and with agricultural agribusiness farmers in local and domestic markets? In a sustainable manner, guaranteeing and increasing the farmers' agricultural production results, and providing satisfaction for customers who enjoy the results.

The Analysis and results of their search carried out show that:

1. Interview results: Question No 1. No 2 shows that the majority of respondents understand the financial-based technology service network system and want to have the AGRIFARMERS logo.
2. Digital transaction services in the Sukabumi area, 7 people do not understand the QR Code service because they are considered too long-winded and do not understand digital banking. Of the eight respondents who understand the digital transaction network system, five people

are from the Bekasi area, and 4 respondents come from Farmers in the Bogor Region. Of the 4 respondents who did not understand the QR Code digital transactions service, 3 people were from farmers in the local Agribusiness sector, and 2 people were from local farmers. This means that the majority of urban farmers are satisfied and understand the digital transaction network system that supports digital-based agricultural technology services, finance, such as AGROFARMERS, for example, for farmers'activities carryng out their business production activities.

3. The results of interviews questions No 2 showed that 13 local farmers respondents already understood a little about the use of digital technology networks, for example through QR Codes for daily transactions and business activities, especially in ncreasing agricultural production to support sustainable agricultural production, and 12 respondents had never ger QR Code digital transaction network system services because of the farmers lack of understanding and lack of socialization from the local government in the are awhere they live regarding the use of financial based digital technology facilities and use the services of third parties ormiddlemen because they find it trouble some and do not understand digital media and do not know the digital transaction mode and find it dififficult.
4. Interview results question No 3:as many as 14 MSME actors have obtained and used financial-baseddigitalnetworksystemfacilitiesthroughthenearestbankorbankingand have received socialization from the local government area to facilitate digital transactions to support their business. For example, through the QR code of Bank BRI Agro and other QR code logos.
5. Based on the results of interview question no 5, 10 farmers in the agribusiness sector were satisfied and agreed with the financial based digital system network services that they had carried out so far for daily trade transactions and they generally agreed very much if the financial based digital ttechnology network sytem was carried out through AGROFARMERS as a digital code for carryng out transaction for the activities of local farmers and rural farmers in agricultural and farmers production areas.

Table 9. Results of researchon the distribution of financial-based digital technologyusers 9For Example QR Code)

Description of research	**Research of results**
Know **Do not know**	
Distribution of digital information technology services based on local farmer finance.	
- Rice Farmers 38%	62%
- Soybean and secondary Crop 35%	65%
- Farmers 42%	58%
- Farman does the ragribusiness farmers 26%	74%
Facilitiesfrom government and other institutional support services: - Rice Farmers, other farmers 45%	

Description of research	Research of results
- Farmers in other agribusiness sectors 40%	55%
	60%
Supporting facilities to increase agricultural production (Local and domestic). Access digital financial technology networks: -Accesscertain QR Code services35% -Support for the proposedA GROFARMERS Code10%	65%
	90%

Data Source: Data Source by Research, October-November, 2024

CONCLUSION

The findings of this study indicate that the transformation of digital technology in the agricultural and agribusiness sectors still faces numerous challenges, particularly due to limited access to technology in rural areas and the absence of accurate and reliable financial-technology-based networks. Many agribusiness MSMEs and rural farmers remain behind in adopting modern agricultural technologies for transactions, procurement of raw materials, and access to advanced tools and facilities. This gap is largely caused by restricted network availability and incomplete financial-technology infrastructure that has yet to reach many rural and remote villages in Indonesia. Furthermore, the analysis of empowerment levels related to financial-technology-based information transformation—measured through farmer and MSME profitability—shows an average validity score of 66. 125. This reflects their satisfaction with financial technology services that are accurate, efficient, and effective, though improvement is still needed. In addition, despite high demand for digital technology among farmers and agribusiness service providers, dissatisfaction remains due to the lack of comprehensive socialization by local governments regarding the use of AGROFARMERS finance–based digital systems. Technical barriers, infrastructure limitations, and low awareness within farming communities contribute to these issues. From a profitability perspective, farmers' income generated from digital services has not yet reached optimal levels, as most farmers still rely on manual processes in conducting payment transactions and managing agricultural activities, resulting in suboptimal outcomes and reduced profitability.

Several suggestions can be proposed based on these findings. First, researchers, farmers, and agribusiness MSMEs need to strengthen research collaboration to develop innovative breakthroughs in maximizing the use of financial-technology-based digital tools and improving digital service networks, which will enrich future research. Second, extensive socialization of digital technology transformation systems is urgently needed for rural farmers and MSMEs in Indonesia, applying a sustainability-oriented approach to ensure long-term adoption. Third, efforts must be made to enhance farmers' knowledge and understanding of digital facilities and transformation systems so they can utilize them more effectively and efficiently. Fourth, special assistance programs should be provided for farmers who are unfamiliar with technology, including hands-on training and

continuous monitoring, to improve their productivity and readiness in using digital networks. Lastly, accelerating digital transformation in the agricultural sector requires increased governmental support, stronger communication with local stakeholders, and expanded infrastructure development to improve farmers' performance and optimize the benefits of financial-technology-based digital systems for agribusiness MSMEs across Indonesia.

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