Fintech Interest Index for Sustainability Investment in Agricultural

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Abstract. This study investigates the role of financial technology (Fintech) in supporting long-term investment in agriculture. As farmers need faster and more accessible financing, fintech companies provide new solutions such as peer-to-peer lending platforms and financial management software. The data show an average fintech interest index of 3.03, with the biggest contribution from the predicted profit category (4.78) and the lowest from the technological awareness category (0.09). Supporting data from categories F9 and F10 show that 43% of respondents rely on family and friends for fintech implementation, while 52% say a lack of understanding is a barrier.

Further research shows that fintech not only increases farmers' access to cash, but also their financial management efficiency. However, concerns of financial literacy and technological adoption continue to pose substantial hurdles. As a result, the study proposes expanding training programs and encouraging collaboration between fintech providers and agricultural organizations to leverage the benefits of financial technology in improving farmer welfare. The findings of this study are intended to enlighten stakeholders in the agricultural and fintech sectors, as well as to advocate for laws that encourage the integration of fintech into sustainable farming practices.

Keywords: Fintech, Sustainability Investment, Agricultural

1 Introduction

The concept of sustainable agriculture is a key element in global efforts to achieve food security, environmental protection, and rural development [1]. It aims to fulfill present needs without compromising the ability of future generations to meet theirs [2].

The agriculture industry is critical to the global economy because it serves a growing population. Farmers worldwide face various obstacles, including limited access to funding, price instability, and climate change threats. According to FAO data, almost 1.5 billion smallholder farmers in developing countries do not have enough access to formal financial institutions.

In this environment, financial technology (fintech) has arisen as an innovative approach to improve the efficiency and competitiveness of agriculture. Fintech is the use of technology to create financial services that are faster, more efficient, and easier to obtain. Fintech, by leveraging digital technology, provides a range of services targeted to farmers' individual needs, including finance and risk management.

M. Nohong et al. (eds.), *Proceedings of the 9th International Conference on Accounting, Management, and Economics 2024 (ICAME 2024)*, Advances in Economics, Business and Management Research 331,
https://doi.org/10.2991/978-94-6463-758-8_265

Fintech offers farmers microloans and community-based finance choices. According to a McKinsey report, adopting fintech might increase smallholder farmers' access to finance by up to 50%, reducing their reliance on high-interest informal loans. Financial solutions such as digital wallets and accounting software help farmers manage their finances more efficiently. According to World Bank data, farmers that use these financial applications improve their operational efficiency by up to 30%.

Fintech also provides technology-driven insurance solutions, such as crop insurance, to help farmers limit losses from natural disasters. According to research, embracing such insurance can cut farmers' revenue losses by up to 25%. Farmers can now execute transactions with more security and speed thanks to digital payment networks. Fintech also uses big data and analytics to help farmers better understand market patterns and weather factors. According to a Deloitte analysis, using data analytics can increase crop yields by up to 15% through better decision-making.

The use of fintech into agriculture opens up considerable prospects for increasing production and sustainability. Fintech can help farmers negotiate the issues they face by boosting access to funding, enhancing financial literacy, and protecting against risk. The success of these programs is dependent on collaboration among technology providers, governments, and financial institutions to create an environment that promotes sustainable agricultural development.

2 Literature Review

2.1 The Concept and rule of Fintech

Financial Technology (Fintech) refers to technological innovations that enhance the efficiency of financial services. According to Arner et al [3], fintech encompasses a broad spectrum of services, including digital payments, investment, and risk management. In the agricultural sector, the application of fintech, particularly in financing, has demonstrated a positive impact on farmers' access to capital [4]. Numerous studies indicate that fintech can enhance financing opportunities for farmers, allowing them to secure the necessary capital for production investments [5]. In Indonesia, several peer-to-peer (P2P) lending and crowdfunding platforms have emerged, specifically targeting the agricultural sector and offering solutions for farmers who struggle to obtain loans from traditional financial institutions [6].

2.2 Sustainability Investment in Agricultural

Sustainable investment involves investment practices that take into account social and environmental impacts alongside potential financial returns [7]. In agriculture, sustainable investment can encompass the adoption of eco-friendly farming techniques and efficient resource management. Research by Thiele [8] indicates that implementing sustainable agricultural practices not only boosts productivity but also enhances farmers' well-being. Various case studies have highlighted the successful application of fintech in supporting agriculture. For instance, a study by Gupta [9] found that farmers utilizing fintech platforms saw increases in their incomes and

improved market access. This underscores fintech's potential to revolutionize farming operations and enhance agricultural productivity.

2.3 Challenge of Implementation Financial Technology for Farmers

While fintech provides numerous advantages, there are several challenges that need to be addressed. Farmers frequently struggle with adopting new technologies, face issues related to financial literacy, and encounter data security risks [10]. Thus, there is an urgent need for efforts targeted at educating farmers about fintech usage and improving technology infrastructure in rural areas. This study suggests that fintech has the ability to significantly increase the profits of larger farmers through sustainable investment. However, it is critical to adequately address the existing challenges in order to ensure that the advantages are universally realized.

3 Research Framework

3.1 Research Approach

This study uses both qualitative and quantitative methodologies to provide a thorough knowledge of fintech's involvement in meeting financing needs in the agriculture sector. This dual method allows researchers to investigate farmers' perspectives and experiences while simultaneously examining numerical data on their interest in fintech.

Table 1. Interest Category

No	Code	Interest Category	Scale or Response
1	F1	Understanding of Fintech	1 to 5
2	F2	Technology Awareness	0 or 1
3	F3	Interest in Using Fintech	1 to 5
4	F4	Funding Readiness	1 to 5
5	F5	Expected Profit	1 to 5
6	F6	Support Information	1 to 5
7	F7	Investment Readiness	1 to 5
8	F8	Security System	1 to 5
9	F9	References	Sosial Media, Friend/Family, Seminar, Agricultural Extension
10	F10	Challenges	Less knowledge, Budget, Internet access, Data Security

Source: Authors own estimation

3.2 Data Collection

Data collection was conducted through the following methods:

- **Survey:** A survey was designed to gather information on farmers' interest in fintech, their capital needs, and the challenges they face. It includes 10 questions—8 quantitative and 2 qualitative for additional insights. This questionnaire will be distributed both in person and via an online platform to a random sample of 100 farmers in South Sulawesi.
- **In-depth interviews:** Interviews were conducted with several farmers to gain deeper insights into their hopes and expectations regarding capital in the agricultural sector.

3.3 Data Analysis Based on Fintech Interest Index Approach

Quantitative data collected from the survey will be analyzed using the Fintech Interest Index approach, formulated as follows:

$$\frac{F1+F2+F3+..+F_n}{n}$$

$F1+F2+F3+..+F_n$: Avarage score from question of survey
n : Number of question

4 Result

4.1 Respondent Demographics

The survey results indicate that the majority of respondents are male, comprising 63% of the total. The age distribution of respondents is varied, with the 30-35 age group representing 39%. Additionally, the educational background of the farmers is predominantly senior high school graduates, accounting for 48%.

Table 2. Respondent Demograpchics Result

Gender	Result
Male	63%
Female	37%
Age	**Result**
<20 years	9%
20-25 years	21%
25-30 years	18%
30-35 years	39%

>35 years	13%
Education Background	Result
Elementary School	12%
Junior High School	31%
Senior High School	48%
Graduated	9%

Source: *Authors own estimation (2024)*

4.2 **Fintech Interest Index**

The results reveal that the average Fintech Interest Index, based on a sample of 100 farmers in South Sulawesi, is 3.03. The highest index comes from the expected profit category at 4.78, while the lowest is from the technology awareness category at 0.09. The Fintech Interest Index is calculated using only categories F1 to F8.

Table 3. Fintech Interest Index Result

No	Code	Interest Category	Result
1	F1	Understanding of Fintech	1,27
2	F2	Technology Awareness	0,09
3	F3	Interest in Using Fintech	4.37
4	F4	Funding Readiness	4.24
5	F5	Expected Profit	4,78
6	F6	Support Information	3,94
7	F7	Investment Readiness	3,09
8	F8	Security System	2,46

Source: *Author own estimation (2024)*

4.3 **Interview Result**

From the in-depth interviews, several key themes emerged regarding farmers' interest in using fintech:

- Investment Safety and Transparency: 75% of farmers reported difficulties in finding a safe investment model and ensuring transparency regarding the value of their investments.
- Desire for Small Funding Models: 75% of farmers expressed a preference for investment models that require smaller amounts of funding.
- Commodity Value in Agriculture: Agricultural investments are viewed as having their own intrinsic commodity value, offering more certainty and typically allowing for quicker capital recovery due to defined harvest periods.
- Risk Mitigation: Farmers highlighted the importance of clear risk mitigation strategies associated with their investments.

4.4 Challenges and References Result

Data from category F10 indicate that the primary challenge to implementing fintech in agriculture is a lack of knowledge related to fintech, which accounts for 52% of the responses.

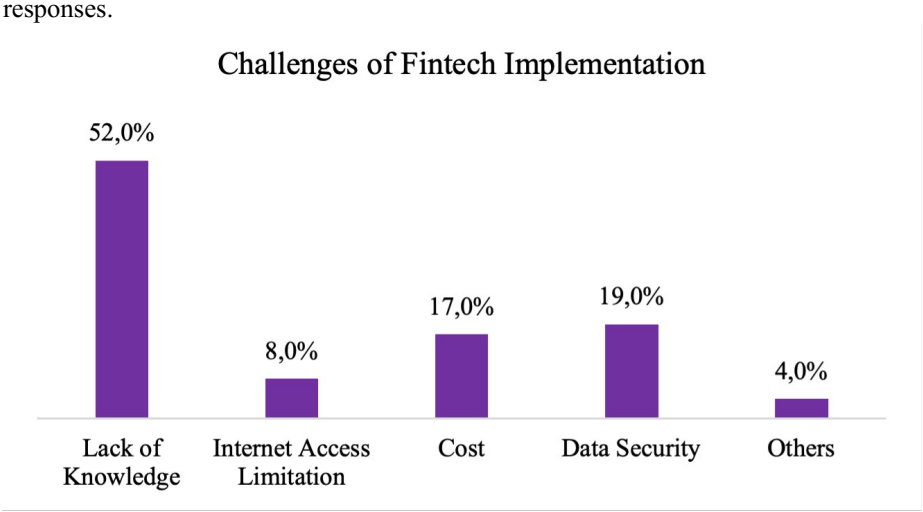

Fig. 1. Challenges of Fintech Implementation

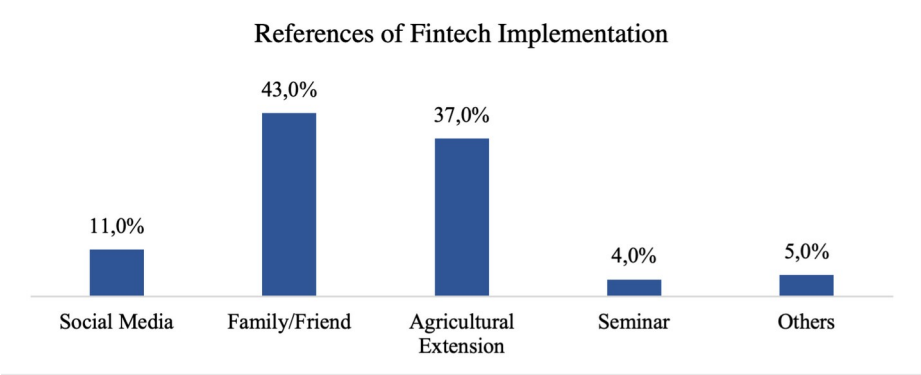

Fig. 2. References of Fintech Implementation

5 Conclusion

The study's results indicate that fintech can be appealing to farmers, achieving an index value of 3.03 based on categories F1-F8, particularly through improved access to capital and enhanced financial management. However, additional efforts, such as education and training, are necessary to address the financial literacy challenges identified in category F10, where the most significant fintech challenge is a lack of knowledge, at 52%.

This study reveals that financial technology (fintech) solutions have significant promise for tailoring to farmers' gender, age, and educational backgrounds. Farmers can maximize their output capacity by improving financial management and making finance more accessible.

However, issues such as low financial literacy among farmers, as emphasized in the F10 category study, and limited internet access (8%) must be addressed in order for fintech to fully fulfill its potential. As a result, adopting education and training programs targeted at improving understanding of technology and financial management is critical, as stated by the F9 category research, which highlights the relevance of agricultural extension services (37%) in fintech adoption.

Furthermore, collaboration among fintech providers, agricultural institutions, and government agencies must be enhanced to facilitate the incorporation of technology into agricultural processes. By following these actions, fintech is expected to greatly improve the welfare of shallot farmers and boost sustainability in Indonesia's agriculture industry.

Overall, this study emphasizes the necessity of using financial technology to stimulate growth and innovation in agriculture, allowing farmers to better handle the obstacles and opportunities given by the modern period.

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