Jurnal Ekonomi
Volume 13, Number 04, 2024, DOI 10.54209/ekonomi.v13i04
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

Digital Transformation In Agriculture: Empowering Aceh's Millennial Farmers For National Food Security

Ricky Ariansyah[1], Agustina[2], Desi Puspita[3], Iswandi Idris[4*]
[1]Office administration, Politeknik Kutaraja, [2]Financial Analyst, Politeknik Kutaraja, [3]Public Sector Financial Management, Politeknik Kutaraja, [4]Digital Business, Politeknik LP3I Medan

Article Info
Keywords:
Digital Transformation,
Millennial Farmers,
Agricultural Innovation,
Food Security,
Technology Adoption,

ABSTRACT
The agricultural sector in Indonesia, particularly in Aceh, is experiencing a transformative shift with the rise of digital technologies. This transformation is driven by the active participation of millennial farmers, who are adopting innovative tools such as IoT-based agricultural management systems, mobile applications, and digital platforms. These technological advancements have the potential to revolutionize farming practices, increase efficiency, and ensure the sustainability of food production systems. The article explores the challenges and opportunities in empowering Aceh's millennial farmers through digital tools, enhancing their capacity to contribute to national food security. By leveraging government support and private sector collaborations, millennial farmers are positioning themselves as key players in improving the resilience and sustainability of Indonesia's food systems. This study highlights the importance of integrating digital literacy in agricultural education and the role of policy interventions in fostering innovation in the agricultural sector.

This is an open access article under theCC BY-NClicense

***Corresponding Author:**
Iswandi Idris
Politeknik LP3I Medan
Jl. Sei Serayu no 48 D, Medan
iswandi.idris@plm.ac.id

INTRODUCTION

Agriculture in Aceh, as an integral part of national food security, has undergone a significant transformation with the emergence of the millennial generation. Millennial farmers, with their spirit of innovation and adaptation of digital technology, play a central role in strengthening the agricultural sector. The development of the digital revolution opens up new opportunities to increase productivity, efficiency, and desire in agricultural practices. The millennial farmer program is a program to help the government realize 100 thousand young farmers who are qualified and able to develop agriculture both "on farm" and "off farm" in order to support food security in Indonesia and improve community welfare. The Central Statistics Agency (BPS) of Banda Aceh City noted that currently the number of millennial farmers in the capital city of Aceh Province is 797 people. Millennial farmers aged 19-39 years are 507 people and millennial farmers who are over 39 years old and are technology literate are 290 people (Farha, 2023)

In this context, Aceh as an agricultural region faces special dynamics that need to be understood. Millennial farmers in Aceh, with their generational characteristics, can be a

Jurnal Ekonomi
Volume 13, Number 04, 2024, DOI 10.54209/ekonomi.v13i04
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

catalyst for significant change in implementing digital technology in agriculture. With a deep understanding of the challenges and opportunities faced, this study aims to explore the impact of the transformation of Aceh's millennial farmers in the era of the digital revolution on national food security. Problem Formulation:

1. How does the adoption of digital technology by Aceh's millennial farmers affect the efficiency and productivity of agriculture in various sectors.
2. What is the role of millennial farmers in strengthening connectivity and cooperation between business actors in the Aceh food supply chain.
3. What are the main obstacles faced by Aceh's millennial farmers in adopting digital technology in agricultural practices.
4. How do millennial farmers contribute to supporting environmental and agricultural sustainability in Aceh.
5. What is the role of government policies in encouraging and supporting the transformation of Aceh's millennial farmers through the digital revolution.

Table 1. State of the art penelitian

No	Research Topic	Conclusion of Research Results	Reference
1	Adoption of Digital Technology in Agriculture	Technological innovation, especially the adoption of digital technology in the agricultural sector, plays a key role in increasing national productivity and food security. Digital literacy is identified as an important factor in optimizing the use of technology. In addition, digital literacy strategies and millennial farmer participation stand out as important elements in agricultural transformation. Despite challenges such as digital literacy, farmer perceptions, and marketing constraints, the study emphasizes the great potential of digital technology in shaping a more efficient, innovative, and sustainable future for agriculture in Indonesia.	(Asnamawati et al., 2023) (Fharaz, Kusnadi and Rachmina, 2022) (Rifai and Mychelisda, 2023) (Laba and Saing, 2023) (Sirate et al., 2023) (Sirajuddin and Kamba, 2021) (Putra et al., 2023) (Indraningsih, 2017) (Simarmata, 2019) (Nurjati, 2021) (Nofita and Sebastian, 2022) (Upadani, Martha and Suryawan, 2023) (Rachmawati, 2020) (Suarsana and Karyati, 2020) (Ridwan, Maulina and Fahrimal, 2022) (Chazar and Rafsanjani, 2022) (Jaelani and Hanim, 2021)
2	The Role of Millennial Farmers	Millennial farmers have a strategic role in various aspects, ranging from productivity, agricultural exports, characteristics in rice centers, to contributions in the development of organic farming and the tourism sector. Their role is also recognized in	(Savira et al., 2020) (Rachmawati and Gunawan, 2020) (Haryanto, Effendy and Yunandar, 2022) (Arianto, 2021) (Ilyas, 2022) (Widiyanti, 2023) (Septeri, 2023) (ANAN, 2022)

Jurnal Ekonomi
Volume 13, Number 04, 2024, DOI 10.54209/ekonomi.v13i04
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

No	Research Topic	Conclusion of Research Results	Reference
		increasing public awareness through social media.	
3	National Food Security and Agricultural Policy	research results from various references discuss crucial aspects of national food security and agricultural policies, including strategies, sustainable concepts, the role of farmers, government policies, and institutional innovations. These studies provide important insights to understand and address food security challenges in Indonesia.	(Salasa, 2021) (Chaireni et al., 2020) (Christyanto and Mayulu, 2021) (Sianipar and Tangkudung, 2021) (Setyaningsih, 2020) (Sudarmansyah et al., 2021) (Mudatsir and Syarif, 2023) (Sihombing, 2022) (Saputra, Aliudin and Mulyaningsih, 2023) (Sihombing, 2023), (Maharani, Saryani and Idris, 2023), (Maharani, Saryani and Idris, 2022)
4	Recent Research	Until now, there has been no in-depth research that specifically explores the transformation of Aceh's millennial farmers in the context of the digital revolution and strengthening national food security, in accordance with the title of the proposed research. Several recent studies are related to the development of agriculture in rural areas, strengthening food sovereignty through agripreneurship, agricultural digitalization, and indoor hydroponics, but have not specifically discussed the transformation of Aceh's millennial farmers and their impact on national food security. Therefore, the proposed research can be a significant contribution in filling this knowledge gap and providing deeper insights into the topic.	(Noviar et al., 2023) (Utami et al., 2021) (Pratiwi, Salman and Fahmid, 2022) (DI PERKOTAAN, 2022)

METHODS

Research Methodology

a. Case Study and Survei
   Conducting in-depth case studies on several millennial farmers in Aceh to understand the changes in their agricultural practices. Conducting a survey with a structured questionnaire to collect quantitative data on digital technology adoption and millennial farmers' attitudes towards agricultural innovation.
b. In-depth Interviews

Jurnal Ekonomi
Volume 13, Number 04, 2024, DOI 10.54209/ekonomi.v13i04
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

Conducting in-depth interviews with millennial farmers, relevant stakeholders (local governments, research institutions, etc.), and agricultural experts to gain deeper perspectives.

c. Qualitative and Quantitative Data Analysis
   Analyzing qualitative data from interviews and case studies to identify trends, challenges, and opportunities in millennial farmers' transformation. Analyzing quantitative data to evaluate the level of digital technology adoption, its effectiveness, and its impact on agricultural productivity.
d. SWOT Analysis
   Conducting a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis to understand internal and external factors that may influence millennial farmers' transformation.
e. In-depth Literature Review
   Conducting an in-depth literature review on trends and best practices in agricultural digitalization, especially those relevant to Aceh's conditions.

Research Location Banda Aceh City, by exploring 5 sub-districts with potential millennial farmers: Syiah Kuala District, Jaya Baru District, Ulee Kareng District, Lueng Bata District, Banda Raya District. The selection of these sub-districts aims to gain a representative understanding of the potential, challenges, and characteristics of millennial farmers in various regions in Banda Aceh City.

Population and sample

The population in this study is the number of millennial farmers in each sub-district in Banda Aceh City: Syiah Kuala District: 137 people, Jaya Baru District: 64 people, Ulee Kareng District: 63 people, Lueng Bata District: 34 people. Banda Raya District: 33 people. Sample: The sample of this study was selected purposively. By taking 10 samples from each sub-district

Data Collection Techniques

a. Interview
   Conducting direct interviews with millennial farmers to gain an in-depth understanding of their experiences, perceptions, and challenges. Interviews can be conducted face-to-face or through virtual communication technology, depending on the availability and preferences of the respondents.
b. Questionnaire
   Compiling a structured questionnaire that includes questions relevant to the research objectives. Sending questionnaires to respondents to be filled out, either online or through traditional methods.
c. Observation
   Conducting direct observations of millennial agricultural practices and the use of digital technology in the field. Recording and analyzing the behavior of millennial farmers in implementing innovation and digital technology.
d. Document Study

Jurnal Ekonomi
Volume 13, Number 04, 2024, DOI 10.54209/ekonomi.v13i04
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

Collecting data from written sources such as scientific literature, government documents, and statistical reports related to agriculture and millennial farmers in Aceh. Focus Group Discussion (FGD): Conducting FGD with millennial farmer groups to gain deeper insights, facilitate group discussions, and identify common patterns.

Data Analysis Techniques

1. Descriptive Analysis:
   Involves presenting and summarizing quantitative data using descriptive statistics such as mean, median, mode, and standard deviation. Provides an overview of the data distribution and key characteristics of the respondents.
2. Qualitative Analysis:
   Applying a qualitative approach to explore the meaning and in-depth interpretation of qualitative data, such as interviews and observations. Using content analysis or thematic analysis techniques to identify patterns and themes that emerge from the data.
3. Inferential Statistical Analysis:
   If the data is quantitative and meets statistical assumptions, applying inferential statistical analysis such as hypothesis testing or regression to test the significance of the findings.
   Using relevant significance levels to draw meaningful conclusions. Types of Data,

Qualitative Data:

a. Qualitative Interviews, Gaining in-depth insights from Acehnese millennial farmers on their experiences, motivations, and challenges in agricultural transformation.
b. Focused Discussions, Analyzing the opinions and perceptions of millennial farmer groups regarding innovation and technology in agriculture.
c. Participatory Observation, Understanding agricultural practices directly and identifying changes that occur.

Quantitative Data

a. Quantitative Survei, Collecting data on specific variables, such as age, income, land area, and technology adoption, through structured questionnaires.
b. Agricultural Production Data, Measuring agricultural production, income, and other economic factors in numerical form.
c. Statistical Analysis, Analyzing quantitative data using statistical methods to obtain objective and measurable findings.
d. Longitudinal Data, Long-term monitoring: Collecting data over time to track changes and trends in millennial farming transformation.

Research Variables

Variable X (Independent Variable):

a. X1, Age of Millennial Farmers.
b. X2, Education Level of Millennial Farmers.
c. X3, Experience in Farming.
d. X4, Adoption of Digital Technology in Farming.

Variable Y (Dependent Variable):

a. Y1, Income from Farming Activities.

Jurnal Ekonomi
Volume 13, Number 04, 2024, DOI 10.54209/ekonomi.v13i04
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

b. Y2, Sustainability of Farming Practices.
c. Y3, Availability of Local Food.

Variable Z (Control Variable):

a. Z1, Geographical Location of Millennial Farming (sub-district).
b. Z2, Scale of Agricultural Production (land area or production per hectare).
c. Z3, Participation in Empowerment or Training Programs.

RESULTS AND DISCUSSION

The area of rice fields in Banda Aceh City is 58 hectares in 2023 according to the Decree of the Minister of ATR/BPN No. 686/SK-PG.03.03/XII/2019 quoted by the Aceh Agriculture and Plantation Service and in 2024 it will shrink to 56 HA. Based on data taken from Landsat-8 satellite imagery, the standard area of rice fields in Banda Aceh City in 2023 was recorded at 58 hectares. However, in 2024, the area decreased to 56 hectares. This decrease was caused by several factors, such as changes in land use, climate change, or suboptimal agricultural management. Made into new settlements, shops, and a number of public facilities. Rice fields in Banda Aceh City are located in five sub-districts, namely: Banda Raya, Jaya Baru, Lueng Bata, Syiah Kuala, Ulee Kareng

Each of these sub-districts has unique characteristics that affect agricultural practices. The decline in the standard area of rice fields in this area indicates the need for more attention to the management of agricultural resources and the need to implement technologies that can improve the efficiency and sustainability of agricultural practices. From a policy perspective, it is important to develop strategies that can maintain and even expand the area of agricultural land, including incentives for farmers and training programs to improve modern agricultural techniques.

The Aceh Agriculture and Plantation Service explained that in order to provide protection for agricultural land, Aceh Province has stipulated Qanun [Regional Regulation] Number 19 concerning the Aceh Regional Spatial Plan for 2013-2033. This is related to the strategy for developing cultivation areas with the utilization of cultivation areas effectively, efficiently, and sustainably.

However, the implementation of the qanun has not explicitly mandated the protection of agricultural land. Especially, ensuring sustainable food sovereignty in the form of land protection. Indonesia itself has Law Number 41 of 2009 concerning Sustainable Agricultural Land Protection. The mandate is clear, the protection of food agricultural land is an inseparable part of regional spatial planning.

SWOT Analysis

Strengths

1. Technology Adaptation: Millennial farmers tend to be quicker to adopt digital technologies, such as agricultural applications and IoT-based farm management systems, which can improve agricultural efficiency and productivity
2. Environmental Awareness: The younger generation is more concerned about sustainability, encouraging environmentally friendly agricultural practices and supporting food security.

Jurnal Ekonomi
Volume 13, Number 04, 2024, DOI 10.54209/ekonomi.v13i04
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

3. Government Support: Government programs that support millennial farmers in terms of training and access to modern technology can strengthen the capacity of millennial farmers

Weaknesses

1. Limited Knowledge: Many millennial farmers still lack knowledge and skills related to the use of modern technology in agriculture
2. Inadequate Infrastructure: Limited supporting infrastructure, such as unstable internet access, can hinder the implementation of digital technology
3. Limited Access to Capital: Millennial farmers may face difficulties in accessing capital to invest in modern agricultural technology.

Opportunities

1. Policy Support: Government and non-governmental organizations are increasingly providing support for food security programs and millennial farmer development, creating opportunities for innovation
2. Growing Market: Demand for organic and sustainable agricultural products is increasing, providing opportunities for millennial farmers to market their products
3. Increasing Market Demand: With increasing consumer awareness of local and organic products, there is a large market potential for agricultural products produced by millennial farmers.
4. Partnerships with the Private Sector: Partnerships with technology companies can facilitate the adoption of digital innovations in agriculture

Threats

1. Land Use Change: The decline in agricultural land area due to conversion to residential areas, shops, and public facilities threatens the availability of land for agriculture, which can reduce food production
2. Climate Change: Climate change factors can affect agricultural yields and increase the risk of losses due to extreme weather
3. Suboptimal Agricultural Management: Inefficient management practices can worsen land conditions, reduce soil fertility, and affect the sustainability of agriculture in Aceh.
4. Global Competition: Increased competition from foreign agricultural products can depress prices and reduce the competitiveness of local products.

SmartPLS Analysis

The SmartPLS results indicate a strong positive relationship between the adoption of digital technologies and increased agricultural productivity. The analysis also shows that government support and access to digital training programs significantly enhance the effectiveness of digital tools for millennial farmers.

Jurnal Ekonomi
Volume 13, Number 04, 2024, DOI 10.54209/ekonomi.v13i04
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

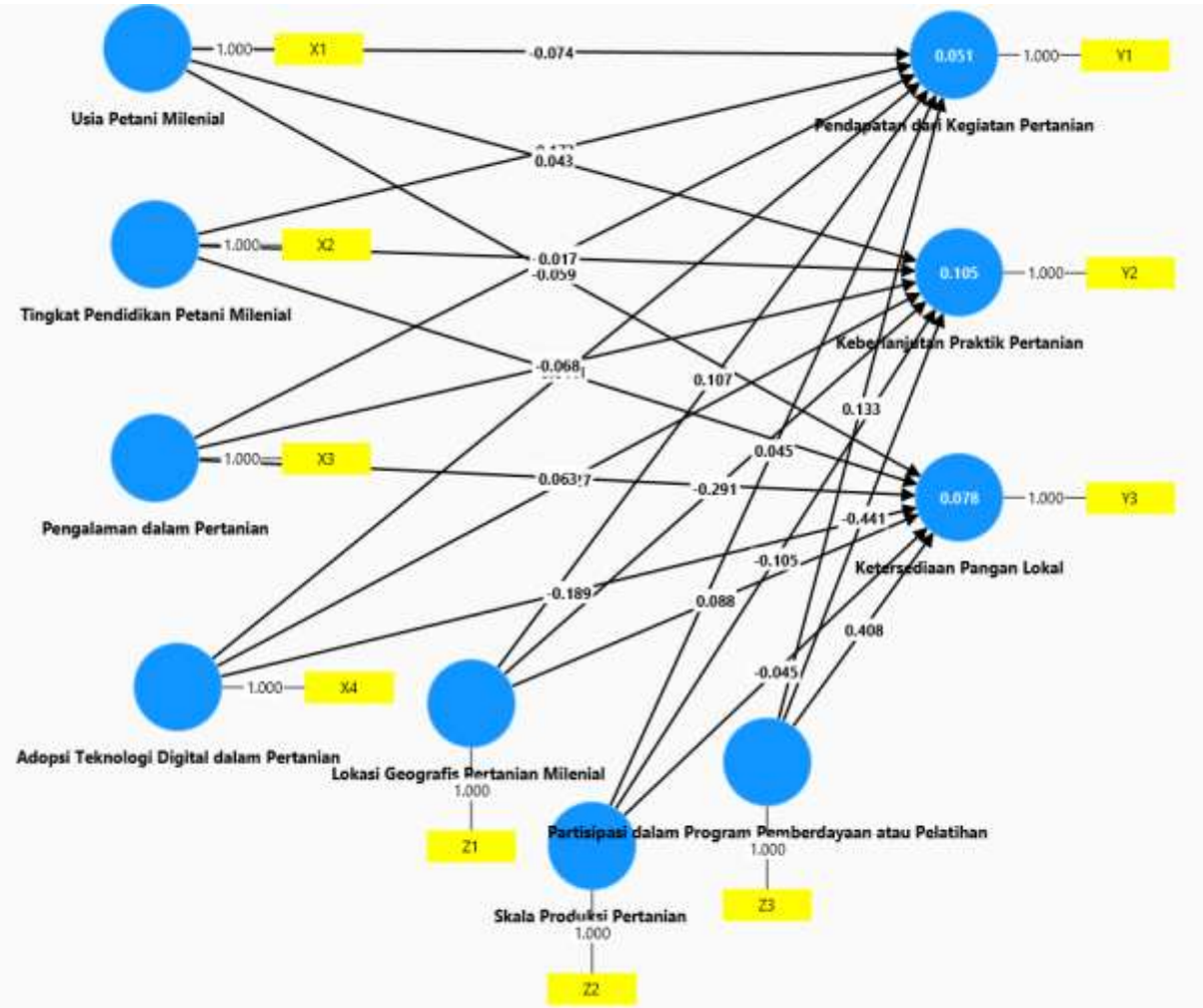

Figure 1. test result variable X, Y,Z

Positive Relationship:

a. X1 with Y1 (0.051): This relationship shows a very small positive influence, which means that the higher the value of X1 (Age of Millennial Farmers), the higher the value of Y1 (Income from Agricultural Activities). Although small, this shows that there is an influence that can be calculated.
b. X2 with Y2 (0.105): The positive relationship between X2 (Education Level of Millennial Farmers) and Y2 (Sustainability of Agricultural Practices) shows that increasing the level of education has the potential to increase sustainability in agricultural practices.

Negative Relationship:

1. X3 with Y3 (-0.441): This fairly strong negative relationship indicates that the higher the value of X3 (Experience in Agriculture), the lower the value of Y3 (Availability of Local Food). This reflects that experience in agriculture is not always directly proportional to the increase in the availability of local food, perhaps due to other factors such as the scale of production or the technology applied.
2. X4 with Y2 (-0.291): The negative relationship between X4 (Adoption of Digital Technology in Agriculture) and Y2 (Sustainability of Agricultural Practices) indicates

Jurnal Ekonomi
Volume 13, Number 04, 2024, DOI 10.54209/ekonomi.v13i04
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

that although digital technology can improve efficiency, there are some challenges in implementation that affect long-term sustainability.

Overall, these results indicate that some independent variables such as education level and age have a significant positive relationship, while experience in agriculture and adoption of digital technology negatively affect some aspects related to agriculture.

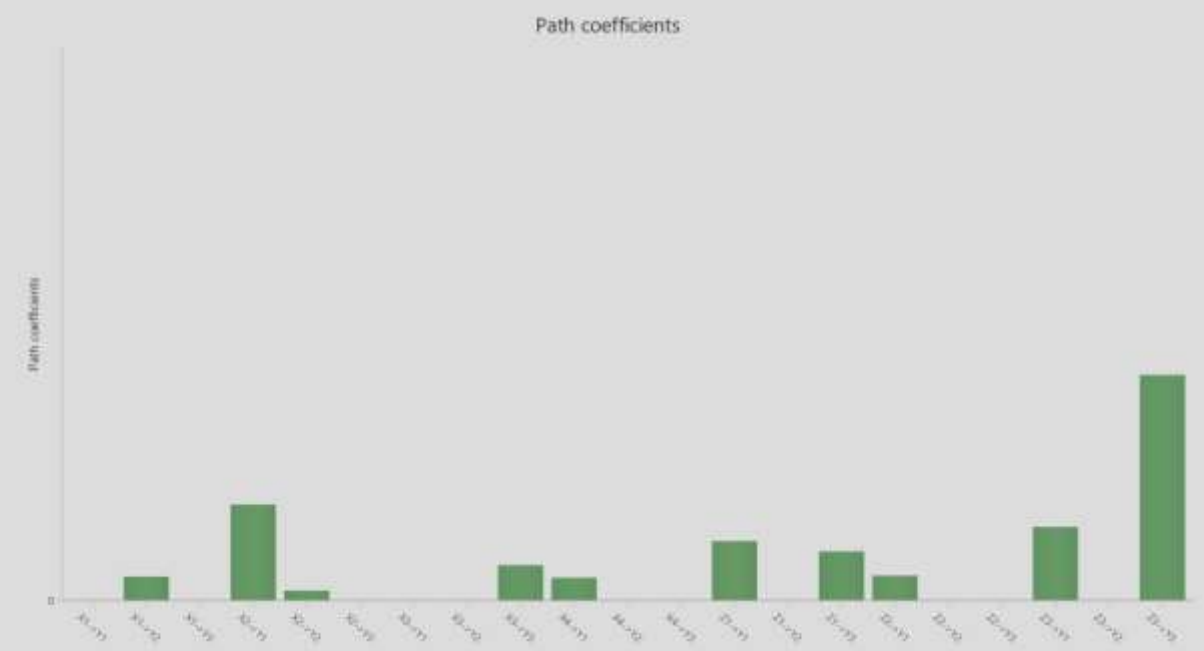

Figure 2. Path Coefficient analysis

Based on the path coefficients image above, the analysis is:

1. X2 → Y1 shows a fairly high path coefficient, indicating that the variable X2 (Education Level of Millennial Farmers) has a significant influence on Y1 (Income from Agricultural Activities).
2. Z3 → Y3 also shows a very high path coefficient, indicating that the variable Z3 (Participation in Empowerment or Training Programs) has a large influence on Y3 (Local Food Availability).
3. Most of the other path coefficients, such as X1 → Y2 and X4 → Y2, show a smaller influence. This indicates that these variables have a weaker influence on their respective dependents.
4. Very low path coefficients in some relationships, such as X3 → Y1 and Z1 → Y2, indicate that the relationship is less significant in this model.

Overall, variables with higher path coefficients, such as X2 → Y1 and Z3 → Y3, appear to play a stronger role in influencing the measured outcomes.

Jurnal Ekonomi
Volume 13, Number 04, 2024, DOI 10.54209/ekonomi.v13i04
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

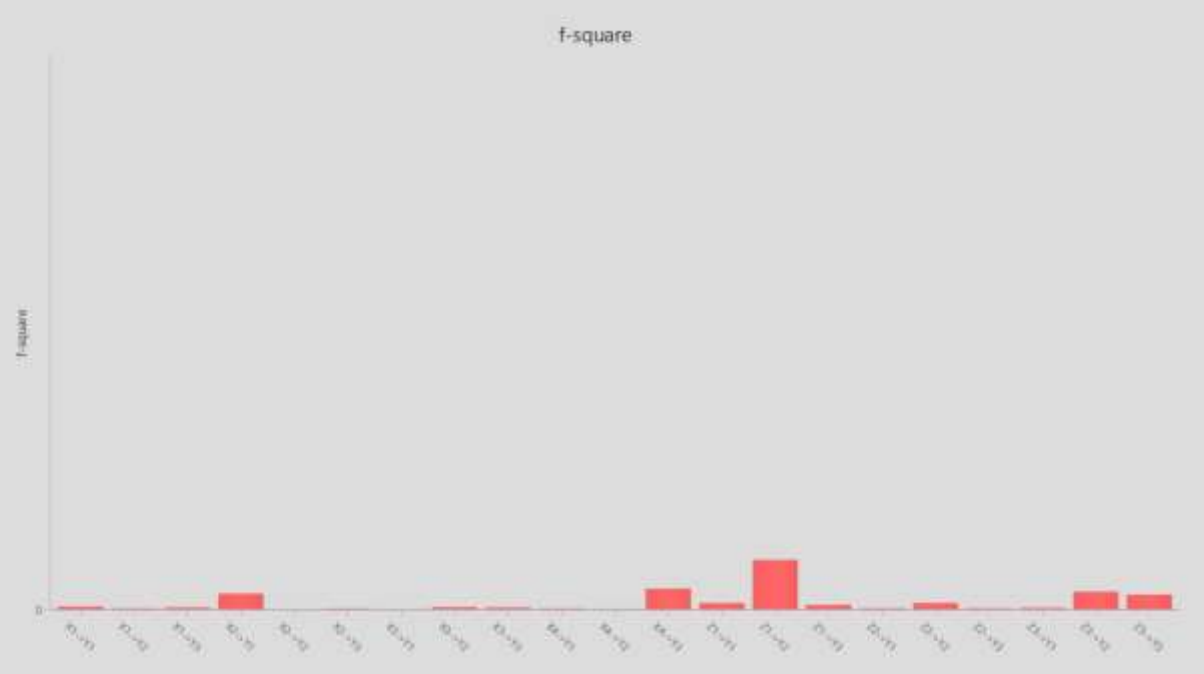

Figure 3. F Square

The F-Square test in SmartPLS above is used to assess the magnitude of the influence of independent variables on dependent variables in the path analysis model. Based on the f square diagram above, we can see the F-Square value for each relationship path between variables:

1. Small F-Square Value: Most of the relationships between variables show very small F-Square values (close to 0). This indicates that the influence between these variables tends to be weak. For example, the path X1 → Y1 or X2 → Y1 shows a very weak relationship between these variables.
2. Large F-Square Value: There is one relationship that shows a much larger F-Square value than the others, namely Z3 → Y3. This shows that Z3 has a greater influence on Y3 compared to other paths.

Overall, the results of this F-Square test show that most of the variables in the model have a weak relationship to the dependent variable, except for a few paths that show a significant influence such as Z3 → Y3.

Discussion

Based on the SWOT analysis obtained from the results of interviews with respondents, the following is the preparation of SO (Strengths-Opportunities), WO (Weaknesses-Opportunities), ST (Strengths-Threats), and WT (Weaknesses-Threats) strategies for the development of millennial farmers:

SO (Strengths-Opportunities)

a. Technology Adaptation + Policy Support: Leveraging millennial farmers' ability to adopt technology to leverage government policy support that encourages food security programs and millennial farmer development.

Jurnal Ekonomi
Volume 13, Number 04, 2024, DOI 10.54209/ekonomi.v13i04
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

b. Environmental Awareness + Growing Market: Leveraging millennial farmers' awareness of sustainability and market trends that lead to demand for organic products, to market sustainable agricultural products.
c. Government Support + Increasing Market Demand: Using training and technology access provided by the government to introduce local products that are in line with consumer demand that is increasingly concerned about organic and local products.

WO (Weaknesses-Opportunities)

a. Knowledge Limitations + Policy Support: Government training programs can be used to address millennial farmers' limited knowledge of the use of modern technology in agriculture.
b. Inadequate Infrastructure + Partnerships with the Private Sector: Partnerships with the private sector, especially technology companies, can help improve inadequate infrastructure and provide digital technology solutions to support agriculture.
c. Limited Access to Capital + Private Sector Partnership: Collaborate with the private sector to gain access to capital and investment in modern agricultural technologies.

ST (Strengths-Threats)

a. Technology Adaptation + Land Use Change: With IoT-based technology and farm management systems, millennial farmers can improve the efficiency of limited agricultural land use.
b. Environmental Awareness + Climate Change: Environmentally friendly agricultural practices can help mitigate the negative impacts of climate change and improve the sustainability of agricultural output.
c. Government Support + Suboptimal Farm Management: Use government support to improve more efficient farm management, thereby addressing soil fertility and agricultural sustainability issues.

WT (Weaknesses-Threats)

a. Limited Knowledge + Land Use Change: Millennial farmers need to increase their knowledge of more effective farming methods to address the threat of land conversion that can reduce agricultural output.
b. Inadequate Infrastructure + Climate Change: Inadequate infrastructure hinders the ability to adapt to extreme climate change. Therefore, infrastructure improvements are needed for agriculture to survive.
c. Limited Access to Capital + Global Competition: Without adequate access to capital, millennial farmers will have difficulty competing with foreign agricultural products. Access to financing is needed to increase competitiveness in the global market.

Based on the results of interviews with several millennial farmers, it shows the importance of education and mentoring by agricultural extension workers to improve the ability of millennial farmers to adopt new technologies. The role of extension workers in providing guidance and support is crucial in creating an ecosystem that supports sustainable agriculture amidst social and environmental changes. The role of extension workers is able to change the mindset of prospective millennial farmers and experiment with modern

Jurnal Ekonomi
Volume 13, Number 04, 2024, DOI 10.54209/ekonomi.v13i04
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

agricultural technology. Persistence is needed in facing initial challenges, such as nutritional errors, reflecting an important spirit of adaptation in the agricultural sector.
In addition, emphasizing innovation in agricultural methods, such as hydroponics and aquaponics, as an alternative to overcome the problem of limited land and increase agricultural yields.

It is also important to support sustainability and food security through ongoing training programs for farmers, so that they can develop the skills needed to adapt to climate change and growing market demand. The success of millennial farmers in generating significant income from their gardens shows the potential of modern agricultural models to contribute to local food security. The approach applied by millennial farmers can be adapted by other farmers in Aceh to increase food production, especially in facing challenges such as climate change and urbanization. Thus, research on the transformation of millennial farmers in Aceh is highly relevant and offers valuable insights into the role of technology and social support in creating more productive and sustainable agriculture.

CONCLUSION

The Role of Millennial Farmers in Food Security: Millennial farmers have great potential in adopting modern agricultural technology, which can increase agricultural productivity and sustainability. Therefore, it is important to continue to encourage the adoption of digital technology and ensure access to training and capital for them. Government Policy Support: Support provided by the government, both in terms of food security policies and access to technology, must be maintained and expanded. This will greatly assist millennial farmers in overcoming existing challenges, such as limited knowledge and inadequate infrastructure. Infrastructure Improvement: There needs to be infrastructure improvement, especially in terms of stable internet connections, to ensure that digital technology can be optimally implemented by millennial farmers. Collaboration with the private sector to provide better infrastructure will be very supportive. Facing Global Challenges and Climate Change: To face the threat of climate change and global competition, millennial farmers must be empowered with knowledge and environmentally friendly agricultural practices. More intensive education programs on efficient and sustainable agricultural management will strengthen the competitiveness of local agricultural products. Digital transformation has the potential to revolutionize agriculture in Aceh, especially for millennial farmers who are open to embracing new technologies. By addressing challenges such as infrastructure and financial access, and capitalizing on the opportunities presented by government policies, Aceh's millennial farmers can contribute significantly to national food security. Further investment in digital education and infrastructure will be crucial in scaling these initiatives and ensuring long-term sustainability.

ACKNOWLEDGEMENT

Researchers would like to express their gratitude to the Ministry of Education and Culture, DRPM, Vocation, for financing the Novice Lecturer Research grant for the 2024 fiscal year 2024 batch 3, based on Decree Number 1297/D4/AL.04/2024, as well as Politeknik Kutaraja

Jurnal Ekonomi
Volume 13, Number 04, 2024, DOI 10.54209/ekonomi.v13i04
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

which has facilitated lecturers to carry out and participate in activities in the PDP scheme through BIMA Vocation batch 3.

REFERENCE

ANAN, S. (2022) 'PERAN PETANI MILENIAL DALAM PENGEMBANGAN AGROWISATA DAN AGRIBISNIS DIKAWASAN TAMAN EDUKASI PERTANIAN MASYARAKAT (STUDI KELURAHAN PAMPANG, KAPANEWON PALIYAN, KABUPATEN GUNUNG KIDUL)'. Universitas Muhammadiyah Yogyakarta.

Arianto, B.-- (2021) 'Analisis Peran Buzzer Media Sosial dalam Memperkuat Kampanye Petani Milenial', *JRK (Jurnal Riset Komunikasi)*, 11(2).

Asnamawati, L. *et al.* (2023) 'APLIKASI TEKNOLOGI RITX SOIL DAN WEATHER SENSOR DALAM PENINGKATAN PRODUKSI PADI: BAGAIMANA ADOPSI INOVASI PETANI?', *Jurnal Agroqua: Media Informasi Agronomi dan Budidaya Perairan*, 21(2), pp. 480–497.

Chaireni, R. *et al.* (2020) 'Ketahanan Pangan Berkelanjutan', *Jurnal Kependudukan dan Pembangunan Lingkungan*, 1(2), pp. 70–79.

Chazar, C. and Rafsanjani, M.H. (2022) 'Penerapan Teachable Machine Pada Klasifikasi Machine Learning Untuk Identifikasi Bibit Tanaman', in *Prosiding Seminar Nasional Inovasi dan Adopsi Teknologi (INOTEK)*, pp. 32–40.

Christyanto, M. and Mayulu, H. (2021) 'Pentingnya pembangunan pertanian dan pemberdayaan petani wilayah perbatasan dalam upaya mendukung ketahanan pangan nasional: Studi kasus di wilayah perbatasan Kalimantan', *Journal of Tropical AgriFood*, 3(1), pp. 1–14.

Farha, I. (2023) *BPS Sebut Petani Milenial di Banda Aceh Capai 797 Orang*, *Aceh Journal National Networdk*. Available at: https://www.ajnn.net/news/bps-sebut-petani-millenial-di-banda-aceh-mencapai-797-orang/index.html (Accessed: 11 January 2024).

Fharaz, V.H., Kusnadi, N. and Rachmina, D. (2022) 'Pengaruh literasi digital terhadap literasi E-marketing pada petani', *Jurnal Agribisnis Indonesia (Journal of Indonesian Agribusiness)*, 10(1), pp. 169–179.

Haryanto, Y., Effendy, L. and Yunandar, D.T. (2022) 'Karakteristik Petani Milenial pada Kawasan Sentra Padi di Jawa Barat', *Jurnal Penyuluhan*, 18(01), pp. 25–35.

Ilyas, I. (2022) 'Optimalisasi peran petani milenial dan digitalisasi pertanian dalam pengembangan pertanian di Indonesia', in *FORUM EKONOMI*, pp. 259–266.

Indraningsih, K.S. (2017) 'Strategi diseminasi inovasi pertanian dalam mendukung pembangunan pertanian', in *Forum Penelitian Agro Ekonomi*, pp. 107–123.

Jaelani, A. and Hanim, T.F. (2021) 'Teknologi digital, keberlanjutan lingkungan, dan desa wisata di Indonesia', *Al-Mustashfa: Jurnal Penelitian Hukum Ekonomi Syariah*, 6(2), pp. 237–244.

Laba, M.S. and Saing, M.M. (2023) 'Transformasi Digital di Sektor Pertanian di Indonesia', *Jurnal e-bussiness Institut Teknologi dan Bisnis Muhammadiyah Polewali Mandar*, 3(2), pp. 49–53.

Maharani, F., Saryani, L. and Idris, I. (2022) 'Analysis of the Welfare Level of Rice Farmers

Using the Farmer ' s Exchange Rate (FER) Approach and Factors Affecting FER in South Tapanuli Regency', *Journal of Economics*, 10(02), pp. 1044–1055. Available at: http://ejournal.seaninstitute.or.id/index.php/Ekonomi.

Maharani, F., Saryani, L. and Idris, I. (2023) 'In North Sumatra Province, an Analysis of Farmer Change Rates and Economic Growth on the Human Growth Index', *Jurnal Ekonomi*, 12(04), pp. 1656–1668.

Mudatsir, R. and Syarif, A. (2023) *Kelembagaan Pertanian dalam Mewujudkan Ketahanan Pangan Nasional*. CV. Mitra Cendekia Media.

Nofita, M. and Sebastian, D. (2022) 'Technology Acceptance Models pada Teknologi Digital: Survey Paper', *KONSTELASI: Konvergensi Teknologi dan Sistem Informasi*, 2(2), pp. 309–320.

Noviar, H. *et al.* (2023) 'Tantangan Pengembangan Pertanian Wilayah Pedesaan (Studi Kasus Desa Leuken)', *Jurnal Pengabdian Agro and Marine Industry*, 3(1), pp. 16–27.

Nurjati, E. (2021) 'Peran Dan Tantangan E-Commerce Sebagai Media Akselerasi Manajemen Rantai Nilai Produk Pertanian', in *Forum Penelitian Agro Ekonomi*, pp. 105–115.

DI PERKOTAAN, B.D.T. (2022) 'HIDROPONIK INDOOR, SOLUSI KETERBATASAN LAHAN TERBUKA UNTUK', *Dinamika Kemajuan Dalam Studi Pembangunan Pertanian: Membangun Kesadaran dan Pengembangan Inovasi Pertanian*, p. 151.

Pratiwi, R.D., Salman, D. and Fahmid, I.M. (2022) 'Digitalisasi Pertanian melalui Program Kostratani pada Agribisnis Padi Sawah di Kecamatan Barebbo Kabupaten Bone', *Jurnal Sosial Ekonomi Pertanian*, 18(3), pp. 277–292.

Putra, D.T. *et al.* (2023) 'Pemanfaatan E-Commerce dalam Pemasaran Hasil Pertanian: Kelebihan dan Tantangan di Era Digital', *Jurnal Multidisiplin West Science*, 2(08), pp. 684–696.

Rachmawati, R.R. (2020) 'Smart Farming 4.0 Untuk Mewujudkan Pertanian Indonesia Maju, Mandiri, Dan Modern', in *Forum Penelitian Agro Ekonomi*, pp. 137–154.

Rachmawati, R.R. and Gunawan, E. (2020) 'Peranan petani milenial mendukung ekspor hasil pertanian di Indonesia', in *Forum penelitian agro ekonomi*. Indonesian Center for Agricultural Socioeconomic and Policy Studies, pp. 67–87.

Ridwan, S., Maulina, P. and Fahrimal, Y. (2022) 'Komunikasi Inovasi dalam Adopsi Benih Unggul Baru Tanaman Pangan pada Kelompok Tani di Kabupaten Nagan Raya', *Jurnal Sains Terapan: Wahana Informasi dan Alih Teknologi Pertanian*, 12(Khusus), pp. 165–180.

Rifai, B. and Mychelisda, E. (2023) 'Model Percepatan Adopsi Teknologi Digital Industri Makanan Minuman Berbasis Potensi Lokal Menuju Industri 4.0 Untuk Mendukung Ketahanan Pangan Nasional', *TheJournalish: Social and Government*, 4(5), pp. 211–231.

Salasa, A.R. (2021) 'Paradigma dan dimensi strategi ketahanan pangan Indonesia', *Jejaring Administrasi Publik*, 13(1), pp. 35–48.

Saputra, Y., Aliudin, A. and Mulyaningsih, A. (2023) 'Pengendalian Impor Kedelai dalam Upaya Mewujudkan Ketahanan Pangan Nasional di Kabupaten Serang', *Jurnal Agribisnis Terpadu*, 16(2), pp. 90–98.

Jurnal Ekonomi
Volume 13, Number 04, 2024, DOI 10.54209/ekonomi.v13i04
ESSN 2721-9879 (Online)
https://ejournal.seaninstitute.or.id/index.php/Ekonomi

Savira, R.P. *et al.* (2020) 'eduFarm: Aplikasi Petani Milenial untuk Meningkatkan Produktivitas di Bidang Pertanian', *Automata*, 1(2).

Septeri, D.I. (2023) 'Lahirnya Petani Milenial dan Peranannya dalam Pengembangan Agrowisata di Kabupaten Gunungkidul', *Jurnal Ilmu Sosial dan Humaniora*, 12(1), pp. 29–39.

Setyaningsih, A. (2020) 'Kebijakan food security: arah kebijakan dan strategi ketahanan pangan pemerintah Indonesia', *Journal of Governance Innovation*, 2(1), pp. 77–82.

Sianipar, B. and Tangkudung, A.G. (2021) 'Tinjauan ekonomi, politik dan keamanan terhadap pengembangan food estate di Kalimantan Tengah sebagai alternatif menjaga ketahanan pangan di tengah pandemi Covid-19', *Jurnal Komunikasi, Masyarakat dan Keamanan*, 3(1).

Sihombing, Y. (2022) 'Kebijakan Pembangunan Pertanian Berbasis Inovasi Teknologi sebagai Upaya Peningkatan Produksi Komoditas Pertanian Strategis dan Pendapatan Petani Mendukung Ketahanan Pangan', in *Prosiding Seminar Nasional Hasil Penelitian Agribisnis*, pp. 137–143.

Sihombing, Y. (2023) 'Inovasi Kelembagaan Pertanian dalam Mewujudkan Ketahanan Pangan', *Proceedings Series on Physical & Formal Sciences*, 5, pp. 83–90.

Simarmata, T. (2019) 'Percepatan transformasi teknologi dan inovasi dalam era smart farming dan petani milenial untuk meningkatkan produktivitas, nilai tambah dan daya saing pertanian Indonesia', in *Makalah pada rangkaian Seminar/Kuliah Umum tanggal*.

Sirajuddin, Z. and Kamba, P.L. (2021) 'Persepsi Petani terhadap Implementasi Teknologi Informasi dan Komunikasi dalam Penyuluhan Pertanian', *Jurnal Penyuluhan*, 17(2), pp. 136–144.

Sirate, S.F.S. *et al.* (2023) 'Pemanfaatan Teknologi Digital Bagi Masyarakat Kabupaten Takalar; Strategi Literasi Digital', *JOURNAL OF TRAINING AND COMMUNITY SERVICE ADPERTISI (JTCSA)*, 3(3), pp. 1–6.

Suarsana, K. and Karyati, N.K. (2020) 'Adopsi Teknologi Informasi Komputer Dan Implikasinya Bagi Pertanian Di Bali', *J. Manaj. AGRIBISNIS (Journal Agribus. Manag*, 8(1), p. 61.

Sudarmansyah, S. *et al.* (2021) 'Peran penyuluh pertanian dalam mendukung ketahanan pangan pada saat wabah pandemi Covid-19', *Jurnal Agribis*, 14(1).

Upadani, I.G.A.W., Martha, G.I.R. and Suryawan, I.K.D. (2023) 'PENGEMBANGAN USAHA PERTANIAN KOPI MELALUI PEMASARAN DIGITAL DI UUP. CATUR PARAMITHA', *WIDYA LAKSANA*, 12(1).

Utami, D.P. *et al.* (2021) 'Penguatan Kedaulatan Pangan dan Pendapatan Masyarakat di Era New Normal melalui Agripreneurship', *SELAPARANG: Jurnal Pengabdian Masyarakat Berkemajuan*, 4(3), pp. 918–927.

Widiyanti, E. (2023) 'PERAN PETANI MILENIAL DALAM PENGEMBANGAN PERTANIAN ORGANIK', *Kapita Selekta Pertanian Organik dan Pertanian Ramah Lingkungan*, p. 269.