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Posted Date: 15 May 2025

doi: 10.20944/preprints202505.1168.v1

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Article

Strategic Foresight and Digital Transformation: Enhancing the Resilience and Sustainability of Indonesian MSMEs

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Abstract: This study explores potential challenges Indonesian MSMEs may face over the next 10-20 years and proposes strategies to address them. Using strategic foresight methods, the research highlights the importance of digital transformation and legal reforms in enhancing MSME resilience and sustainability. Continuous legal and educational support is emphasized to empower MSMEs and ensure their significant contribution to Indonesia's economic prosperity and food security. Strategic foresight, scenario planning, and trend analysis are employed to identify emerging challenges and opportunities, ensuring MSMEs can navigate future trends effectively. Digital transformation and anticipation of future trends are key to creating resilient and sustainable MSMEs. The report notes that Indonesian MSMEs, which make up 99% of businesses, are vital for the economy. Digitalization is seen as a critical tool to expand market access, reduce costs, and optimize transactions. Legal reforms, such as the Omnibus Law, along with enhanced legal and educational support, are essential for MSMEs' growth and sustainability. By leveraging digital transformation and strategic foresight, Indonesia can ensure resilient and sustainable MSMEs that contribute significantly to food security and economic prosperity. Continuous legal and educational support will empower MSMEs to navigate future challenges and thrive in a dynamic economic environment. Embracing digitalization for broader market access and cost reduction is crucial. Policymakers should use strategic foresight to prepare for future trends and challenges, and continuous legal reforms and educational programs are essential to empower MSMEs and foster innovation.

Keywords: education; business law; MSMEs; Indonesia; sustainable; Omnibus law; food security

I. Introduction

Definition of Micro, Small, and Medium Enterprises (MSMEs), are a form of people's economic activity that is small-scale and meets certain criteria (S. Saiful, Hotma Napitupulu, and Sabar Napitupulu 2023). In Indonesia, the definition of MSMEs has been clarified through Law No. 20/2008 and Government Regulation Number 7 of 2021(Winarto, Santoso et al. 2022).

MSMEs are classified into three types according to (Kaukab 2023)

(1). Micro Business, Business with assets of up to IDR 50 million (including land and buildings) or annual income of up to IDR 300 million. (2) Small Business: Business with assets of more than IDR 50 million to IDR 500 million or annual income of more than IDR 300 million to IDR 2.5 billion. (3) Medium Business: Businesses with assets of more than IDR 500 million to IDR 10 billion or annual income of more than IDR 2.5 billion to IDR 50 billion.

The definition of food security according to de Oliveira Veras, M., et al., (2021, FAO 1983). is as follows;

Food security is the ideal situation when all people have physical, social, and economic access to enough, safe, and nutritious food and have the capacity to meet their food needs and preferences

aiming to promote a healthy life. Food security is a condition where all people have physical, social and economic access to obtain sufficient food, both in quantity and quality.

Food access by individuals or households to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal, political, economic, and social arrangements of the community in which they live including traditional rights such as access to common resources (Bailey et al. 2024)

The main factors of food security include the availability of food supply in good quantity and quality. The ability of an individual or family to obtain food. Affordability is food prices that can be reached by the public and are safe for consumption. Indonesia, although rich in natural resources, is currently facing challenges as a food-importing country. Food security is crucial considering population growth continues to increase (Akbari et al. 2022)

The role of MSMEs in Food Security is local food MSMEs significantly contribute to the local food industry, impacting economic growth and food security. They also play a role in developing local food processing and supporting food diversification (especially carbohydrate sources) to strengthen national food security(Hasanuddin et al. 2022).

Development of Local Food MSMEs is involved in developing local food, including tubers, sago, bananas, breadfruit, and pumpkin. Food processing technology enables the creation of various food preparations that complement rice as a daily menu. (Lin et al. 2022; AHMED and ÖZER CANARSLAN 2023; Wisnumurti 2023).

To improve food quality and safety, agriculturally processed food MSMEs prioritize quality and food safety, implementing practices like Good Processed Food Production Methods (GMP). Support for food diversification MSMEs contributes to food diversification through Local Food Industry Development (PIPL) activities, particularly focusing on carbohydrate sources. Overall, MSMEs play a crucial role in enhancing food security in Indonesia (Britwum and Demont 2022; Clapp et al. 2022a).

Food security in Indonesia are facing several challenges in ensuring food security, including, impacts of climate change, the COVID-19 pandemic, geopolitical dynamics, population growth, and future generations of farmers and fishermen. The pandemic has hampered land harvesting processes and the war between Russia and Ukraine has affected the food supply chain(Rabbi et al. 2023a; 2023b).

The role of MSMEs in food security is that MSMEs play an important role in the food sector in Indonesia. They are involved in various stages of the food supply chain, from production to distribution. However, they face several challenges such as limited access to resources, technology, and markets (García-Díez et al. 2021).

Future Directions for Indonesian MSMEs and Food Security the Indonesian government has implemented several strategic policies to address challenges related to food security and the role of Micro, Small, and Medium Enterprises (MSMEs). These policies aim to enhance domestic production, improve market access, and provide financial support to farmers.

1. Domestic Production Boost:

The government encourages increased domestic production by supporting MSMEs in agriculture and food processing. The involvement is promoting sustainable practices, improving productivity, and investing in technology.

2. Research and Innovation:

Strengthening research is crucial for MSMEs. Collaborations between research institutions, universities, and MSMEs can lead to innovative solutions for food security challenges.

3. Market Access and Financing:

Establishing farmer corporations helps improve market access for MSMEs. Access to financing is equally important, allowing MSMEs to invest in production, infrastructure, and technology.

4. Subsidies and Assistance:

Direct subsidies and assistance programs benefit small-scale farmers. These can include seed subsidies, training, and capacity-building initiatives.

5. Agricultural Insurance:

Protecting MSMEs through agricultural insurance mitigates risks associated with climate events, pests, and diseases.

6. Food Estate Development:

Creating food estate areas ensures sustainable food production. These areas focus on high-yield crops and efficient land use. Several problems caused a loss of 80-90% of income for MSMEs during the pandemic. Most Indonesian MSMEs face capital difficulties due to traditional management, lack of planning, and limited access to proper credit financing. Bank loans and proper credits require official business permits(Adeyanju et al. 2023; Clapp et al. 2022b)

a). Climate Change and Pandemics:

Climate change impacts crop yields and availability. Pandemics disrupt supply chains and reduce food access for vulnerable populations.

b). Geopolitical Factors:

Geopolitical dynamics affect trade and food prices. Ensuring stable international relations is essential for food security.

c). Population Growth and Succession Planning:

As Indonesia's population grows, planning for future generations of farmers and fishermen becomes critical.

d). Supply Chain Constraints (COVID-19):

The COVID-19 pandemic has disrupted supply chains, affecting food availability and affordability.

e) Imported Wheat Prices (Russo-Ukrainian War):

The conflict has led to higher prices for imported wheat, impacting households and food processing industries. Addressing challenges and implementing strategic measures will contribute to a more resilient and secure food system in Indonesia.

The Indonesian MSME strategy to ensure food security:

The Ministry of National Development Planning (Bappenas) and the United Nations Global Pulse (UNGP) have launched the report Strategic Foresight: The Future of MSMEs in Indonesia which presents the results of horizon scanning activities carried out to identify potential new issues that could impact Indonesian MSMEs in the next 10-20 year (Judijanto et al. 2023).

The foresight method is valuable for thinking and acting in the long term and anticipatory terms, ensuring that possible scenarios and assumptions are integrated into policy-making.

The government has prepared various strategies to monitor the stability of necessities prices to prevent sudden spikes, increase national food production based on smallholder agriculture, and support small farmers. The role of universities in supporting the growth of Indonesian MSMEs: Universities can play a crucial role in supporting MSMEs(Harsono et al. 2024). They contribute to economic and industrial growth in Indonesia. Higher education institutions fulfill. The three pillars of education, research, and community, including community service or Tridharma. Universities can help enhance knowledge transfer activities from academia to MSMEs (Cockshut, Brown, and Hardey 2020a; 2020b). These points provide a comprehensive overview of the current situation and future direction of Indonesian MSMEs in ensuring food security.

It is a complex issue that requires multifaceted solutions and collaboration among various stakeholders, including the government, universities, and MSMEs themselves (K. M., Aithal, and K. R. S. 2023)

Research Questions as follows;

1. What are the main challenges faced by MSMEs in the context of climate change, the COVID-19 pandemic, geopolitical dynamics, population growth, and future generations of farmers and fishermen and how do these challenges affect the ability of MSMEs to contribute to food security in Indonesia?
2. What is the role of MSMEs in the food supply chain in Indonesia and how do challenges such as limited access to resources, technology, and markets affect this role?

- What strategies and policies have been implemented by the Indonesian government to support MSMEs and food security? What are these strategies and policies effective in overcoming the challenges faced by MSMEs?

II. The Objective of Research

The article explores challenges faced by Indonesian micro, small, and medium enterprises (MSMEs) related to food security. The study aims to discuss strategies, solutions, and future directions for these businesses to overcome obstacles and contribute to ensuring food security in Indonesia. (Risnawaty et al. 2023).

The study aims to discuss strategies, solutions, and future directions for Indonesian MSMEs to overcome obstacles and contribute to ensuring food security in Indonesia.

III. Research Method

This study is conducted by focusing on three key domains:

Social, economic, and technology. The scanning and analysis were undertaken.

Using three core techniques: Desk research based on a range of literature, internet searches, press, and social media. Focus group discussions and workshops to validate and sense-check the insights generated by the output of the horizon. These drivers were documented, along with a summary of the most relevant underlying signals and their future implications (Octasylva et al. 2022; Johan, Hubeis, and Karno 2022).

1. Methodology:

Desk Research: Literature used, internet searches, press, and social media, conducted with experts and stakeholders. Focus Group Discussions and Workshops; Validated insights.

2. Findings; Documentation: Details relevant signals and their future implications.

3. Case Studies, conducting case studies on several MSMEs in Indonesia to understand the challenges they face. These case studies may include, observations, and document analysis. This survey conducts surveys to collect data from a - number of MSMEs. The survey of the role finds the MSMEs in food security and the challenges that they undergo.

2 Policy analyzes, government policies related to MSMEs and food security. The analysis includes legal research and public policy research.

3. Sector Analysis, carry out sector analysis to understand how various sectors (such as agriculture, fisheries and others) interact with MSMEs and contribute to food security.

4. Modeling and Simulation, use modeling and simulation techniques to predict how various factors (such as climate change and geopolitical dynamics) may affect MSMEs and food security in the future.

IV. Result of Analysis and Discussion

In Indonesia, MSMEs are defined and classified based on their capital and annual income, as stipulated in Law Number 20 of 2008 and Government Regulation Number 7 of 2021:

Micro Enterprises has capital: Up to IDR 1 billion (excluding land and buildings).

Annual Income: Up to IDR 2 billion.

Small Enterprises has capital: Between IDR 1 billion and IDR 5 billion.

Annual Income: Between IDR 2 billion and IDR 15 billion.

Medium Enterprises has capital: Between IDR 5 billion and IDR 10 billion.

Annual Income: Between IDR 15 billion and IDR 50 billion.

Role of MSMEs in the Indonesian Economy

- Employment: MSMEs are significant job creators, providing employment for a large portion of the population.
- Economic Growth: They contribute significantly to GDP, driving economic growth and stability.

3. Innovation: MSMEs encourage innovation and entrepreneurship, often resulting in new products and services.
4. Regional Development: They help develop rural and underdeveloped areas by promoting local businesses and industries.

A. Legal Criteria

MSMEs are subject to specific legal criteria as outlined in the laws and regulations (Hassan and Bhatti 2023). The legal framework for MSMEs in Indonesia includes several key regulations:

- a. Law No. 20 of 2008: This law provides basic definitions and classifications for MSMEs.
- b. Government Regulation No. 7 of 2021: This regulation further details the criteria for MSMEs, including capital and revenue limits, and introduces benefits and reliefs for MSMEs.
- c. Job Creation Law (Omnibus Law): This law aims to simplify business licensing and provide more support for MSMEs, making it easier for them to operate and grow.

These regulations are designed to support the growth and sustainability of MSMEs by recognizing their importance to the national economy.

Food security is defined as a situation where all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life. This concept is critical to ensuring the well-being and health of populations and is built on four key dimensions:

1. Availability: This refers to the physical presence of food, influenced by food production, stock levels, and net trade.
2. Access: Economic and physical access to food means that people have the resources to obtain food. It includes considerations of income, expenditure, markets, and prices.
3. Utilization: This dimension focuses on the body's ability to make maximum use of the nutrients in the food consumed. It involves appropriate food preparation, dietary diversity, and good care and feeding practices.
4. Stability: This ensures that the other three dimensions are stable over time, meaning that food security is not affected by adverse conditions such as weather, political instability, or economic factors.

The Importance of Food Security

1. Health: Adequate nutrition is essential for maintaining health, especially for children, as it affects their growth and development.
2. Economic Stability: Food security contributes to economic stability by ensuring that populations are healthy and productive.
3. Social Stability: It helps prevent conflict and social unrest that can arise from food shortages.
4. Environmental Sustainability: Sustainable food systems help protect the environment and ensure long-term food availability.

Factors contributing to Food Security

1. Agricultural Practices: Efficient and sustainable agricultural techniques can increase food production and availability.
2. Economic Policies: Policies that support fair trade, market access, and income generation can increase access to food.
3. Infrastructure: Good infrastructure, such as roads and storage facilities, ensures that food can be transported and stored effectively.
4. Education and Awareness: Educating communities about nutrition and food preparation can increase food utilization.
5. Political Stability: A stable political environment is essential to maintaining a consistent food supply chain.

Food security is a multifaceted issue that requires coordinated efforts across sectors to ensure that everyone has access to the food they need for a healthy life.

Table 1. MSMEs contribute to food security in Indonesia:.

Aspect	Contribution	Value
Developing Local Food Industries	Reduces dependency on imported goods- Supports local farmers and producers	Strengthens the resilience of the food supply chain and fosters local economic growth.
Supporting Food Diversification	Introduces a variety of food products and innovates with local ingredients	Ensures a balanced diet and reduces risk of food shortages
Ensuring Food Quality and Safety	Adheres to food safety standards and provides training for safe food production	Prevents foodborne illnesses and maintains public health
Economic Growth	Creates jobs and generates income	Increases purchasing power of communities and supports overall economic stability
Sustainability	Promotes sustainable agricultural practices and reduces food waste	Maintains a stable food supply and supports environmental conservation

Table 2. The challenges Indonesia faces in ensuring food security:.

Challenge	Details
Climate Change	Impact on Agriculture: Unpredictable weather, extreme events, rising temperatures and water scarcity: Changes in rainfall patterns affecting irrigation and water availability
COVID-19 Pandemic	Supply Chain Disruptions: Bottlenecks in distribution of food and inputs and economic Impact: Reduced income and increased unemployment affecting food purchasing power
Geopolitical Issues	Trade Disruptions: Increased prices of imported commodities like wheat and fertilizers and dependence on Imports: Vulnerability to global market fluctuations and trade restrictions
Population Growth	Increased Demand: Higher food demand due to population growth and urbanization: Shift in dietary patterns and increased demand for processed foods
Future of Farming	Aging Farmers: Decline in agricultural productivity due to aging farming population and technological Adoption: Limited access to modern farming technologies and practices
Policy Responses	Details
Social Protection Schemes	Direct assistance and cash-for-work programs to support farmers and consumers
Subsidies and Support	Changes in fertilizer subsidy policies and promotion of sustainable agricultural practices

This table provides a clear overview of the main challenges and policy responses related to food security in Indonesia.

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Several problems caused a loss of 80-90% of income for MSMEs during the pandemic. Most Indonesian MSMEs face capital difficulties due to traditional management, lack of planning, and limited access to proper credit financing. Bank loans and proper credits require official business permits. (Durán-Sandoval, Durán-Romero, and Uleri 2023) (Cockshut, Brown, and Hardey 2020b)

1. Climate Change and Pandemics:

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The foresight method is valuable for thinking and acting in the long term and anticipatory terms, ensuring that possible scenarios and assumptions are integrated into policy-making.

The government has prepared various strategies to monitor the stability of basic necessities prices to prevent sudden spikes, increase national food production based on smallholder agriculture, and support small farmers. The role of universities in supporting the growth of Indonesian MSMEs: Universities can play a crucial role in supporting MSMEs (Putri and Putri 2023; Winarto Santoso et al. 2022). These points provide a comprehensive overview of the current situation and future direction of Indonesian MSMEs in ensuring food security.

It is a complex issue that requires multifaceted solutions and collaboration among various stakeholders, including the government, universities, and MSMEs themselves (Reed et al. 2022).

1. Access Gaps:

Despite MSMEs playing a crucial role in local food production and processing, the exist gaps in their access to markets, technology, and resources. To address this, it is essential to enhance MSMEs' access to distribution channels, financing options, and knowledge-sharing platforms.

2. Digital Economic Transformation:

MSMEs must embrace digital technology. This transformation enables broader market access through e-commerce platforms and social media. With e-commerce, MSMEs can sell their products worldwide, unrestricted by geographical limitations.

3. Operational Efficiency:

By digitizing business processes, MSMEs can improve operational efficiency. Utilizing technologies like inventory management systems, cloud-based accounting, and customer relationship management (CRM) applications can reduce operational costs and enhance productivity.

4. Product and Service Innovation:

Analyzing data from social media and e-commerce platforms empowers MSMEs to develop innovative products and services aligned with market needs. For instance, MSME owners can adjust production and marketing strategies based on consumer preferences.

5. Effective Marketing:

Digital marketing enables MSMEs to run more efficient campaigns, reaching a wider audience and allowing better measurement of campaign results.

6. Collaboration and Partnerships:

MSMEs can collaborate with technology companies or digital platforms to strengthen their global market position. Such partnerships expand reach, enhance technological capabilities, and provide access to previously scarce resources.

7. Capacity Gaps:

MSMEs often face limitations in technical skills, infrastructure, and business management. Addressing these gaps involves capacity-building programs, training, and mentoring to enhance MSME capabilities.

8. Innovation Gap:

Encouraging MSMEs to adopt innovative practices—such as sustainable production methods, value addition, and product diversification—can help close the innovation gap. This requires increased research and development within MSMEs.

9. Policy Gaps:

Harmonizing policies related to MSMEs and food security is crucial. Advocacy for supportive policies, incentives, and regulations can create an environment conducive to MSME growth.

10. Collaboration Gap:

Strengthening collaboration among MSMEs, government institutions, research organizations, and NGOs is vital. Joint efforts can overcome food security challenges and amplify the impact of MSMEs.

1. Analyze Challenges faced by MSMEs in Indonesia Regarding Food Security:

Investigate how Micro, Small, and Medium Enterprises (MSMEs) encounter challenges related to food security. Consider factors such as climate change, the COVID-19 pandemic, geopolitical dynamics, population growth, and the impact on future generations of farmers and fishermen.

2. Understand the Role of MSMEs in Indonesian Food Security: Examine the involvement of MSMEs across different stages of the food supply chain (from production to distribution).

Highlight the challenges MSMEs face, including limited access to resources, technology, and markets.

3. Explore Strategies and Policies Implemented by the Indonesian Government:

Evaluate measures taken by the government to address MSME-related food security challenges. Examples include promoting domestic production, supporting research, establishing farmer corporations for better market access and financing, providing subsidies and direct assistance to farmers, and implementing agricultural insurance. Additionally, explore the development of food estate areas for sustainable food production.

4. Propose Solutions to enhance MSME contributions to food security:

Develop a comprehensive approach to overcome obstacles faced by MSMEs.

Address issues related to climate change, geopolitical dynamics, and technology access.

In Indonesia, Micro, Small, and Medium Enterprises (MSMEs) face multifaceted challenges that impact their ability to contribute to food security. These challenges include climate change effects, the COVID-19 pandemic, geopolitical dynamics, population growth, and the need to engage future generations of farmers and fishermen. Despite these obstacles, MSMEs play a crucial role in the food supply chain. The Indonesian government has implemented various strategies, such as promoting domestic production, supporting research, establishing farmer corporations, providing subsidies, and developing food estate areas. A holistic approach that the gap as follows;

Access Gaps: Although MSMEs have an important role in local food production and processing, there may be gaps in access to markets, technology and resources. To bridge this gap, it is necessary to increase MSME access to distribution channels, financing, and knowledge sharing platforms.

1. **Digital Economic Transformation:** MSMEs need to adopt digital technology. This transformation allows wider market access through e-commerce platforms and social media. With e-commerce, MSMEs can sell products to various corners of the world without being limited by geographic location.

2. **Operational Efficiency:** Digitalization of business processes helps improve the operational efficiency of MSMEs. By utilizing technology such as inventory management systems, cloud-based accounting, and customer relationship management (CRM) applications, operational costs can be reduced and productivity increased.

3. **Product and Service Innovation:** Data analysis from social media and e-commerce helps MSMEs develop products and services that are more innovative and in line with market needs. For example, MSME owners can adjust production and marketing strategies based on consumer preferences.

4. **Effective Marketing:** MSMEs can run more effective marketing campaigns through digital marketing. This allows them to reach a wider audience and better measure campaign results.

5. **Collaboration and Partnerships:** MSMEs can collaborate with technology companies or digital platforms to strengthen their position in the global market. This partnership allows MSMEs to expand their reach, improve technological capabilities, and utilize resources that were previously difficult to access.

6. **Capacity Gaps:** MSMEs may face limitations in terms of technical skills, infrastructure, and business management. Addressing this gap involves capacity building, training, and mentoring programs to improve MSME capabilities.

Capacity Gaps: MSMEs may face limitations in terms of technical skills, infrastructure, and business management. Addressing this gap involves capacity building, training, and mentoring programs to improve MSME capabilities.

To close the capacity gap in the MSME sector, there are several steps that can be taken:

1. **Training and Skills Improvement** Training programs that focus on technical, management, and marketing skills can help MSMEs increase their capacity. This may include training in technology use, financial management, and marketing strategies.

2. Assistance and Consultation MSMEs can benefit from assistance and consultation by business experts. This mentoring can help them overcome daily challenges and develop strategies for business growth.

3. Access to Infrastructure and Technology: The government and related institutions must ensure better access to basic infrastructure such as electricity, clean water, and internet access. In addition, facilitating MSME access to digital technology and e-commerce platforms is also important.

4. Partnership and Collaboration, MSMEs can work together with large companies, research institutions, and universities to share knowledge and resources. Such partnerships can help fill gaps in capacity.

5. Policy Development; The government needs to develop policies that support MSMEs, including tax incentives, financing, and legal protection. Policies that strengthen the capacity of MSMEs will have a positive impact on overall economic growth.

6. Innovation Gap: Encouraging MSMEs to adopt innovative practices, such as sustainable production methods, value addition, and product diversification, can help close the innovation gap. This involves increasing research and development within MSMEs.

Table 3. The bridging of Gap.

Solution	Description
Improving Financial Literacy and Management	MSMEs need to understand financial management and manage resources efficiently.
Adoption of Technology and Digitalization	Adopting technology, such as digital platforms and e-commerce, to improve efficiency and competitiveness.
Strengthening Networks and Partnerships	Collaboration with educational institutions and industry to broaden horizons and access to innovation.
Training and Skills Development	Develop skills in dealing with change and understanding market trends.
Advocacy for Pro-MSME Policies	The Intersection of Innovation and Sustainability: Unpacking the Role of MSMEs in Depok's Agricultural Sector (Yanto, S. S., & Kurniasih, F.2024)

1. Legal Evidence: In Indonesian law, evidence is crucial for court proceedings. The legal code specifies admissible types of evidence, and without proper presentation, there can be no trial (Hervina Puspitosari, Lilik Suprianti, and Alfian Chandra Ayuswantana 2021; Khuan, Judijanto, and Lubis 2024)

2. Environmental Challenges: Researchers and policymakers in Indonesia address environmental challenges related to forests, marine ecosystems, sustainable energy, air pollution, and urban transport. Collaboration and evidence-based approaches are essential for effective solutions (Osabohien et al. 2023; Janda et al. 2022).

3. Collaboration Gap: Strengthening collaboration between MSMEs, government institutions, research institutions, and NGOs is very important. Joint efforts can overcome challenges related to food security and increase the impact of MSMEs (Ohlan and Ohlan 2023; Bahiru, Senapathy, and Bojago 2023),

Collaboration between Micro, Small, and Medium Enterprises (MSMEs) government agencies, research institutions, and Non-Governmental Organizations (NGOs) has a key role in overcoming

challenges related to food security and increasing the impact of MSMEs (Widiawati, Ani Nuraini, and Arif Haryana 2023)

Some important points regarding this collaboration:

1. Strengthening MSMEs through Collaboration:

Market Access: Collaboration between MSMEs can expand marketing networks and reach wider markets.

Competitiveness: Collaboration with other parties, such as large companies or research institutions, helps MSMEs improve the quality of their products and services.

2. Role of Government and Private Sector:

Government: Government involvement in providing training, financing (including People's Business Credit/KUR), and support for MSMEs is very important.

Private: Collaboration with private companies helps MSMEs access technology, knowledge, and networks that support their growth

3. Government Funds for NGOs:

Indonesia issued regulations that make it easier for the government to use NGO services. This regulation has the potential to improve the quality of services for poor and marginalized communities, as well as provide access to funding needed by NGOs.

The article explores challenges faced by Indonesian micro, small, and medium enterprises (MSMEs) related to food security. The study aims to discuss strategies, solutions, and future directions for these businesses to overcome obstacles and contribute to ensuring food security in Indonesia. Shinozaki, S.(2022).

Table 4. Challenges Faced by MSMEs and Their Impact on Food Security.

Challenge	Impact on MSMEs	Effect on Food Security
COVID-19 Pandemic	Disrupted operations due to mobility restrictions and changes in consumer behavior.	Opened opportunities for adaptation and innovation.
Limited Access to Financing	Difficulty in securing funding, especially outside Java.	Categorizes many MSMEs as vulnerable, affecting their stability and growth.
Digital Readiness	Need for digital transformation to remain competitive.	Challenges in understanding technology, internet access, and utilizing digital platforms.
Marketing Access	Obstacles in marketing products and services.	Necessitates effective marketing strategies and wider market access.

Table 5. Role of MSMEs in the Food Supply Chain.

Role	Description
Acceleration of Digital Transformation	Strengthening MSMEs through digital technology and access to marketing via digital platforms.
Strengthening the Local Food MSME Sector	Growing the local food industry, impacting economic growth and food security.
Vital Role in Strengthening the Supply Chain	Ensuring supply chain resilience during economic crises or natural disasters.
Inter-MSME Cooperation	Forming consortia or collaborations to increase collective bargaining power.

Table 6. Government Strategies and Policies.

No.	Policy and Strategy	Effectiveness
1	Increasing Domestic Production and Research	Improves domestic food quality and productivity.
2	Formation of Farmers Corporations	Provides better bargaining power to farmers regarding market access and financing.

Research Questions 1.: What are the main challenges faced by MSMEs in the context of climate change, the COVID-19 pandemic, geopolitical dynamics, population growth, and future generations of farmers and fishermen? How do these challenges affect the ability of MSMEs to contribute to food security in Indonesia?

The challenges faced by Micro, Small and Medium Enterprises (MSMEs) in Indonesia in the context of climate change, the COVID-19 pandemic, geopolitical dynamics, population growth, and future generations of farmers and fishermen are very diverse are some of the main relevant challenges: (1) COVID-19 Pandemic: The pandemic has drastically changed the way the world works. Mobility restrictions and changes in consumer behavior affect MSMEs. However, the pandemic also opens up new opportunities for adaptation and innovation. (2). Limited access to financing: MSMEs often face difficulties in accessing financing. Especially outside Java, where many MSMEs are categorized as vulnerable. (3). Digital Readiness Digital transformation is important for MSMEs to be able to compete. This challenge involves understanding technology, internet access, and utilizing digital platforms. (4) Marketing Access: MSMEs need to overcome obstacles in marketing their products and services. Effective marketing strategies and access to a wider market are challenges.

How do these challenges affect the ability of MSMEs to contribute to food security in Indonesia? Even though these challenges exist, MSMEs still have a vital role in food security, with support and innovation, MSMEs can play a role in local food production, distribution, and strengthening the food supply chain. Universities and educational institutions can also play a role in providing training and knowledge to MSMEs to overcome these challenges (Rabbi et al. 2023a)

Research Question 2; What is the role of MSMEs in the food supply chain in Indonesia and how do challenges such as limited access to resources, technology, and markets affect this role? (Widiawati, Ani Nuraini, and Arif Haryana 2023; Saputra and Inayatuloh 2020)

MSMEs (Micro, Small, and Medium Enterprises) have a significant role in food and economic security in Indonesia. The following are several examples and analyses related to the role of MSMEs in the food supply chain:

(1) Acceleration of Digital Transformation of Food MSMEs;

Food MSMEs need to be strengthened in an integrated economic ecosystem, including adapting to the expanded use of digital technology. Access to marketing via digital platforms can help MSMEs expand their reach and increase their competitiveness

(2) Strengthening the Local Food MSME Business Sector:

Local food MSMEs play an important role in growing the local food industry, which in turn has an impact on economic growth and food security.

(3) The Vital Role of MSMEs in Strengthening the Supply Chain:

MSMEs not only contribute to the economy but also have a vital role in increasing supply chain resilience. When an economic crisis or natural disaster occurs, MSMEs often become lifesavers by ensuring the continuity of food supplies.

(4). Inter-MSME Cooperation to Increase Bargaining Power:

The formation of a consortium or collaboration between MSMEs can strengthen their position in the supply chain and increase collective bargaining power.

Research question 3. What strategies and policies have been implemented by the Indonesian government to support MSMEs and food security? To what extent are these strategies and policies

effective in overcoming the challenges faced by MSMEs?. (Faisal, Hermawan, and Arafah 2018; Lin et al. 2022)

Table 6. Strategy and policies support the MSMEs and Food Security.

No.	Policy and Strategy	Effective
1	Increasing Domestic Production and Research on the Capacity of Farmers and Fishermen	Improving domestic food quality and productivity
2	Formation of Farmers Corporation	Providing better bargaining power to farmers regarding market access and financing
3	Financial supports	Subsidies and direct assistance to increase the availability of production capital and protection of agricultural businesses.
4	Integrated Infrastructure	Development of Food Estate and strengthening of national food reserves.
5	Budget Allocation for Food Security	Focus on food availability, accessibility, and price stability.

Even though this strategy has been implemented, challenges such as limited infrastructure, changes in land use, and inequality of supply across time and regions still affect MSMEs. However, these steps are concrete efforts to overcome the problem of food security and support the growth of MSMEs in Indonesia.

4. Solutions to overcome barriers: What multi-faceted approaches can be effective in overcoming the barriers faced by MSMEs in contributing to food security? How can issues related to climate change, geopolitical dynamics, technology access and others be addressed in this context? The food security challenge in Indonesia involves various aspects, including economic, social, political, and environmental. To overcome the obstacles faced by Micro, Small and Medium Enterprises (MSMEs) in contributing to food security, there are several approaches that can be applied:

1. Strengthening Infrastructure: MSMEs need good access to infrastructure such as transportation, energy, and communications. Investment in infrastructure will help increase the productivity and competitiveness of MSMEs.

2. Increasing HR Capacity, training, and education for MSME owners and their employees will help improve the skills and knowledge needed to face changes in the business environment.

3. Product and Market Diversification: MSMEs need to develop their product portfolio and look for new market opportunities. Diversification will help reduce risk and increase business resilience.

4. Collaboration and Networking: MSMEs can work together with business partners, research institutions, and governments to share knowledge, resources, and opportunities. This network will help overcome barriers and expand market access.

5. Adaptation to Climate Change: MSMEs must consider the impact of climate change on food production and distribution. The use of environmentally friendly technologies and sustainable agricultural practices can help reduce vulnerability to weather changes.

6. Risk Management: MSMEs need to identify and manage risks related to market uncertainty, policy changes, and natural disasters. Insurance and other financial instruments can help protect MSMEs from losses.

7. Use of Technology: MSMEs can utilize information and communication technology to increase operational efficiency, access markets, and communicate with customers.

Issues related to climate change, geopolitical dynamics, and access to technology must be considered in designing policies that support MSMEs. Holistic and evidence-based policies will help ensure MSMEs' contribution to sustainable food security.

Conclusion

The challenges faced by Micro, Small, and Medium Enterprises (MSMEs) in Indonesia are very diverse, especially in the context of climate change, the COVID-19 pandemic, geopolitical dynamics, population growth, and future generations of farmers and fishermen. Even though these challenges exist, MSMEs still have a vital role in food security in Indonesia. With support and innovation, MSMEs can play a role in local food production, distribution, and strengthening the food supply chain. Universities and educational institutions can also play a role in providing training and knowledge to MSMEs to overcome these challenges. All of this will contribute to better food security for Indonesia.

MSMEs (Micro, Small, and Medium Enterprises) play an important role in Indonesia's food supply chain. They contribute to economic resilience and food security. The strategies include digital transformation, strengthening local MSME businesses, and collaboration between MSMEs. Government policy focuses on domestic production, financial support, and integrated infrastructure. Challenges still exist, but this effort aims to increase food security and support the growth of MSMEs in Indonesia.

The following are conclusions regarding a multi-aspect approach that can be effective in overcoming the obstacles faced by Micro, Small, and Medium Enterprises (MSMEs) in contributing to food security:

1. Strengthening Infrastructure: MSMEs need good access to infrastructure such as transportation, energy, and communications. Investment in infrastructure will help increase the productivity and competitiveness of MSMEs.
2. Increasing HR Capacity: Training and education for MSME owners and their employees will help improve the skills and knowledge needed to face changes in the business environment.
3. Product and Market Diversification: MSMEs need to develop their product portfolio and look for new market opportunities. Diversification will help reduce risk and increase business resilience.
4. Collaboration and Networking: MSMEs can work together with business partners, research institutions, and the government to share knowledge, resources, and opportunities. This network will help overcome barriers and expand market access.
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Issues related to climate change, geopolitical dynamics, and access to technology must be considered in designing policies that support MSMEs. Holistic and evidence-based policies will help ensure MSMEs' contribution to sustainable food security.

Implications:

The implications of a multi-faceted approach to overcome the obstacles faced by MSMEs in contributing to food security are as follows:

1. Increasing Economic Welfare: By strengthening infrastructure, increasing human resource capacity, and diversifying products, MSMEs can increase productivity and competitiveness. The impact on the economic welfare of MSME owners and society as a whole.

2. Resilience towards Change: Collaboration and networking help MSMEs face changes in the business environment. Adaptation to climate change and risk management also increase business resilience.

3. Contribution to Food Security: With access to technology and the use of sustainable practices, MSMEs can contribute to national food security. Policies that support MSMEs will strengthen their role in the food system.

The implications of a multi-faceted approach to overcome the obstacles faced by MSMEs in contributing to food security are as follows:

1. Increasing Economic Welfare: By strengthening infrastructure, increasing human resource capacity, and diversifying products, MSMEs can increase productivity and competitiveness. The Impact on the economic welfare of MSME owners and society as a whole.

2. Resilience towards Change: Collaboration and networking help MSMEs face changes in the business environment. Adaptation to climate change and risk management also increase business resilience.

1. Contribution to Food Security:

MSMEs, with access to technology and the adoption of sustainable practices, play a crucial role in enhancing national food security. Policies that specifically support MSMEs will further strengthen their position within the broader food system.

2. Recommendations for Future Research:

Enhancing Economic Welfare: Strengthening infrastructure, expanding human resource capacity, and diversifying product offerings can boost productivity and competitiveness for MSMEs. Positively impacts the economic welfare of both MSME owners and society as a whole.

3. Building Resilience: Collaboration and networking are essential for MSMEs to navigate changes in the business environment. Additionally, adapting to climate change and implementing effective risk management strategies contribute to greater business resilience.

Acknowledgments: Presented paper: "Strategic Foresight and Digital Transformation: Enhancing the Resilience and Sustainability of Indonesian MSMEs," presented on November 4–5, 2024, at the 6th ICLAVE 2024 Conference, held at the Faculty of Law, University of Indonesia, Depok, West Java, Indonesia.

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