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Research Article

# Understanding Food Safety Certification: Key Determinants, Barriers, and Antecedents

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**ABSTRACT:**
This study aims to identify the elements influencing food safety certification adoption and conduct a thematic analysis using the Technology-Organization-Environment (TOE) framework and eco-innovation principles to determine focus areas for stakeholders. A comprehensive literature search was conducted, followed by thematic analysis based on four themes: technology, organization, environment, market pull, and regulation pull/push. The review identified 33 key elements related to food safety certification adoption, classified into three categories: 12 determinant elements driving adoption, 9 barrier elements representing challenges faced by farmers, and 12 antecedent elements as pre-existing conditions influencing adoption. The findings reveal that market pull is a dominant determinant, significantly influencing certification adoption, while regulation pull/push factors emerge as the most significant barriers. Furthermore, organizational factors play a crucial role in the successful adoption of food safety certification among producers. Based on these insights, stakeholders, including policymakers and farmers, should prioritize addressing barriers while reinforcing drivers of certification adoption. Streamlining regulatory frameworks and creating incentives for small-scale producers will enhance accessibility and support. Increasing consumer awareness and strengthening internal organizational capacities through targeted training programs can further promote certification practices. However, this study acknowledges several limitations, including the potential variability of thematic elements across regions, which may affect the applicability of the findings. Future research should gather expert opinions on identified elements, explore region-specific influences, and examine the long-term impact of certification on farm profitability and market competitiveness to foster sustainable certification adoption.

**KEYWORDS:** Food Safety Certification, Determinant, Barrier, Antecedent, Thematic Analysis, TOE Framework, Eco Innovation

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## INTRODUCTION

Food safety certification has become crucial in modern agriculture, reflecting a growing global concern for public health and food security. As people worldwide become more aware of the importance of safe food consumption, the demand for food safety certifications increases. These certifications ensure that food products meet specific health and safety standards, protecting consumers from foodborne illnesses and other health risks (Todd, 2020). In addition to safeguarding public health, food safety certifications also help foster consumer trust in the products they purchase, ensuring that food is produced and handled safely (Rezvani Ghalhari et al., 2021; World Health Organization, 2022). Moreover, food safety certifications are essential for international trade, as many



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countries require imported food products to comply with their safety regulations (Liu et al., 2021). This means that farmers and producers must obtain the necessary certifications to access broader markets, which can significantly enhance their business opportunities.

In Malaysia, agriculture plays a vital role in the economy, providing employment and contributing to food security for the population. The sector encompasses a wide range of activities, including the cultivation of crops and the raising of livestock. Despite its importance, the adoption of food safety certifications among Malaysian farmers is not as widespread as it should be. According to Omar et al. (2023), only 1 over 32 registered farmers in system E-Ladang Kontrak have food safety certification either Malaysia Good Agricultural Practice (MyGAP) or Malaysia Organic. Many farmers face various challenges that hinder their ability to obtain and maintain these certifications. For instance, the costs associated with the certification process can be a significant burden, especially for small-scale farmers who operate on tight profit margins (Nazar & Mawarni, 2023). Additionally, there may be a lack of access to training and resources needed to understand the certification requirements, making it difficult for farmers to navigate the process (Clements & Bihn, 2019). Some farmers may also feel overwhelmed by the complexity of the certification process, leading to hesitation in pursuing it.

Furthermore, there is often insufficient knowledge about the benefits of food safety certifications and how they can enhance market access (Gordon & Schreurs, 2020). Many farmers may not fully realize that obtaining certification can lead to higher prices for their products and increased consumer demand (Zubaidi, 2020). The diverse nature of Malaysia's agricultural sector, with its variety of crops and livestock, underscores the need for tailored approaches to food safety certification. Each type of product may have specific requirements and standards that need to be met, complicating the certification process even further. Therefore, addressing these barriers is essential for encouraging Malaysian farmers to adopt food safety certifications and improving the overall quality and safety of food in the country.

The purpose of this study is to explore the factors that influence food safety certification adoption among farmers in Malaysia. By identifying the key determinants, barriers, and antecedents to certification adoption, this research aims to provide valuable insights for policymakers, agricultural organizations, and farmers themselves. To facilitate a more effective understanding of stakeholders, this study uses a thematic analysis to classify the adoption elements of food safety certification. The technology, Organization, and Environment (TOE) Framework will be integrated with Eco-Innovation theory to provide a more robust understanding to stakeholders. Together, these frameworks will offer a comprehensive understanding of the challenges and motivations behind food safety certification adoption in Malaysia, ultimately leading to more effective strategies to promote food safety and quality in the agricultural sector.

## LITERATURE REVIEW

### *Food Safety Certification and its Adoption in the Agricultural Sector*

Food safety certification is an essential component in ensuring the safety, quality, and traceability of food products within global supply chains (Shirabe & Gurol, 2013). It has become especially crucial in the agricultural sector, where the risk of contamination and foodborne illnesses is significant. Research has shown that certification not only increases consumer confidence but also enhances the marketability of agricultural products, allowing producers to meet international standards and access new markets (Guo et al., 2019). This is particularly important in developing countries like Malaysia, where agricultural exports form a substantial part of the economy. Certification systems such as



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Hazard Analysis and Critical Control Points (HACCP), Good Agricultural Practices (GAP), and GlobalGAP are among the most widely recognized schemes globally.

In the context of Malaysia, government initiatives, such as the Malaysian Good Agricultural Practices (MyGAP) certification, have been introduced to encourage farmers to adopt safer and more sustainable farming practices (DOA, 2023). These programs have helped to raise awareness about food safety and improve the competitiveness of Malaysia's agricultural products in international markets. However, the uptake of these certifications has been uneven across the sector, with larger, export-oriented farms adopting them more readily compared to smaller, domestic-focused operations (Fitrianingrum et al., 2017). Studies suggest that factors such as cost, lack of knowledge, and limited access to resources hinder small-scale farmers from adopting food safety certifications (Nawi & Nasir, 2014).

Research has also examined the role of external pressures, such as market demand and regulatory requirements, in driving certification adoption. For example, export-oriented farmers are more likely to adopt certifications to meet the stringent import requirements of countries like the European Union (EU) and Japan (Cabrera & Pastor, 2022). In contrast, smallholder farmers, who typically supply local markets, may not see immediate benefits from certification and therefore are less motivated to comply with international standards. The divergence in adoption rates highlights the need for tailored interventions that address the specific barriers faced by different segments of the farming community (Dvouletý et al., 2021).

Overall, while food safety certification is recognized as a vital tool for ensuring food quality and safety in Malaysia's agricultural sector, significant gaps remain in terms of equitable adoption. Addressing these gaps is crucial for ensuring that all farmers, regardless of size or market orientation, can participate in and benefit from certified food systems (Gotteland et al., 2020).

### *The Importance of Thematic Analysis in Understanding Food Safety Certification Adoption*

Thematic analysis offers a structured method for identifying patterns within data. In studies focusing on food safety certification adoption among farmers, thematic analysis helps to explore complex behavioral, social, and economic factors that influence decision-making. Its flexibility allows researchers to generate a rich understanding of the challenges and motivations that shape adoption rates (Braun & Clarke, 2012). This makes it particularly suitable for addressing questions of how and why farmers choose to adopt or resist certification schemes like GlobalGAP, HACCP, and Malaysia's Good Agricultural Practices (MyGAP).

Thematic analysis is essential for uncovering the contextual factors that influence farmers' decisions to adopt food safety certification. For instance, through thematic analysis, researchers can identify recurring themes related to cost-benefit concerns, such as how small-scale farmers might perceive certification as a financial burden despite its potential long-term benefits (Guest et al., 2011). Similarly, themes related to knowledge gaps often emerge, revealing that many farmers are unaware of the specific advantages that certification can offer in terms of market access or premium pricing (Lochmiller, 2021). These insights are crucial for stakeholders, especially policymakers, as they develop targeted education or subsidy programs to increase adoption.

Furthermore, thematic analysis aids in exploring external influences such as market demands, government policies, and buyer pressures that affect farmers' adoption behavior. By analyzing data, researchers have found that pressures from buyers, especially international ones, can drive the adoption of certification to meet export requirements (Mook & Overdevest, 2021). Thematic analysis



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helps categorize these external forces into distinct, actionable themes, allowing stakeholders to understand the broader socio-economic environment that encourages or discourages certification adoption (Xu & Lu, 2021). This can guide the development of more effective incentives or regulatory measures to align with market needs.

Thematic analysis also reveals cultural attitudes and social norms that shape farmers' perceptions of food safety certification. Studies that employ thematic analysis have shown that traditional farming practices, combined with community attitudes toward modern agricultural regulations, often play a significant role in farmers' resistance to change (Kim et al., 2017). These findings help stakeholders understand the social dimensions of certification adoption, facilitating the design of culturally sensitive outreach programs that address farmers' concerns and provide them with the necessary tools to engage with modern safety standards.

In summary, thematic analysis offers a comprehensive approach to understanding the multilayered factors affecting food safety certification adoption. By identifying key themes, such as economic considerations, external pressures, and cultural perceptions, thematic analysis provides valuable insights for stakeholders like government agencies, certification bodies, and agribusinesses. These insights help in crafting policies and programs that address the specific barriers and motivations identified, thereby supporting informed decision-making aimed at increasing certification uptake among farmers (Braun & Clarke, 2021).

### *TOE Framework and Eco-Innovation Theory*

The Technology-Organization-Environment (TOE) framework is widely used to explain the adoption of innovations, including food safety certifications. The TOE framework posits that the adoption of new technologies or processes is influenced by three interrelated contexts: technological, organizational, and environmental (Depietro et al., 1990). In the case of food safety certification, the technological context refers to the availability and accessibility of certification tools and technologies, such as auditing systems and traceability software. Organizational factors include the size of the farm, managerial capabilities, and financial resources, while environmental factors encompass market demand, regulatory pressures, and competitive dynamics (Tornatzky et al., 1990).

Several studies have applied the TOE framework to understand the adoption of food safety certification in the agricultural sector. For example, research by Danuri et al. (2019)found that Malaysian farmers are more likely to adopt certification when they have access to affordable technologies and supportive organizational structures. Moreover, farms that are larger and export-oriented tend to have more resources and are better positioned to meet certification requirements compared to smaller farms (Bahari et al., 2024). On the environmental side, external pressures such as buyer requirements, international market standards, and government policies also play a significant role in encouraging adoption (Jamalut et al., 2022).

The TOE framework's emphasis on the interaction between internal and external factors makes it a valuable tool for understanding why some farmers adopt food safety certifications while others do not. For instance, smallholder farmers in Malaysia may lack the organizational capacity to implement complex certification systems, even if they recognize the market benefits (Ab Talib, 2017). Similarly, without strong regulatory enforcement or consumer demand, the environmental push for certification adoption remains weak. This suggests that a holistic approach is needed to address the multiple barriers to adoption, particularly for smaller farms (Durst & Gerstlberger, 2020).



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Eco-Innovation Theory focuses on the introduction of innovations that lead to environmental sustainability while maintaining economic viability. According to Rennings (2000), eco-innovation can be defined as the development and application of new processes, products, or services that result in reduced environmental impact. In the agricultural sector, eco-innovations involve the use of organic fertilizers, renewable energy, and sustainable farming practices that not only improve food safety but also minimize the sector's ecological footprint. For example, adopting practices that conserve water and reduce the use of chemical inputs can enhance both environmental and food safety outcomes.

Eco-innovation is particularly relevant in the context of food safety certification because sustainable practices are increasingly becoming part of certification criteria (Triguero et al., 2022). Certifications like GlobalGAP and Organic Certification include eco-friendly practices as essential components. Therefore, farmers who engage in eco-innovations are more likely to adopt food safety certifications, as the two often go hand in hand (Horbach et al., 2012). This synergy suggests that eco-innovations can be a steppingstone toward certification, enabling farmers to improve their competitiveness while contributing to broader environmental goals. The adoption of eco-innovations in the agricultural sector is often driven by three main forces: technology push, market pull, and regulation pull/push. Each of these forces can play a critical role in shaping farmers' decisions to adopt eco-innovations and, by extension, food safety certifications.

Integrating the Technology-Organization-Environment (TOE) Framework with eco-innovation theory offers a robust and holistic approach to understanding how firms adopt sustainable practices and technologies. This integration provides a more comprehensive understanding of how firms can leverage technological advancements to innovate in ways that align with environmental sustainability, ultimately supporting both competitive advantage and compliance with environmental regulations. It offers a comprehensive approach that guides stakeholders in designing policies, incentives, and strategies that address both the internal barriers and external pressures firms face in adopting eco-innovations, promoting sustainable business practices.

## METHODS

In this research, the methodology begins with a comprehensive literature review. A total of 348 articles were sourced from reputable academic journals using relevant keywords such as *"food safety certificate," "sustainable certificate," and "food safety standard"*. These keywords ensured the search focused on studies related to food safety certification and sustainability practices in the agricultural sector. The selection of articles was carefully limited to those published between 2018 and 2023, ensuring that the findings reflect the most recent and relevant developments in the field.

From this review, 33 key elements related to food safety certification adoption were identified. These elements were further classified into three categories which are 12 determinant elements, which are factors that drive the adoption of food safety certification, 9 barrier elements, representing the challenges or obstacles faced by farmers, and 12 antecedent elements, which are pre-existing conditions that influence adoption.

Based on these classifications, the elements were then grouped into broader themes using the Technology-Organization-Environment (TOE) Framework and Eco-Innovation Theory. Specifically, the elements were organized under five main themes: Technology, which looks at the technological factors influencing adoption; Organization, focusing on internal organizational factors; Environment, which examines external environmental pressures; Market Pull, referring to the demand from markets for certified products; and Regulation Push/ Pull, addressing how government regulations and



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policies encourage or enforce certification adoption. This structured approach helps to provide a clear understanding of the factors influencing food safety certification adoption, offering a robust framework for further analysis.

## RESULTS AND ANALYSIS

### Determinant Element of Food Safety Certification Adoption

The adoption of food safety certification among farmers is influenced by various factors, often referred to as determinant elements. These elements are critical drivers that encourage farmers to implement food safety standards, ensuring compliance with both national and international requirements. The growing demand for safer food, increasing consumer awareness, and heightened regulations have made certification an essential part of modern agricultural practices. Understanding these determinants is key to improving the adoption rates of certifications like GlobalGAP, HACCP, and MyGAP.

Determinant elements typically include factors such as technological readiness, market demand, organizational capacity, and economic incentives. These elements play a pivotal role in shaping farmers' decisions, enabling them to improve their competitive advantage, meet buyer expectations, and access premium markets. By examining these determinant elements, stakeholders can gain insights into the motivations behind certification adoption and develop strategies to support and promote these practices among farmers. Identifying these drivers is also crucial for policymakers aiming to implement effective interventions that facilitate widespread adoption of food safety standards in the agricultural sector.

Table 1 Determinant Element of Food Safety Certification Adoption

| Theme | Element | Literature |
|---|---|---|
| Market Pull | Premium Price Offer | (Afeltra et al., 2021; Apriani et al., 2020; Bidzakin et al., 2020; Brach et al., 2018; Doanh et al., 2022) |
| Market Pull | More Market Access | (Borsellino et al., 2020; Bujang & Abu Bakar, 2019; Jagri Binpori et al., 2021; Mariyono, 2018; Ton et al., 2018) |
| Market Pull | Consumer Awareness Regarding Food Safety | (Adnan et al., 2019; Azmi et al., 2018; Massey, 2019; Zanetta et al., 2022; Zheng et al., 2022) |
| Organization | Contract Offers | (Jagri Binpori et al., 2021; Laksono et al., 2022; Olawuyi, 2019; Sellitto, 2021; Tey et al., 2020) |
| Technology | Technology Transfer Occurs in the Market | (Adnan et al., 2018; Boonchan et al., 2022; Samsudin, 2010; Shamshiri et al., 2018; Swinnen & Kuijpers, 2019) |
| Organization | Farmers' Awareness Regarding Food Safety | (Akhtar et al., 2018; Apriani et al., 2020; Berger et al., 2020; Gichuki et al., 2014; Kassem et al., 2021) |
| Technology | Technology Innovation Introduced | (Adnan et al., 2019; Afeltra et al., 2021; Arranz et al., 2022; Giampietri & Trestini, 2020; Reardon et al., 2009) |
| Organization | Cooperative or Association Membership | (Abebe et al., 2020; Barthel et al., 2019; Chistov et al., 2021; Sellitto, 2021; Wossen et al., 2019) |
| Market Pull | Good Demand for Agricultural Produce with Logo | (Enahoro et al., 2019; Joya et al., 2022; Nayal et al., 2022; Nupueng et al., 2022; Wahab & Ling, 2019) |
| Market Pull | Higher Return on Investment | (Bilal Irshad et al., 2021; Imathiu, 2020; Imran et al., 2019; Kakani et al., 2020; Muhammad Auwal et al., 2020) |



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| | | |
|---|---|---|
| Market Pull | Consumer Recognizing MyGAP and MyOrganic Logo | (Agnihotri et al., 2022; Batubara & Harahap, 2022; Cheah & Aigbogun, 2022; Knuth et al., 2018; Manta et al., 2022) |
| Environment | Incentives Offered by the Government | (Amekawa et al., 2022; Massey, 2019; Piot-lepetit et al., 2020; Quartey et al., 2021; Yusaf et al., 2022) |

Table 1 show a comprehensive list of elements influencing the adoption of food safety certification, as identified through an extensive literature review. This analysis found 12 elements that serve as determinants for food safety certification adoption among food producers. These elements represent the primary factors that motivate or hinder the decision to adopt certification, which is essential for ensuring food safety compliance in agricultural practices.

The identified elements have been categorized under four major themes, each reflecting different aspects of the adoption process. Specifically, 2 elements were classified under the theme of technology, focusing on the technological capabilities and advancements that enable food producers to implement certification standards efficiently. 3 elements were grouped under organization, emphasizing the role of internal factors such as organizational readiness, management support, and human resource capabilities in the adoption process. Meanwhile, 1 element was placed under environment, highlighting incentives that impact certification adoption. Finally, 6 elements were categorized under the theme of market pull, reflecting the strong influence of market demand and consumer expectations on food producers' decisions to adopt certification.

From these findings, it becomes evident that market pull stands out as a determinant factor, significantly influencing the adoption of food safety certifications. The high number of elements under this theme indicates that consumer demand, buyer requirements, and market access play a pivotal role in encouraging food producers to obtain certification. This trend highlights the growing importance of food safety standards in the global market and underscores the need for producers to align with these expectations to remain competitive. Ultimately, understanding these determinants is crucial for stakeholders who seek to promote broader adoption of food safety certification in the agricultural sector.

## Barrier Element of Food Safety Certification Adoption

The adoption of food safety certification in agriculture faces several barriers that can hinder its widespread implementation. These barriers include economic, social, and technical challenges that affect farmers' ability to comply with certification standards. Financial constraints, lack of awareness, limited access to training, and insufficient government support are among the key factors that slow down the adoption process. Additionally, small-scale farmers may find the costs and complexity of certification overwhelming, leading to hesitation in pursuing such standards. Understanding these barriers is crucial for developing effective strategies to promote food safety certification and ensure compliance within the agricultural industry.



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Table 2 Barriers Element of Food Safety Certification Adoption

| Theme | Element | Literature |
|---|---|---|
| Organization | Farmer Future Direction | (Knuth et al., 2018; Mariyono, 2018; Panghal et al., 2018; Sapbamrer & Thammachai, 2021; Van Loon et al., 2020) |
| Technology | Having Logistics and a Good Supply Chain | (Azanaw et al., 2019; Blodgett & Feld, 2021; Nyuyen & Li, 2022; Panghal et al., 2018; Yadav et al., 2021) |
| Regulation Pull/Push | Policies and Regulations Enforced by the Government | (Arfaoui, 2018; Bozsik et al., 2022; Carrasco Cabrera & Medina Pastor, 2022; Philip et al., 2022; Sulaiman, 2020) |
| Regulation Pull/Push | Legal Liability Makes Farmers Not Interested | (Baur, 2022; Irani & Sharif, 2018; Negash et al., 2021; Shahabuddin et al., 2020; Todd, 2020) |
| Regulation Pull/Push | The High Cost of Renewal | (Ben Hassen & El Bilali, 2022; Bilali & Strassner, 2021; Irtyshcheva et al., 2020; Quartey et al., 2021; Tsagkaris et al., 2021) |
| Technology | Time Constraints | (Fróna et al., 2019; Lusk & McCluskey, 2018; Mijena et al., 2022; Raza, 2020; Ricci et al., 2018) |
| Organization | Financial Constraints | (Dainelli & Daddi, 2019; Hoffmann & Jones, 2021; Jagri Binpori et al., 2021; Nayal et al., 2022; Tiraieyari & Krauss, 2018) |
| Market Pull | Limited Demand from the Market Surrounding Farm | (Azmi et al., 2020; Fink et al., 2020; Hinkes & Peter, 2020; Mijena et al., 2022; Zulfiqar et al., 2017) |
| Regulation Pull/Push | Farm Location Close to Industry Area | (Bolarinwa et al., 2020; Evans & Taylor, 2021; Farouk et al., 2021; Jankuloska et al., 2019; Mijena et al., 2022) |

Table 2 presents a list of elements that act as barriers in the adoption of food safety certification. A total of 9 key elements have been identified as obstacles for food producers in successfully implementing and complying with these certification standards. Among these, 2 elements have been classified under the category of technological factors, which refers to issues related to the availability and use of appropriate technology in food safety practices. Another 2 elements fall under the category of organizational factors, highlighting challenges within the structure, management, and operational systems of food producers. 1 element has been categorized under the market pull theme, indicating factors related to market demand and consumer expectations that may either encourage or hinder the adoption of such certifications. Lastly, 4 elements are grouped under the regulation pull/push theme, which refers to the influence of governmental and regulatory requirements, whether through enforcement or incentives, on the adoption of food safety standards.

From the findings of this analysis, it is clear that the most significant barrier to the adoption of food safety certification lies within the regulation pull/push factors. This suggests that regulatory frameworks and their implementation play a critical role in shaping how food producers perceive and adopt food safety certification, either facilitating or hindering the process.

## Antecedent Element of Food Safety Certification Adoption

An antecedent is something that happens or exists before an event and helps cause or influence it. In the case of adopting food safety certification, antecedents are the factors that come first and make it easier or more likely for producers to adopt the certification. These can include things like having



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enough information, good infrastructure, market demand, or government support. Antecedents are the things that set the stage for the adoption to happen successfully. Understanding these antecedent elements is essential for identifying the key enablers that promote the adoption of food safety certification, ensuring food producers are better equipped to comply with standards and meet consumer expectations.

Table 3 Antecedent Element of Food Safety Certification Adoption

| Theme | Element | Literature |
|---|---|---|
| Organization | Farm Size | (Abdullah et al., 2022; Carlisle et al., 2022; Hughes et al., 2022; Jelsma et al., 2019; Tey et al., 2020) |
| Organization | Farmers Education Background | (Adnan et al., 2019; Akinwehinmi et al., 2022; Alam et al., 2018; Brown et al., 2021; Okpala & Korzeniowska, 2023) |
| Technology | Technology Affordability | (Araus & Kefauver, 2018; Asfaw et al., 2009; Du et al., 2022; Fraser & Campbell, 2019; Shepherd et al., 2020) |
| Organization | Farming Experience | (Cui et al., 2018; Fierros-González & López-Feldman, 2021; Kahsu, 2018; Kassem et al., 2021; Nguyen et al., 2021) |
| Environment | Competitive Pressure | (Azmi et al., 2019; Mahakittikun et al., 2021; Ngah et al., 2020; Vabi Vamuloh et al., 2019; Yoon et al., 2020) |
| Technology | Technology Acceptability | (Beghin & Gustafson, 2021; Beluhova-uzunova & Dunchev, 2022; Guliyeva & Lis, 2020; Tawafak, 2020; Zainal & Hamzah, 2018) |
| Technology | The Output Volume | (Bello, 2021; Hoffmann & Jones, 2021; Huang et al., 2019; Nathan et al., 2021; Viana et al., 2022) |
| Regulation Pull/Push | The Status of the Farm (Tenure Period) | (Carlisle et al., 2022; Jagri Binpori et al., 2021; Kahsu, 2018; Laosutsan et al., 2019; Schleifer & Sun, 2020) |
| Organization | The Age of Farmers | (Adams et al., 2018; Bidzakin et al., 2020; Feyisa, 2020; Watanabe et al., 2021; Yahaya et al., 2018) |
| Regulation Pull/Push | A Lot of Documentation Preparation | (Amekawa et al., 2022; Evans & Taylor, 2021; Quyen et al., 2021; Razzif et al., 2020; Sorensen et al., 2018) |
| Environment | Government involvement and support | (Brenya et al., 2022; Mohd Imran Khan et al., 2018; Mozaffarian et al., 2018; Sampalean et al., 2020; Tawfik et al., 2019) |
| Regulation Pull/Push | Training | (Abd Razak & Daud, 2020; Alemayehu et al., 2021; Aquino et al., 2021; Bou-Mitri et al., 2018; Clements & Bihn, 2019) |

Table 3 showed the antecedent elements that play a critical role in the adoption of food safety certification among food producers. A total of 12 key elements have been identified as antecedents that influence this adoption process. These elements are categorized into distinct themes based on their nature and influence. 3 of these elements fall under the technology theme, highlighting the importance of technological tools, innovations, and infrastructure in facilitating food safety certification. 4 elements are classified under the organization theme, focusing on factors related to the structure, management, and internal operations of food producers, which are crucial for the successful implementation of certification standards. 2 elements are grouped under the environment theme, pointing to external conditions such as environmental sustainability and the ecological impact



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of food production. Finally, 3 elements are categorized under the regulation pull/push theme, which reflects the role of government policies, incentives, and enforcement measures in shaping the adoption of food safety standards.

The results from the thematic analysis show that the organization theme has the most significant influence on the adoption of food safety certification among food producers. This suggests that internal organizational factors, such as leadership, decision-making processes, and resource allocation, are critical in determining whether food producers can successfully adopt and maintain certification.

In conclusion, the findings from this analysis reveal several key determinants influencing the adoption of food safety certification among food producers, each playing a distinct role. The market pull theme emerges as a dominant factor, highlighting the critical impact of consumer demand, buyer requirements, and market access. This indicates that food producers are increasingly driven to obtain certification to meet market expectations and maintain competitiveness in the global market.

On the other hand, regulatory factors, grouped under the regulation pull/push theme, represent the most significant barrier to adoption. This suggests that the structure and enforcement of regulatory frameworks are crucial in either facilitating or hindering the adoption process, making it essential for regulatory bodies to provide clear, accessible, and supportive guidelines.

Additionally, the organization theme has a notable influence, with internal factors such as leadership, decision-making, and resource management being pivotal for successful certification. The effectiveness of an organization's internal structure directly impacts its ability to adopt and maintain food safety standards.

Taken together, these findings highlight the importance of a balanced approach in promoting food safety certification, where market demand, regulatory support, and organizational readiness all play vital roles. Understanding these elements is essential for stakeholders aiming to encourage broader adoption of certification practices across the agricultural industry.

## CONCLUSION

In this review, a total of 33 key elements related to food safety certification adoption were identified and classified into three categories: 12 determinant elements, 9 barrier elements, and 12 antecedent elements. These categories represent the determinant factors, barriers, and antecedent conditions influencing the adoption process. The findings highlight that market pull is a dominant determinant, with consumer demand, buyer requirements, and market access significantly encouraging food producers to pursue certification. At the same time, regulatory pull/push factors are the most significant barriers, indicating the critical role of government frameworks in either facilitating or obstructing the process. Additionally, internal organizational factors, such as leadership and resource management, play a major role in determining whether food producers can successfully adopt and maintain food safety certification.

Based on these results, stakeholders including policymakers, and farmers should focus on addressing the barriers while strengthening the drivers of food safety certification adoption. Policymakers need to streamline regulatory frameworks, making them more accessible and supportive to ease the burden on small-scale producers (Dessart et al., 2019). At the same time, creating incentives or subsidies to offset the costs of certification could further encourage adoption. Additionally, stakeholders should invest in enhancing market access and increasing consumer awareness of food safety standards to



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sustain the strong influence of market pull (Gordon & Schreurs, 2020). Strengthening internal organizational capacities through training programs and support services aimed at improving leadership and decision-making skills among producers can also promote greater adoption of certification practices (Rose et al., 2018).

However, this study has several limitations that must be acknowledged. First, the analysis is based on thematic elements that may vary across regions, meaning that the findings may not be universally applicable in all agricultural settings. The classification of barriers, drivers, and antecedents may also be subjective, as different stakeholders might interpret these factors differently. Future studies should enhance the results by gathering expert opinions on the identified elements and highlighting the most influential factors toward food safety certification. Additionally, further research could explore region-specific studies to provide a more nuanced understanding of the factors influencing food safety certification adoption. Exploring the long-term impact of certification on farm profitability and market competitiveness would also contribute valuable insights for promoting sustainable certification adoption.

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## REFERENCES

Ab Talib, M. S. (2017). Motivations and benefits of halal food safety certification. *Journal of Islamic Marketing, 8*(4), 605–624.

Abd Razak, A. R., & Daud, N. M. (2020). Hazard Analysis Critical Control Point (HACCP) Certification Hurdles Among Malaysia's Small and Medium Enterprises (SMEs). International *Journal of Academic Research in Business and Social Sciences, 10*(5). https://doi.org/10.6007/ijarbss/v10-i5/7320

Abdullah, Qingshi, W., & Akbar, M. (2022). A Spatial Panel Analysis of Food Security and Political Risk in Asian Countries. *Social Indicators Research, 161*(1), 345–378. https://doi.org/10.1007/s11205-021-02821-5

Abebe, G. K., Bahn, R. A., Chalak, A., & Yehya, A. A. K. (2020). Drivers for the implementation of market-based food safety management systems: Evidence from Lebanon. *Food Science and Nutrition, 8*(2), 1082–1092. https://doi.org/10.1002/fsn3.1394

Adams, A., K. Agbenorhevi, J., Alemawor, F., E. Lutterodt, H., & O. Sampson, G. (2018). Assessment of the Consumers' Awareness and Marketing Prospects of Organic Fruits and Vegetables in Techiman, Ghana. *Journal of Food Security, 6*(2), 55–66. https://doi.org/10.12691/jfs-6-2-2

Adnan, N., Nordin, S. M., Rahman, I., & Noor, A. (2018). The effects of knowledge transfer on farmers decision making toward sustainable agriculture practices. World Journal of Science, *Technology and Sustainable Development, 15*(1), 98–115. https://doi.org/10.1108/wjstsd-11-2016-0062

Adnan, N., Nordin, S. M., & Rasli, A. M. (2019). A possible resolution of Malaysian sunset industry by green fertilizer technology: Factors affecting the adoption among paddy farmers. *Environmental Science and Pollution Research*, 26, 27198–27224.

Afeltra, G., Alerasoul, S. A., & Strozzi, F. (2021). The evolution of sustainable innovation: from the past to the future. *European Journal of Innovation Management*. https://doi.org/10.1108/EJIM-02-2021-0113

Agnihotri, D., Kulshreshtha, K., Tripathi, V., & Chaturvedi, P. (2022). Does green self-identity influence the revisit intention of dissatisfied customers in green restaurants? *Management of Environmental Quality: An International Journal*. https://doi.org/10.1108/MEQ-03-2022-0076

Akhtar, R., Afroz, R., Masud, M. M., Rahman, M., Khalid, H., & Duasa, J. B. (2018). Farmers' perceptions, awareness, attitudes and adaption behaviour towards climate change. *Journal of the Asia Pacific Economy, 23*(2), 246–262. https://doi.org/10.1080/13547860.2018.1442149

Akinwehinmi, O., Ogundari, K., & Amos, T. T. (2022). Consumers' food control risk perception and preference for food safety certification in emerging food markets. *Journal of Agricultural Economics, 73*(3), 690–708. https://doi.org/10.1111/1477-9552.12474

Al Zubaidi, N. (2020). The relationship between collectivism and green product purchase intention: The role of attitude, subjective norms, and willingness to pay a premium. *Journal of Sustainable Marketing, 1*(1), 34–46.

Alam, M. M., Wahid, A. N. M., & Siwar, C. (2018). Resilience, adaptation and expected support for food security among the Malaysian east coast poor households. *Management of Environmental Quality: An International Journal, 29*(5), 877–902. https://doi.org/10.1108/MEQ-01-2018-0013

Alemayehu, T., Aderaw, Z., Giza, M., & Diress, G. (2021). Food safety knowledge, handling practices and associated factors among food handlers working in food establishments in debre markos town, northwest ethiopia, 2020: Institution-based cross-sectional study. *Risk Management and Healthcare Policy*, 14, 1155–1163. https://doi.org/10.2147/RMHP.S295974

Amekawa, Y., Bumrungsri, S., Wayo, K., Gebre, G. G., & Hongsibsong, S. (2022). Pesticide Use under Public Good Agricultural Practices Standard: A Comparative Study in Thailand. *Agriculture (Switzerland), 12*(5). https://doi.org/10.3390/agriculture12050606

Apriani, E., Kim, Y. S., Fisher, L. A., & Baral, H. (2020). Non-state certification of smallholders for sustainable palm oil in Sumatra, Indonesia. *Land Use Policy*, 99. https://doi.org/10.1016/j.landusepol.2020.105112

Aquino, H. V. A., Yap, T., Lacap, J. P. G., Tuazon, G., & Flores, M. (2021). Food safety knowledge, attitudes, practices and training of fast-food restaurant food handlers: a moderation analysis. *British Food Journal, 123*(12), 3824–3840. https://doi.org/10.1108/BFJ-01-2021-0026

Araus, J. L., & Kefauver, S. C. (2018). Breeding to adapt agriculture to climate change: affordable phenotyping solutions. *Current Opinion in Plant Biology, 45*(Figure 2), 237–247. https://doi.org/10.1016/j.pbi.2018.05.003

Arfaoui, N. (2018). Eco-innovation and regulatory push/pull effect in the case of REACH regulation: empirical evidence based on survey data. *Applied Economics, 50*(14), 1536–1554. https://doi.org/10.1080/00036846.2017.1368989

Arranz, N., Arroyabe, M. F., Li, J., Arranz, C. F. A., & Fernandez de Arroyabe, J. C. (2022). An integrated view of eco-innovation in the service sector: Dynamic capability, cooperation and corporate environmentalism. *Business Strategy and the Environment*, January, 1–14. https://doi.org/10.1002/bse.3276

Asfaw, S., Mithöfer, D., & Waibel, H. (2009). EU food safety standards, pesticide use and farm-level productivity: The case of high-value crops in Kenya. *Journal of Agricultural Economics, 60*(3), 645–667. https://doi.org/10.1111/j.1477-9552.2009.00205.x

Azanaw, J., Gebrehiwot, M., & Dagne, H. (2019). Factors associated with food safety practices among food handlers: Facility-based cross-sectional study. *BMC Research Notes, 12*(1). https://doi.org/10.1186/s13104-019-4702-5

Azmi, F. R., Abdullah, A., Bakri, M. H., Musa, H., & Jayakrishnan, M. (2018). The adoption of halal food supply chain towards the performance of food manufacturing in Malaysia. *Management Science Letters, 8*(7), 755–766. https://doi.org/10.5267/j.msl.2018.5.010

Azmi, F. R., Abdullah, A., Musa, H., & Wan Mahmood, W. H. (2020). Perception of food manufacturers towards adoption of halal food supply chain in Malaysia: Exploratory factor



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analysis. *Journal of Islamic Marketing, 11*(3), 571–589. https://doi.org/10.1108/JIMA-12-2018-0236

Azmi, F. R., Abdullah, A., Yahaya, S. H., Woźniak, M., & Purnomo, M. R. A. (2019). Adoption of halal standard in Malaysian food industry: A case of small and medium enterprises. *Journal of Advanced Manufacturing Technology, 13*(3), 37–49.

Bahari, M., Arpaci, I., Der, O., Akkoyun, F., & Ercetin, A. (2024). Driving Agricultural Transformation: Unraveling Key Factors Shaping IoT Adoption in Smart Farming with Empirical Insights. *Sustainability, 16*(5), 2129.

Barthel, S., Isendahl, C., Vis, B. N., Drescher, A., Evans, D. L., & van Timmeren, A. (2019). Global urbanization and food production in direct competition for land: Leverage places to mitigate impacts on SDG2 and on the Earth System. *Anthropocene Review, 6*(1–2), 71–97. https://doi.org/10.1177/2053019619856672

Batubara, C., & Harahap, I. (2022). HALAL INDUSTRY DEVELOPMENT STRATEGIES Muslims' Responses and Sharia Compliance In Indonesia. *Journal of Indonesian Islam, 16*(1), 103–132. https://doi.org/10.15642/JIIS.2022.16.1.103-132

Baur, P. (2022). When farmers are pulled in too many directions: comparing institutional drivers of food safety and environmental sustainability in California agriculture. *In Social Innovation and Sustainability Transition* (pp. 241–260). Springer.

Beghin, J. C., & Gustafson, C. R. (2021). Consumer valuation of and attitudes towards novel foods produced with new plant engineering techniques: A review. *In Sustainability (Switzerland) (Vol. 13*, Issue 20). MDPI. https://doi.org/10.3390/su132011348

Bello, K. M. (2021). Economic Importance of Agriculture for Poverty Reduction in Nigeria. 23, 324–334. https://doi.org/10.1007/978-3-319-95867-5_124

Beluhova-uzunova, R., & Dunchev, D. (2022). AGRICULTURE 4 . 0 – CONCEPTS , *TECHNOLOGIES AND PROSPECTS. 22*(2), 97–104.

Ben Hassen, T., & El Bilali, H. (2022). Impacts of the Russia-Ukraine War on Global Food Security: *Towards More Sustainable and Resilient Food Systems? Foods, 11*(15), 1–17. https://doi.org/10.3390/foods11152301

Berger, A., Blümer, D., Brandi, C., & Chi, M. (2020). Towards Greening Trade? Environmental Provisions in Emerging Markets' Preferential Trade Agreements. *In Sustainability Standards and Global Governance*. https://doi.org/10.1007/978-981-15-3473-7_4

Bidzakin, J. K., Fialor, S. C., Awunyo-Vitor, D., & Yahaya, I. (2020). Contract farming and rice production efficiency in Ghana. *Journal of Agribusiness in Developing and Emerging Economies, 10*(3), 269–284. https://doi.org/10.1108/JADEE-11-2018-0160

Bilal Irshad, M., Ali, M., Masood, A., & Sohu, S. (2021). A Feasibility Study on GlobalGAP Adoption among Small Farmers in Pakistan. *Psychology and Education Journal, 58*(1), 3121–3126. https://doi.org/10.17762/pae.v58i1.1215

Bilali, H. El, & Strassner, C. (2021). Sustainable Agri-Food Systems : Environment, Economy, Society, and Policy. 1–67.

Blodgett, D. M., & Feld, M. N. (2021). Teaching an interdisciplinary course in sustainable food systems: science and history meet in "a world that works." *International Journal of Sustainability in Higher Education*. https://doi.org/10.1108/IJSHE-02-2020-0044

Bolarinwa, O. D., Ogundari, K., & Aromolaran, A. B. (2020). Intertemporal evaluation of household food security and its determinants: evidence from Rwanda. *Food Security, 12*(1), 179–189. https://doi.org/10.1007/s12571-019-00986-z

Boonchan, G., Sinthamrongruk, T., & Khamaksorn, A. (2022). Knowledge Management in the Royal Thai Army: ISO30401: 2018 Knowledge Management Systems Perspective. *7th International Conference on Digital Arts, Media and Technology, DAMT 2022 and 5th ECTI Northern Section Conference on Electrical, Electronics, Computer and Telecommunications Engineering, NCON 2022*, 151–156. https://doi.org/10.1109/ECTIDAMTNCON53731.2022.9720353

Borsellino, V., Schimmenti, E., & El Bilali, H. (2020). Agri-food markets towards sustainable patterns. *In Sustainability (Switzerland) (Vol. 12, Issue 6)*. MDPI. https://doi.org/10.3390/su12062193

Bou-Mitri, C., Mahmoud, D., El Gerges, N., & Jaoude, M. A. (2018). Food safety knowledge, attitudes and practices of food handlers in lebanese hospitals: A cross-sectional study. *Food Control, 94*, 78–84. https://doi.org/10.1016/j.foodcont.2018.06.032

Bozsik, N., Cubillos, J. P. T., Stalbek, B., Vasa, L., & Magda, R. (2022). Food security management in developing countries: Influence of economic factors on their food availability and access. *PLoS ONE, 17*(7 July). https://doi.org/10.1371/journal.pone.0271696

Brach, S., Walsh, G., & Shaw, D. (2018). Sustainable consumption and third-party certification labels: Consumers' perceptions and reactions. *European Management Journal, 36*(2), 254–265. https://doi.org/10.1016/j.emj.2017.03.005

Braun, V., & Clarke, V. (2012). Thematic analysis. In APA handbook of research methods in psychology, Vol 2: Research designs: Quantitative, qualitative, neuropsychological, and biological. (pp. 57–71). *American Psychological Association*. https://doi.org/10.1037/13620-004

Braun, V., & Clarke, V. (2021). Can I use TA? Should I use TA? Should I not use TA? Comparing reflexive thematic analysis and other pattern-based qualitative analytic approaches. *Counselling and Psychotherapy Research, 21*(1), 37–47.

Brenya, R., Akomea-Frimpong, I., Ofosu, D., & Adeabah, D. (2022). Barriers to sustainable agribusiness: a systematic review and conceptual framework. *Journal of Agribusiness in Developing and Emerging Economies*. https://doi.org/10.1108/JADEE-08-2021-0191

Brown, K. A., Srinivasapura Venkateshmurthy, N., Law, C., Harris, F., Kadiyala, S., Shankar, B., Mohan, S., Prabhakaran, D., & Knai, C. (2021). Moving towards sustainable food systems: A review of Indian food policy budgets. *Global Food Security*, 28. https://doi.org/10.1016/j.gfs.2020.100462

Bujang, A. S., & Abu Bakar, B. H. (2019). Precision Agriculture in Malaysia. International Workshop on ICTs for Precision Agriculture, September, 91–104. https://www.fftc.org.tw/upload/files/activities/20190926114217/PROCEEDING_BOOK_FFTC_2019.pdf#page=91

Carlisle, L., Esquivel, K., Baur, P., Ichikawa, N. F., Olimpi, E. M., Ory, J., Waterhouse, H., Iles, A., Karp, D. S., Kremen, C., & Bowles, T. M. (2022). Organic farmers face persistent barriers to adopting diversification practices in California's Central Coast. *Agroecology and Sustainable Food Systems, 46*(8), 1145–1172. https://doi.org/10.1080/21683565.2022.2104420

Carrasco Cabrera, L., & Medina Pastor, P. (2022). The 2020 European Union report on pesticide residues in food. *EFSA Journal, 20*(3). https://doi.org/10.2903/j.efsa.2022.7215

Cheah, W. K. A., & Aigbogun, O. (2022). Exploring attitude-behaviour inconsistencies in organic food consumption during the COVID-19 pandemic in the Klang Valley, Malaysia. *Cleaner and Responsible Consumption, 7*. https://doi.org/10.1016/j.clrc.2022.100077

Chistov, V., Aramburu, N., & Carrillo-Hermosilla, J. (2021). Open eco-innovation: A bibliometric review of emerging research. *Journal of Cleaner Production*, 311(May), 127627. https://doi.org/10.1016/j.jclepro.2021.127627

Clements, D. P., & Bihn, E. A. (2019). The impact of food safety training on the adoption of good agricultural practices on farms. *In Safety and Practice for Organic Food* (pp. 321–344). Elsevier. https://doi.org/10.1016/B978-0-12-812060-6.00016-7

Cui, L., Fan, D., Guo, F., & Fan, Y. (2018). Explicating the relationship of entrepreneurial orientation and firm performance: Underlying mechanisms in the context of an emerging market. *Industrial Marketing Management*, 71, 27–40.

Dainelli, F., & Daddi, T. (2019). Does an organic strategy pay? An explanatory study of the Italian wine industry. *British Food Journal, 121*(10), 2322–2336. https://doi.org/10.1108/BFJ-01-2019-0059

Danuri, M., Shahibi, M. S., & Kadir, M. R. A. (2019). Transforming smallholder farmers business towards agribusiness: a framework using ICT. *Pertanika Journal of Social Science & Humanities, 27*(3), 1635–1658.

Depietro, R, E, W., Fleischer, & M. (1990). The Context for Change: Organization, Technology and Environment. Lexington Books, Lexington.

Dessart, F. J., Barreiro-Hurlé, J., & Van Bavel, R. (2019). Behavioural factors affecting the adoption of sustainable farming practices: a policy-oriented review. *European Review of Agricultural Economics, 46*(3), 417–471.

DOA. (2023). Jabatan Pertanian Malaysia. Www.Doa.Gov.My. http://www.doa.gov.my/index.php/pages/view/497?mid=23

Doanh, N. K., Quynh, N. N., & Pham, T. T. L. (2022). Going organic or staying traditionalistic? The role of agriculture information system. *International Journal of Social Economics, 49*(10), 1458–1478. https://doi.org/10.1108/IJSE-11-2021-0720

Du, X., Wang, X., & Hatzenbuehler, P. (2022). Digital technology in agriculture: a review of issues, applications and methodologies. *China Agricultural Economic Review, 15*(1), 95–108. https://doi.org/10.1108/CAER-01-2022-0009

Durst, S., & Gerstlberger, W. (2020). Financing responsible small-and medium-sized enterprises: An international overview of policies and support programmes. *Journal of Risk and Financial Management, 14*(1), 10.

Dvouletý, O., Srhoj, S., & Pantea, S. (2021). Public SME grants and firm performance in European Union: A systematic review of empirical evidence. *Small Business Economics*, 57, 243–263.

Enahoro, D., Mason-D'Croz, D., Mul, M., Rich, K. M., Robinson, T. P., Thornton, P., & Staal, S. S. (2019). Supporting sustainable expansion of livestock production in South Asia and Sub-Saharan Africa: Scenario analysis of investment options. *In Global Food Security (Vol. 20*, pp. 114–121). Elsevier B.V. https://doi.org/10.1016/j.gfs.2019.01.001

Evans, E. W., & Taylor, H. R. (2021). Understanding the barriers to food safety scheme certification in the food and drink manufacturing industry in Wales, UK. *International Journal of Environmental Health Research, 31*(2), 225–236. https://doi.org/10.1080/09603123.2019.1645307

Farouk, M. M., Strydom, P., Dean, R., Vather, N., Gcabo, M., & Amir, M. (2021). Industrial Halal hunted-game and feral animals' meat production. *In Meat Science (Vol. 181)*. Elsevier Ltd. https://doi.org/10.1016/j.meatsci.2021.108602

Feyisa, B. W. (2020). Determinants of agricultural technology adoption in Ethiopia: A meta-analysis. *Cogent Food and Agriculture, 6*(1). https://doi.org/10.1080/23311932.2020.1855817

Fierros-González, I., & López-Feldman, A. (2021). Farmers' Perception of Climate Change: A Review of the Literature for Latin America. *In Frontiers in Environmental Science (Vol. 9*). Frontiers Media S.A. https://doi.org/10.3389/fenvs.2021.672399

Fink, G., Jack, B. K., & Masiye, F. (2020). Seasonal liquidity, rural labor markets, and agricultural production. *American Economic Review, 110*(11), 3351–3392. https://doi.org/10.1257/AER.20180607

Fitrianingrum, A., Fernando, Y., & Richardson, C. (2017). Organisational determinants of export performance: evidence from exporting firms in Batam, Indonesia. *International Journal of Business Excellence, 11*(1), 95. https://doi.org/10.1504/ijbex.2017.10000679

Fraser, E. D. G., & Campbell, M. (2019). Agriculture 5.0: Reconciling Production with Planetary Health. *One Earth, 1*(3), 278–280. https://doi.org/10.1016/j.oneear.2019.10.022

Fróna, D., Szenderák, J., & Harangi-Rákos, M. (2019). The challenge of feeding the world. Sustainability, 11(20), 5816.

Giampietri, E., & Trestini, S. (2020). Analysing farmers' intention to adopt web marketing under a technology-organisation-environment perspective: A case study in Italy. *Agricultural Economics (Czech Republic), 66*(5), 226–233. https://doi.org/10.17221/355/2019-AGRICECON



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Gichuki, J. A. W., Njeru, A., & Tirimba, O. I. (2014). Challenges facing micro and small enterprises in accessing credit facilities in Kangemi Harambee market in Nairobi City County, Kenya. *International Journal of Scientific and Research Publications, 4*(12), 1–25.

Gordon, A., & Schreurs, F. (2020). Addressing trade and market access issues based on food safety strategies. *In Food Safety and Quality Systems in Developing Countries* (pp. 41–80). Elsevier.

Gotteland, D., Shock, J., & Sarin, S. (2020). Strategic orientations, marketing proactivity and firm market performance. *Industrial Marketing Management*, 91, 610–620.

Guest, G., MacQueen, K. M., & Namey, E. E. (2011). Applied thematic analysis. SAGE publications.

Guliyeva, A. E., & Lis, M. (2020). Sustainability management of organic food organizations: A case study of Azerbaijan. *Sustainability (Switzerland), 12*(12). https://doi.org/10.3390/su12125057

Guo, Z., Bai, L., & Gong, S. (2019). Government regulations and voluntary certifications in food safety in China: A review. *Trends in Food Science & Technology*, 90, 160–165.

Hinkes, C., & Peter, G. (2020). Traceability matters: A conceptual framework for deforestation-free supply chains applied to soy certification. *Sustainability Accounting, Management and Policy Journal, 11*(7), 1159–1187. https://doi.org/10.1108/SAMPJ-04-2019-0145

Hoffmann, V., & Jones, K. (2021). Improving food safety on the farm: Experimental evidence from Kenya on incentives and subsidies for technology adoption. *World Development, 143*, 105406. https://doi.org/10.1016/j.worlddev.2021.105406

Horbach, J., Rammer, C., & Rennings, K. (2012). Determinants of eco-innovations by type of environmental impact - The role of regulatory push/pull, technology push and market pull. *Ecological Economics, 78*, 112–122. https://doi.org/10.1016/j.ecolecon.2012.04.005

Huang, Z., Liao, G., & Li, Z. (2019). Loaning scale and government subsidy for promoting green innovation. *Technological Forecasting and Social Change, 144*, 148–156.

Hughes, M., Hughes, P., Hodgkinson, I., Chang, Y., & Chang, C. (2022). Knowledge-based theory, entrepreneurial orientation, stakeholder engagement, and firm performance. *Strategic Entrepreneurship Journal, 16*(3), 633–665.

Imathiu, S. (2020). Benefits and food safety concerns associated with consumption of edible insects. *NFS Journal, 18*(August 2019), 1–11. https://doi.org/10.1016/j.nfs.2019.11.002

Imran, M. A., Ali, A., Ashfaq, M., Hassan, S., Culas, R., & Ma, C. (2019). Impact of climate smart agriculture (CSA) through sustainable irrigation management on Resource use efficiency: A sustainable production alternative for cotton. *Land Use Policy, 88*(January), 104113. https://doi.org/10.1016/j.landusepol.2019.104113

Irani, Z., & Sharif, A. M. (2018). Food security across the enterprise: a puzzle, problem or mess for a circular economy? *Journal of Enterprise Information Management, 31*(1), 2–9. https://doi.org/10.1108/JEIM-03-2017-0045

Irtyshcheva, I., Stehnei, M., Popadynets, N., Danylo, S., Rogatina, L., Bogatyrev, K., Boiko, Y., Hryshyna, N., Ishchenko, O., & Voit, O. (2020). Business process management in the food industry under the conditions of economic transformations. *Management Science Letters, 10*(14), 3243–3252. https://doi.org/10.5267/j.msl.2020.6.014

Jagri Binpori, R., Awunyo-Vitor, D., & Wongnaa, C. A. (2021). Does contract farming improve rice farmers' food security? Empirical evidence from Ghana. *World Journal of Science, Technology and Sustainable Development, 18*(2), 130–149. https://doi.org/10.1108/wjstsd-11-2020-0091

Jamalut, Y., Abd Rahim, M. F., & Ong, J.-W. (2022). A Framework on Intention to Adopt Internet of Things Among MSMEs in Farming. *International Conference on Technology and Innovation Management (ICTIM 2022)*, 321–332.

Jankuloska, V., Karov, I., Pavlovska, G., Kalevska, T., Stamatovska, V., & Uzunoska, Z. (2019). Pesticide Residues in Food: Food Safety, Nutrition and Health Effects. *International Journal of Food Technology and Nutrition, 2*(4).

Jelsma, I., Woittiez, L. S., Ollivier, J., & Dharmawan, A. H. (2019). Do wealthy farmers implement better agricultural practices? An assessment of implementation of Good Agricultural Practices



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among different types of independent oil palm smallholders in Riau, Indonesia. *Agricultural Systems, 170*(January), 63–76. https://doi.org/10.1016/j.agsy.2018.11.004

Joya, K., Ramli, N. N., Shamsudin, M. N., & Kamarulzaman, N. H. (2022). Consumers' willingness to pay for food safety attributes of tomato. *British Food Journal, 124*(3), 701–717. https://doi.org/10.1108/BFJ-02-2021-0164

Kahsu, M. (2018). The Links Between Policy, Sustainable Food Security and Well-Being in Gelgele and Yetnora Villages in Ethiopia. October.

Kakani, V., Nguyen, V. H., Kumar, B. P., Kim, H., & Pasupuleti, V. R. (2020). A critical review on computer vision and artificial intelligence in food industry. *Journal of Agriculture and Food Research, 2(November 2019)*, 100033. https://doi.org/10.1016/j.jafr.2020.100033

Kassem, H. S., Alotaibi, B. A., Aldosari, F. O., Herab, A., & Ghozy, R. (2021). Factors influencing smallholder orange farmers for compliance with GobalGAP standards. Saudi *Journal of Biological Sciences, 28*(2), 1365–1373. https://doi.org/10.1016/j.sjbs.2020.11.070

Kim, J. H., Fiese, B. H., & Donovan, S. M. (2017). Breastfeeding is natural but not the cultural norm: A mixed-methods study of first-time breastfeeding, African American mothers participating in WIC. *Journal of Nutrition Education and Behavior, 49*(7), S151–S161.

Knuth, U., Amjath-Babu, T. S., & Knierim, A. (2018). Adoption of Farm Management Systems for Cross Compliance – An empirical case in Germany. *Journal of Environmental Management, 220*, 109–117. https://doi.org/10.1016/j.jenvman.2018.04.087

Laksono, P., Irham, Mulyo, J. H., & Suryantini, A. (2022). Farmers' willingness to adopt geographical indication practice in Indonesia: A psycho behavioral analysis. *Heliyon, 8*(8), e10178. https://doi.org/10.1016/j.heliyon.2022.e10178

Laosutsan, P., Shivakoti, G. P., & Soni, P. (2019). Agricultural and natural resources adaptations to climate change: Factors influencing the adoption of good agricultural practices and export decision of thailand's vegetable farmers. *International Journal of the Commons, 13*(2), 867–880. https://doi.org/10.5334/ijc.895

Liu, F., Rhim, H., Park, K., Xu, J., & Lo, C. K. Y. (2021). HACCP certification in food industry: Trade-offs in product safety and firm performance. *International Journal of Production Economics*, 231, 107838.

Lochmiller, C. R. (2021). Conducting thematic analysis with qualitative data. *The Qualitative Report, 26*(6), 2029–2044.

Lusk, J. L., & McCluskey, J. (2018). Understanding the impacts of food consumer choice and food policy outcomes. *Applied Economic Perspectives and Policy, 40*(1), 5–21. https://doi.org/10.1093/aepp/ppx054

Mahakittikun, T., Suntrayuth, S., & Bhatiasevi, V. (2021). The impact of technological-organizational-environmental (TOE) factors on firm performance: merchant's perspective of mobile payment from Thailand's retail and service firms. *Journal of Asia Business Studies, 15*(2), 359–383. https://doi.org/10.1108/JABS-01-2020-0012

Manta, F., Campobasso, F., Tarulli, A., & Morrone, D. (2022). Showcasing green: how culture influences sustainable behavior in food eco-labeling. *British Food Journal, 124*(11), 3582–3594. https://doi.org/10.1108/BFJ-05-2021-0478

Mariyono, J. (2018). Profitability and Determinants of Smallholder Commercial Vegetable Production. *International Journal of Vegetable Science, 24*(3), 274–288. https://doi.org/10.1080/19315260.2017.1413698

Massey, M. (2019). Unpacking Consumer Purchase of Organic Food: How Consumer Perceive Organic Food and What Factors Drive Their Purchases (Issue February).

Mijena, G. M., Gedebo, A., Beshir, H. M., & Haile, A. (2022). Ensuring food security of smallholder farmers through improving productivity and nutrition of potato. *Journal of Agriculture and Food Research, 10*, 100400. https://doi.org/10.1016/j.jafr.2022.100400

Mohd Imran Khan, M., Shahbaz Khan, M., Abid Haleem, D., Mohd Javaid, M., Imran Khan, M., Khan, S., Haleem, A., & Javaid, M. (2018). Prioritising Barriers towards Adoption of

Sustainable Consumption and Production Practices using TOPSIS. *IOP Conference Series: Materials Science and Engineering, 404*(1), 0–5. https://doi.org/10.1088/1757-899X/404/1/012011

Mohd Nawi, N., & Mohd Nasir, N. I. (2014). Consumers' attitude toward the food safety certificate (FSC) in Malaysia. *Journal of Food Products Marketing, 20(sup1)*, 140–150.

Mook, A., & Overdevest, C. (2021). What drives market construction for fair trade, organic, and GlobalGAP certification in the global citrus value chain? Evidence at the importer level in the Netherlands and the United States. *Business Strategy and the Environment, 30*(7), 2996–3008.

Mozaffarian, D., Angell, S. Y., Lang, T., & Rivera, J. A. (2018). Role of government policy in nutrition-barriers to and opportunities for healthier eating. *BMJ (Online)*, 361, 1–11. https://doi.org/10.1136/bmj.k2426

Muhammad Auwal, A., Mohamed, Z., Nasir Shamsudin, M., Sharifuddin, J., & Ali, F. (2020). External pressure influence on entrepreneurship performance of SMEs: a case study of Malaysian herbal industry. *Journal of Small Business and Entrepreneurship, 32*(2), 149–171. https://doi.org/10.1080/08276331.2018.1509504

Nathan, R. J., Soekmawati, Victor, V., Popp, J., Fekete-Farkas, M., & Oláh, J. (2021). Food innovation adoption and organic food consumerism-a cross national study between Malaysia and Hungary. *Foods, 10*(2), 1–21. https://doi.org/10.3390/foods10020363

Nayal, K., Raut, R., Priyadarshinee, P., Narkhede, B. E., Kazancoglu, Y., & Narwane, V. (2022). Exploring the role of artificial intelligence in managing agricultural supply chain risk to counter the impacts of the COVID-19 pandemic. *International Journal of Logistics Management, 33*(3), 744–772. https://doi.org/10.1108/IJLM-12-2020-0493

Nazar, M. R., & Mawarni, A. (2023). Return On Asset, Return on Equity, And Net Profit Margin: Influence Stock Price. *Jurnal E-Bis, 7*(2), 444–457.

Negash, Y. T., Hassan, A. M., Tseng, M. L., Wu, K. J., & Ali, M. H. (2021). Sustainable construction and demolition waste management in Somaliland: Regulatory barriers lead to technical and environmental barriers. *Journal of Cleaner Production*, 297, 126717. https://doi.org/10.1016/j.jclepro.2021.126717

Ngah, A. H., Ramayah, T., Ali, M. H., & Khan, M. I. (2020). Halal transportation adoption among pharmaceuticals and comestics manufacturers. *Journal of Islamic Marketing, 11*(6), 1619–1639. https://doi.org/10.1108/JIMA-10-2018-0193

Nguyen, T. P. L., Doan, X. H., Nguyen, T. T., & Nguyen, T. M. (2021). Factors affecting Vietnamese farmers' intention toward organic agricultural production. *International Journal of Social Economics, 48*(8), 1213–1228. https://doi.org/10.1108/IJSE-08-2020-0554

Nupueng, S., Oosterveer, P., & Mol, A. P. J. (2022). Global and local sustainable certification systems: Factors influencing RSPO and Thai-GAP adoption by oil palm smallholder farmers in Thailand. Environment, *Development and Sustainability*, 0123456789. https://doi.org/10.1007/s10668-022-02306-6

Nyuyen, T. T. B., & Li, D. (2022). A systematic literature review of food safety management system implementation in global supply chains. *British Food Journal, 124*(10), 3014–3031. https://doi.org/10.1108/BFJ-05-2021-0476

Okpala, C. O. R., & Korzeniowska, M. (2023). Understanding the relevance of quality management in agro-food product industry: From ethical considerations to assuring food hygiene quality safety standards and its associated processes. *Food Reviews International, 39*(4), 1879–1952.

Olawuyi, S. O. (2019). Building resilience against food insecurity through social networks: The case of rural farmers in Oyo State, Nigeria. *International Journal of Social Economics, 46*(7), 874–886. https://doi.org/10.1108/IJSE-11-2018-0624

Omar, M. S., Yusuf, M. F., & Kie, C. J. (2023). Thematic analysis: factors of food safety certification adoption among farmers in Malaysia. *Journal of International Trade Law and Policy, 22*(3), 192–208. https://doi.org/10.1108/JITLP-06-2023-0031

Panghal, A., Chhikara, N., Sindhu, N., & Jaglan, S. (2018). Role of Food Safety Management Systems in safe food production: A review. *Journal of Food Safety, 38*(4), e12464.

Philip, L. D., Emir, F., & Udemba, E. N. (2022). Investigating possibility of achieving sustainable development goals through renewable energy, technological innovation, and entrepreneur: a study of global best practice policies. *Environmental Science and Pollution Research, 29*(40), 60302–60313. https://doi.org/10.1007/s11356-022-20099-z

Piot-lepetit, I., Florez, M., Gauche, K., Piot-lepetit, I., Florez, M., & Gauche, K. (2020). Understanding the determinants of IT adoption in agriculture using an integrated TAM-TOE model: A bibliometric analysis. *HAL Open Science*.

Quartey, C. L. N. K., Osei Mensah, J., Nimoh, F., Adams, F., & Etuah, S. (2021). Choice of certification schemes by smallholder pineapple farmers in Ghana: analysis of constraints and determinants of adoption. *Journal of Agribusiness in Developing and Emerging Economies*. https://doi.org/10.1108/JADEE-02-2021-0046

Quyen, N. T. K., Yen, T. T. B., & Riple, A. K. L. (2021). Adoption of Vietnamese Good Agricultural Practices (VietGAP) in Aquaculture: Evidence From Small-Scale Shrimp Farming. *Asian Fisheries Science, 34*(4), 393–403. https://doi.org/10.33997/j.afs.2021.34.4.012

Raza, Z. (2020). Effects of regulation-driven green innovations on short sea shipping's environmental and economic performance. Transportation Research Part D: *Transport and Environment, 84*, 102340.

Razzif, A., Razak, A., & Safety, F. (2020). Factors Influencing Small and Medium Enterprise to Implement Hazard Analysis Critical Control Point: Issues and Challenges Factors Influencing Small and Medium Enterprise to Implement Hazard Analysis Critical Control Point : *Issues and Challenges. Empirical Economics Letters, 19*(9), (September 2020), 10.

Reardon, T., Barrett, C. B., Berdegué, J. A., & Swinnen, J. F. M. (2009). Agrifood Industry Transformation and Small Farmers in Developing Countries. *World Development, 37*(11), 1717–1727. https://doi.org/10.1016/j.worlddev.2008.08.023

Rennings, K. (2000). Redefining innovation — eco-innovation research and the contribution from ecological economics. *Ecological Economics 32*, 32. https://doi.org/10.1057/9780230339286

Rezvani Ghalhari, M., Kalteh, S., Asgari Tarazooj, F., Zeraatkar, A., & Mahvi, A. H. (2021). Health risk assessment of nitrate and fluoride in bottled water: a case study of Iran. *Environmental Science and Pollution Research, 28*(35), 48955–48966. https://doi.org/10.1007/s11356-021-14027-w

Ricci, E. C., Banterle, A., & Stranieri, S. (2018). Trust to Go Green: An Exploration of Consumer Intentions for Eco-friendly Convenience Food. Ecological Economics, 148, 54–65. https://doi.org/10.1016/j.ecolecon.2018.02.010

Rose, D. C., Keating, C., & Morris, C. (2018). Understand how to influence farmers' decision-making behaviour.

Sampalean, N. I., De-Magistris, T., & Rama, D. (2020). Investigating italian consumer preferences for different characteristics of provolone valpadana using the conjoint analysis approach. *Foods, 9*(12). https://doi.org/10.3390/foods9121730

Samsudin, A. F. M. (2010). Agriculture Extension and Its Roles in Ensuring Food Safety, Quality and Productivity in Malaysia.

Sapbamrer, R., & Thammachai, A. (2021). A systematic review of factors influencing farmers' adoption of organic farming. *Sustainability (Switzerland), 13*(7). https://doi.org/10.3390/su13073842

Schleifer, P., & Sun, Y. (2020). Reviewing the impact of sustainability certification on food security in developing countries. *Global Food Security*, 24, 100337.

Sellitto, M. A. (2021). The after-sales strategy of an industrial equipment manufacturer: evaluation and control. *International Journal of Quality and Reliability Management, 38*(7), 1593–1613. https://doi.org/10.1108/IJQRM-11-2019-0339

Shahabuddin, A. S. M., Sukor, M. E. A., & Hashim, N. H. (2020). Product-centric halal business: a critique from an Islamic perspective. *Journal of Islamic Marketing, 11*(6), 1707–1724. https://doi.org/10.1108/JIMA-06-2019-0129

Shamshiri, R. R., Kalantari, F., Ting, K. C., Thorp, K. R., Hameed, I. A., Weltzien, C., Ahmad, D., & Shad, Z. (2018). Advances in greenhouse automation and controlled environment agriculture: A transition to plant factories and urban agriculture. *International Journal of Agricultural and Biological Engineering, 11*(1), 1–22. https://doi.org/10.25165/j.ijabe.20181101.3210

Shepherd, M., Turner, J. A., Small, B., & Wheeler, D. (2020). Priorities for science to overcome hurdles thwarting the full promise of the 'digital agriculture' revolution. *Journal of the Science of Food and Agriculture, 100*(14), 5083–5092. https://doi.org/10.1002/jsfa.9346

Shirabe, T., & Gurol, C. (2013). Are Food Safety Certifications Solutions to Restore Falling Consumer Trust in Food? February. www.iffa.com

Sorensen, C., Murray, V., Lemery, J., & Balbus, J. (2018). Climate change and women's health: Impacts and policy directions. *PLoS Medicine, 15*(7). https://doi.org/10.1371/journal.pmed.1002603

Sulaiman, S. S. (2020). Regulating Good Agriculture Practices (GAPs) in Enhancing Sustainability of Halal Food: Malaysian Experience. *In MALAYSIAN JOURNAL OF CONSUMER AND FAMILY ECONOMICS (Vol. 24*, Issue S2).

Swinnen, J., & Kuijpers, R. (2019). Value chain innovations for technology transfer in developing and emerging economies: Conceptual issues, typology, and policy implications. *Food Policy, 83*(March 2016), 298–309. https://doi.org/10.1016/j.foodpol.2017.07.013

Tawafak, R. M. (2020). An Acceptance Model for Contributing Factors of Continuous Intention to Use E-Learning Systems in Oman Higher Education Institutions.

Tawfik, G. M., Dila, K. A. S., Mohamed, M. Y. F., Tam, D. N. H., Kien, N. D., Ahmed, A. M., & Huy, N. T. (2019). A step-by-step guide for conducting a systematic review and meta-analysis with simulation data. *Tropical Medicine and Health, 47*(1), 1–9. https://doi.org/10.1186/s41182-019-0165-6

Tey, Y. S., Brindal, M., Darham, S., Sidique, S. F. A., & Djama, M. (2020). Factors influencing sustainability certification among plantation companies in Malaysia: a panel approach. *Sustainable Production and Consumption, 22*, 231–238. https://doi.org/10.1016/j.spc.2020.03.005

Tiraieyari, N., & Krauss, S. E. (2018). Predicting youth participation in urban agriculture in Malaysia: insights from the theory of planned behavior and the functional approach to volunteer motivation. *Agriculture and Human Values, 35*(3), 637–650. https://doi.org/10.1007/s10460-018-9854-8

Todd, E. (2020). Food-borne disease prevention and risk assessmentTodd, E. (2020). Food-borne disease prevention and risk assessment. *International Journal of Environmental Research and Public Health, 17*(14), 1–13. https://doi.org/10.3390/ijerph17145129. International Journal of Environmental Research and Public Health, 17(14), 1–13.

Ton, G., Vellema, W., Desiere, S., Weituschat, S., & D'Haese, M. (2018). Contract farming for improving smallholder incomes: What can we learn from effectiveness studies? *In World Development (Vol. 104*, pp. 46–64). Elsevier Ltd. https://doi.org/10.1016/j.worlddev.2017.11.015

Tornatzky, L. G., Fleischer, M., & Chakrabarti, A. K. (1990). Processes of technological innovation. Lexington books.

Triguero, Á., Cuerva, M. C., & Sáez-Martínez, F. J. (2022). Closing the loop through eco-innovation by European firms: Circular economy for sustainable development. *Business Strategy and the Environment, 31*(5), 2337–2350. https://doi.org/10.1002/bse.3024

Tsagkaris, A. S., Pulkrabova, J., & Hajslova, J. (2021). Optical screening methods for pesticide residue detection in food matrices: Advances and emerging analytical trends. *In Foods (Vol. 10*, Issue 1). MDPI AG. https://doi.org/10.3390/foods10010088

Vabi Vamuloh, V., Panwar, R., Hagerman, S. M., Gaston, C., & Kozak, R. A. (2019). Achieving Sustainable Development Goals in the global food sector: A systematic literature review to examine small farmers engagement in contract farming. *Business Strategy and Development, 2*(4), 276–289. https://doi.org/10.1002/bsd2.60

Van Loon, J., Woltering, L., Krupnik, T. J., Baudron, F., Boa, M., & Govaerts, B. (2020). Scaling agricultural mechanization services in smallholder farming systems: Case studies from sub-Saharan Africa, South Asia, and Latin America. *Agricultural Systems, 180* (December 2018), 102792. https://doi.org/10.1016/j.agsy.2020.102792

Viana, C. M., Freire, D., Abrantes, P., Rocha, J., & Pereira, P. (2022). Agricultural land systems importance for supporting food security and sustainable development goals: A systematic review. *Science of the Total Environment, 806*. https://doi.org/10.1016/j.scitotenv.2021.150718

Wahab, S. N., & Ling, E. K. (2019). Integrity of Food Supply Chain: Going beyond Food Safety and Food Quality. *International Journal of Productivity and Quality Management, 1*(1), 1. https://doi.org/10.1504/ijpqm.2019.10019297

Watanabe, E. A. de M., Alfinito, S., & Barbirato, L. L. (2021). Certification label and fresh organic produce category in an emerging country: an experimental study on consumer trust and purchase intention. *British Food Journal, 123*(6), 2258–2271. https://doi.org/10.1108/BFJ-09-2020-0808

World Health Organization, W. (2022). Food safety. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/food-safety

Wossen, T., Alene, A., Abdoulaye, T., Feleke, S., Rabbi, I. Y., & Manyong, V. (2019). Poverty Reduction Effects of Agricultural Technology Adoption: The Case of Improved Cassava Varieties in Nigeria. *Journal of Agricultural Economics, 70*(2), 392–407. https://doi.org/10.1111/1477-9552.12296

Xu, L., & Lu, A. J. (2021). Forest certification in developing countries: current status and hindrances to its adoption within a macro-framework. *International Forestry Review, 23*(1), 105–126.

Yadav, D., Dutta, G., & Kumar, S. (2021). Food safety standards adoption and its impact on firms' export performance: A systematic literature review. *Journal of Cleaner Production, 329*(November), 129708. https://doi.org/10.1016/j.jclepro.2021.129708

Yahaya, I., Pokharel, K. P., Alidu, A. F., & Yamoah, F. A. (2018). Sustainable agricultural intensification practices and rural food security: The case of Northwestern Ghana. *British Food Journal, 120*(2), 468–482. https://doi.org/10.1108/BFJ-01-2017-0021

Yoon, C., Lim, D., & Park, C. (2020). Factors affecting adoption of smart farms: The case of Korea. *Computers in Human Behavior, 108*(February), 106309. https://doi.org/10.1016/j.chb.2020.106309

Yusaf, T., Laimon, M., Alrefae, W., Kadirgama, K., Dhahad, H. A., Ramasamy, D., Kamarulzaman, M. K., & Yousif, B. (2022). Hydrogen Energy Demand Growth Prediction and Assessment (2021–2050) Using a System Thinking and System Dynamics Approach. *Applied Sciences (Switzerland), 12*(2). https://doi.org/10.3390/app12020781

Zainal, M., & Hamzah, S. R. (2018). Urban Agriculture: The Role of Knowledge among Farmer in Malaysia. *International Journal of Academic Research in Business and Social Sciences, 7*(14), 77–85. https://doi.org/10.6007/ijarbss/v7-i14/3653

Zanetta, L. D., Dardaque Mucinhato, R. M., Hakim, M. P., Stedefeldt, E., & Da Cunha, D. T. (2022). What Motivates Consumer Food Safety Perceptions and Beliefs? A Scoping Review in BRICS Countries. *Foods, 11*(3). https://doi.org/10.3390/foods11030432

Zheng, Q., Wen, X., Xiu, X., Yang, X., & Chen, Q. (2022). Can the part replace the whole? A choice experiment on Organic and Pesticide-Free Label. *Foods, 11*(2564), 1–16.

Zulfiqar, F., Datta, A., & Thapa, G. B. (2017). Determinants and resource use efficiency of "better cotton": An innovative cleaner production alternative. *Journal of Cleaner Production, 166, 1372–1380*. https://doi.org/10.1016/j.jclepro.2017.08.155

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