Systematic Analysis of the Influence of Green Product Innovation on Sustainable Competitive Advantage in the Food Industry Sector

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Abstract

This study aims to analyze the relationship between Green Product Innovation (GPI) and sustainable competitive advantage (SCA) in the context of MSMEs in the food sector in West Java. The approach used is the Systematic Literature Review (SLR) of 30 selected scientific articles from various international databases. The results of the analysis show that the main indicators of GPI include environmentally friendly product design, use of sustainable raw materials, green processing technology, and ecological packaging. The dominant dimensions of SCA include cost advantage, product differentiation, customer loyalty, sustainable innovation, and corporate image (green image). Most of the literature supports a positive relationship between GPI and SCA through the mechanisms of operational efficiency, increased brand value, and market attractiveness. There is a theoretical gap due to the lack of integration between GPI and classical strategy frameworks such as Resource-Based View (RBV) and Porter's Generic Strategies. This study provides practical contributions to the food industry through recommendations for systematic adoption of GPI, as well as theoretical contributions in strengthening the resource-based sustainability model. Further research is recommended to use quantitative and longitudinal approaches to deepen the understanding of the causal relationship between these key variables.

Keywords: *Green Product Innovation, Sustainable Competitive Advantage, MSMEs, Food Industry, Systematic Literature Review.*

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A. INTRODUCTION

The challenge of maintaining competitiveness is increasingly complex in the era of globalization and rapid industrial transformation. Companies must face market pressures, technological changes, as well as increasing awareness of environmental issues (Filgueiras & Melo, 2024). The food industry as one of the sectors that has a major environmental impact, is no longer only required to grow economically, but also to be responsible for ecological sustainability. Green product innovation (GPI) has emerged as an important strategy to achieve sustainable competitive advantage (SCA) in the long term (Wu et al., 2024).

GPI is not just a symbol of a company's commitment to sustainability, but also a response to consumer preferences that are increasingly looking for environmentally friendly and ethical products, this strategy is able to build a positive image, strengthen customer loyalty, and open up opportunities for market expansion. Various GPI practices are implemented, ranging from the use of biodegradable materials, efficient use of energy, to the integration of technologies such as blockchain in supply chain management. Companies must overcome obstacles such as high development costs,

resistance from within the organization, and conflicts between short-term economic targets and long-term sustainability goals (Cappelli & Cini, 2021).

The relationship between GPI and sustainable competitive advantage is complex and influenced by a variety of factors, including environmental regulations, organizational capabilities, and market dynamics. Developing dynamic capabilities is critical for companies to optimize the benefits of GPI, especially in the highly competitive food industry (Golgeci et al., 2021). Derivatives of green innovation, such as energy-efficient and zero-waste products, demonstrate how GPI is a foundation for integrating sustainability into business models.

West Java, which is densely populated and has high food consumption, shows the urgency of implementing GPI. Consumer demand for environmentally friendly food continues to grow, while the food industry must deal with strict regulations, packaging waste problems, and global competition (Solnørdal & Foss, 2018; Traoré et al., 2023). Green product innovation strategies that combine market orientation, technology, and sustainability are key to responding effectively to these changes and maintaining a competitive position (Gera et al., 2022; Shekarian et al., 2022). Despite the importance of this topic, academic literature that systematically reviews the relationship between GPI and SCA in the context of the food industry is still limited.

West Java's economic growth in 2024 is estimated to move positively, with projections ranging from 4.9% to 5.7%. Despite facing global challenges such as geopolitical tensions and food inflation, several key sectors have succeeded in driving the province's economic growth. In the second quarter of 2024, economic growth was recorded at 4.95%, with the transportation, warehousing, and wholesale and retail trade sectors as the main drivers. The agriculture, forestry, and fisheries sectors also showed a significant spike, growing by 27.87%. In terms of expenditure, household consumption and investment continue to be important pillars in supporting economic growth.

The food and beverage sector in West Java shows great economic potential, supported by more than 8,000 MSMEs spread across 27 regencies and cities, these MSMEs play an important role not only in driving the local economy, but also represent the rich diversity of culinary history and culture in the region. The businesses that exist vary, from those that were established in the early 20th century to those that have only grown in recent years, making this sector the backbone of the province's creative economy (Hussein et al., 2024; Nasrollahi et al., 2020; Sharma & Gupta, 2024). The focus of this study is on 7,446 food MSMEs, which illustrate the dynamics and rapid development of the food industry in West Java.

One relevant strategy is Green Innovation, especially Green Product Innovation (GPI). This approach offers a solution to harmonize economic goals with environmental responsibility. GPI involves developing products that take into account their entire life cycle, from the use of environmentally friendly raw materials, energy efficiency, waste management, to recyclable packaging. This approach not only reduces production costs in the long term, but also strengthens brand image and

opens access to new markets that are increasingly concerned with sustainability (Ghobakhloo et al., 2021; Moshood et al., 2022).

The implementation of green product innovation opens up opportunities for food MSMEs to create added value both economically and ecologically. Government regulatory pressure, consumer demands for environmentally friendly products, and increasingly fierce competition at the local and global levels, emphasize the importance of this strategy (Yadav et al., 2024). This study aims to explore the relationship between Green Product Innovation and sustainable competitive advantage with food MSMEs in West Java as the main case study, technology also plays an important role in supporting sustainable innovation. Various studies confirm that technological innovation and scientific research are key factors in maintaining competitiveness (Afum et al., 2023; Dangelico et al., 2017; Zameer et al., 2022). Another view states that technology does not necessarily always have a significant impact on sustainable competitive advantage, so more in-depth research is needed to understand the role of technology in this context (de Medeiros et al., 2022; Martínez-Falcó et al., 2024).

Entrepreneurial orientation shows varying results in various studies. Several studies confirm the positive and significant influence of entrepreneurial orientation on competitive advantage. Evidence on the role of green product innovation as an intermediary in the relationship between entrepreneurial orientation and sustainable competitive advantage in MSMEs in Indonesia is still limited and shows uncertainty. This condition indicates that the interaction mechanism between entrepreneurial orientation and green product innovation in driving sustainable competitive advantage is not fully understood in depth.

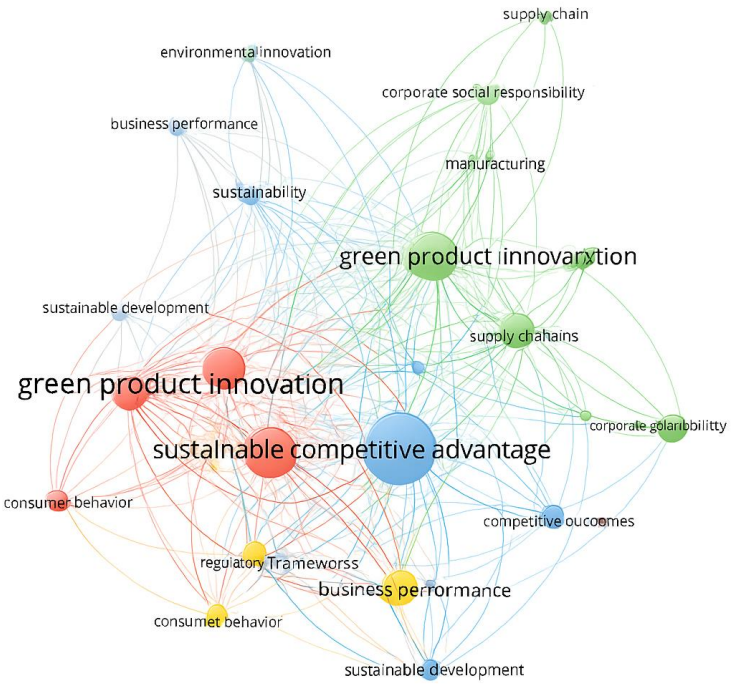

Figure 1. VOSviewer Output
Source: Data Proceed with VOSviewer Software

The bibliometric analysis conducted using VOSviewer reveals key thematic structures and research trends within the domain of Green Product Innovation (GPI) and Sustainable Competitive Advantage (SCA) in the food industry. The generated network map of keyword co-occurrences (Figure 1) visually demonstrates the interconnectedness and frequency of terms across the selected body of literature, offering a rich insight into the intellectual landscape of the field.

The analysis identifies several dominant clusters, each representing a major research stream. The largest cluster, marked in red, is centered around core concepts such as "green product innovation," "eco-innovation," and "environmental sustainability." This suggests a robust scholarly focus on the development of environmentally friendly products as a strategic response to sustainability challenges. Closely related to this is the second major cluster, highlighted in blue, which includes keywords like "competitive advantage," "business performance," and "market orientation." This indicates a strong academic interest in understanding how green innovations contribute to enhanced firm performance and long-term market success.

The map also reveals smaller clusters that address complementary and emerging areas. These include keywords associated with "supply chain management," "consumer behavior," and "regulatory frameworks," reflecting a growing attention to external and operational factors that facilitate or hinder the implementation of green innovation strategies in the food sector.

The network structure also brings to light certain research gaps. For instance, there appears to be limited integration between discussions of technological innovation and tangible sustainability outcomes in food manufacturing. This highlights opportunities for future research to explore how technological advancements can more effectively support green objectives and enhance competitive positioning. This study attempts to fill the gap in understanding by analyzing the simultaneous influence of market orientation, competition, technology, and entrepreneurial orientation on competitive advantage through green product innovation. The focus of the study is directed at the food industry sector in West Java, with the aim of modifying and enriching the existing conceptual framework and integrating these factors into the green product innovation approach. This approach is expected to strengthen the strategy in achieving sustainable competitive advantage for food MSMEs in the region.

This article is structured into several main sections. The first section describes the background and formulation of the research problem. The second section discusses the methodology applied in this study. The third section presents a systematic literature review, while the fourth section focuses on the analysis and discussion of the research findings. The last section contains relevant conclusions and recommendations based on the study results.

This study uses a Systematic Literature Review approach with the aim of identifying trends, indicators, and mechanisms of the relationship between green product innovation and sustainable competitive advantage. The findings are expected

to contribute, both theoretically and practically, to the development of sustainability strategies in the food industry, especially in developing countries.

B. LITERATURE REVIEW

1. Market Orientation

Market orientation refers to a firm's ability to generate, disseminate, and respond to market intelligence about current and future customer needs. In the context of the food industry, this capability is essential for maintaining competitiveness and adapting to rapid shifts in consumer preferences. Narver and Slater (1990) initially established market orientation as a critical driver of long-term business performance, emphasizing customer orientation, competitor orientation, and interfunctional coordination (Le et al., 2024; Oduro et al., 2022).

In green product innovation (GPI), market orientation encourages firms to integrate environmental values into their product development processes. Research by Kirca et al. (2005) confirmed that firms with strong market orientation are more likely to adopt proactive innovation strategies, including sustainability initiatives. This responsiveness not only strengthens customer relationships but also aligns with regulatory trends and ethical consumption movements.

Recent studies in developing economies indicate that market-oriented firms in the food sector are more likely to embed environmental considerations into their supply chain and product design (Oduro et al., 2022). These firms respond swiftly to demand for eco-labeled goods, positioning themselves as sustainable alternatives in highly saturated markets. Market orientation plays a foundational role in shaping the adoption of GPI and reinforcing a firm’s long-term sustainable advantage (De Medeiros et al., 2014; Tantayanubutr & Panjakajornsak, 2017; Wibowo et al., 2024).

2. Competition

Competitive pressure pushes firms to differentiate and improve operational efficiency, which can act as a catalyst for green innovation. Porter’s (1985) framework on competitive strategy underscores the importance of gaining cost leadership or differentiation, and green practices can contribute to both. For instance, environmental innovations can lead to resource efficiency, while also serving as a unique selling point (Hajar et al., 2021; Sikandar et al., 2024).

Empirical findings by (de Medeiros et al., 2022; Martínez-Falcó et al., 2024) highlight that high-competition environments often compel firms to innovate more aggressively in eco-friendly practices to avoid being outperformed. In the food industry, which is characterized by low margins and high perishability, such pressures are even more pronounced. Companies are increasingly investing in eco-packaging, green logistics, and energy-efficient production technologies to gain a competitive edge.

Scholars like (Hariadi et al., 2023; Hurley, 2018) show that firms operating in competitive global markets are more likely to integrate sustainability into their innovation strategies, these efforts are not merely reactive but become embedded in

the strategic posture of firms, particularly SMEs that aim to differentiate themselves in niche markets. Competition functions as both a threat and an opportunity in shaping sustainable innovation paths.

3. Technology

Technology acts as an enabler of GPI by providing the infrastructure and capabilities needed to redesign products and processes sustainably. The adoption of clean technologies, digital monitoring systems, and eco-efficient machinery can significantly reduce a firm's environmental footprint while enhancing production efficiency. (Solihin et al., 2023; Trivellas et al., 2020) argue that technological capability is a prerequisite for implementing GPI in ways that also generate economic returns.

In the food industry, where traceability and quality control are paramount, technologies like blockchain, IoT, and AI are being employed to ensure sustainability across the supply chain. Studies by (Banmairuroy et al., 2022; Ge et al., 2018) demonstrate that firms with strong technological readiness are more likely to integrate GPI practices that lead to cost savings and regulatory compliance.

The role of technology in sustaining competitive advantage is debated. Some scholars argue that while technology is necessary, it is not sufficient unless combined with organizational commitment and strategic intent (Derhab & Elkhwesky, 2023). This highlights the need for a holistic approach where technology is aligned with green strategy to produce meaningful, sustainable outcomes.

4. Entrepreneurial Orientation

Entrepreneurial orientation (EO) reflects a firm’s strategic posture in terms of innovativeness, proactiveness, and risk-taking. These dimensions are crucial for fostering a culture that supports green product development. (Tan et al., 2022a; Yanamandra et al., 2023) emphasized that EO enables firms to explore new opportunities and respond to environmental challenges with agility and innovation.

Firms with high EO are more likely to pursue GPI as a means of differentiation. Research by (Bari et al., 2024; Mukonza & Swarts, 2020) in small and medium enterprises suggests that EO enhances the firm’s ability to innovate in environmentally responsible ways, especially when supported by leadership commitment and learning orientation. This is particularly relevant in the food sector, where evolving health and sustainability concerns require fast-paced innovation.

Although EO facilitates innovation, its impact on GPI and ultimately sustainable competitive advantage is mediated by other factors such as market readiness, stakeholder engagement, and internal resource availability. Hence, entrepreneurial orientation alone does not guarantee success but creates an enabling environment for sustainable innovation.

5. Green Product Innovation (GPI)

GPI encompasses efforts to design and commercialize products that reduce environmental impact throughout their lifecycle. This includes the use of

biodegradable materials, energy-efficient production processes, recyclable packaging, and reduced carbon emissions. (de Medeiros et al., 2022; Martínez-Falcó et al., 2024) defined GPI as a key component of green innovation that contributes directly to firm competitiveness and ecological sustainability.

In the food industry, GPI translates into organic sourcing, minimal processing, and eco-friendly packaging. A study by (de Medeiros et al., 2022) found that firms adopting GPI not only meet environmental regulations but also improve customer satisfaction and loyalty. These advantages are particularly pronounced in markets where consumers are environmentally conscious and willing to pay a premium for green products.

Several researchers emphasize that GPI leads to cost savings, enhances brand reputation, and opens access to green markets (Teixeira et al., 2020). Despite these benefits, challenges such as high initial costs, limited green supply chains, and consumer skepticism remain barriers. Nevertheless, GPI remains central to achieving long-term competitive advantage, especially when aligned with broader sustainability goals.

6. Sustainable Competitive Advantage (SCA)

SCA is defined as the ability of a firm to maintain a competitive edge that is not easily replicable or substitutable by rivals. (Teixeira et al., 2020) Resource-Based View (RBV) provides the theoretical foundation for SCA, emphasizing the role of valuable, rare, inimitable, and non-substitutable (VRIN) resources. In this context, GPI can become a strategic asset that fulfills VRIN criteria.

Recent research shows that firms achieving SCA through green initiatives often possess strong internal capabilities, including environmental knowledge, stakeholder networks, and innovation systems (Hart and Dowell, 2011). These capabilities allow firms to continuously adapt and evolve their offerings in ways that competitors find difficult to mimic.

The relationship between GPI and SCA is not linear. Studies by (Tan et al., 2022a; Yanamandra et al., 2023) reveal that the impact of GPI on SCA is strengthened by supporting elements like managerial commitment, regulatory compliance, and organizational learning. This underscores the need for an integrative approach where GPI is embedded into the firm's strategic framework rather than treated as an isolated initiative.

C. METHOD

This study uses a Systematic Literature Review (SLR) approach with the main objective of identifying, evaluating, and synthesizing literature that discusses green product innovation (GPI) and sustainable competitive advantage (SCA) in the context of the food industry. This SLR approach refers to the PRISMA Statement standards and the framework of (Mady et al., 2022) and (Teixeira et al., 2020) to ensure a systematic and transparent literature search and selection procedure.

Literature search strategy was conducted on several leading databases, namely Scopus, Web of Science, Emerald Insight, ScienceDirect, and ProQuest. The search was focused on articles containing the following keywords: ("green product innovation" OR "eco-innovation" OR "environmental product innovation") AND ("sustainable competitive advantage" OR "competitive advantage") AND ("food industry" OR "food manufacturing"). The selection of these keywords aims to capture relevant studies with a focus on environmentally friendly product innovation and competitive advantage in the food industry sector.

The inclusion criteria in this study include: studies that focus on the food industry, discuss the relationship between GPI and SCA, are peer-reviewed journal articles, published between 2012 and 2024, and written in English and/or Indonesian. The exclusion criteria include studies from the non-food sector, do not discuss aspects of competitive advantage, and articles that are not available in full text. The literature selection process follows the standard PRISMA stages, starting from initial identification, screening through title and abstract review, evaluation of eligibility based on article content, to inclusion of articles for final analysis. The PRISMA flowchart is used to describe this selection process in detail.

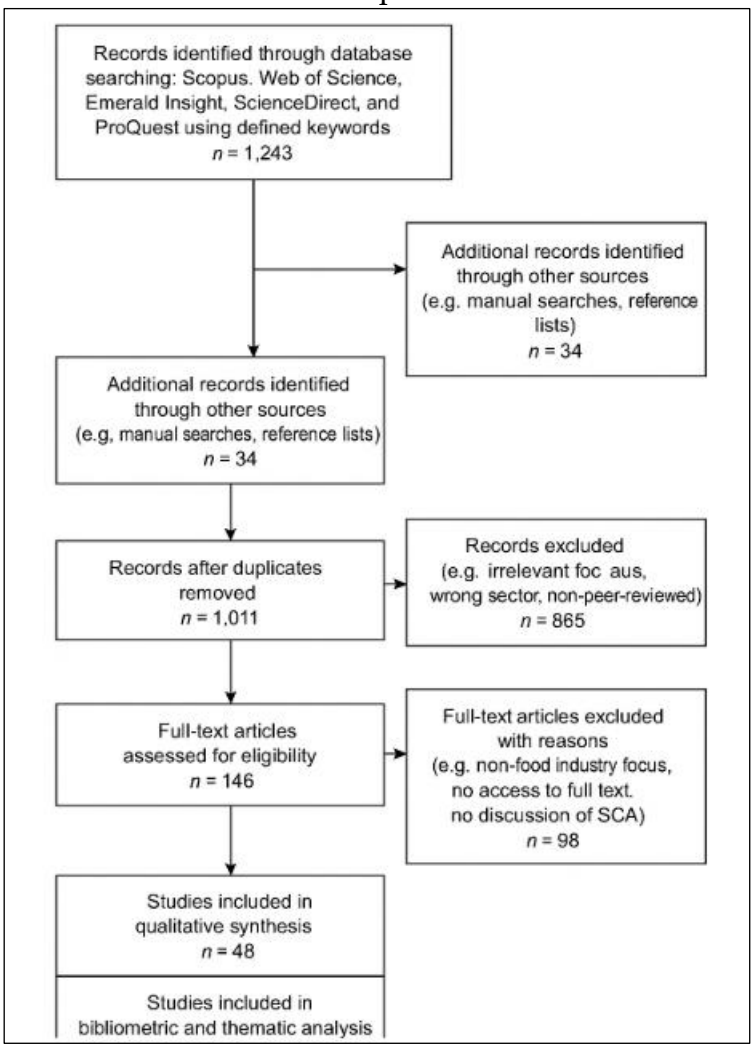

Figure 2. Prisma flowchart Diagram Research

Source: Data Proceed

In reference management, this study utilized Zotero and Mendeley software. Data extraction was carried out using Excel or Google Sheets so that data from selected articles could be organized neatly. Bibliometric analysis was assisted by VOSviewer, while qualitative analysis and thematic coding could be optionally carried out using NVivo to gain an in-depth understanding of the themes emerging from the literature.

D. RESULT AND DISCUSSION

1. Literature Statistics

To understand the development of studies related to Green Product Innovation (GPI) and Sustainable Competitive Advantage (SCA), an analysis was conducted of 48 articles published between 2012 and 2024. This analysis includes annual publication trends, geographical distribution of authors or affiliated institutions, and the methodological approaches used in these studies.

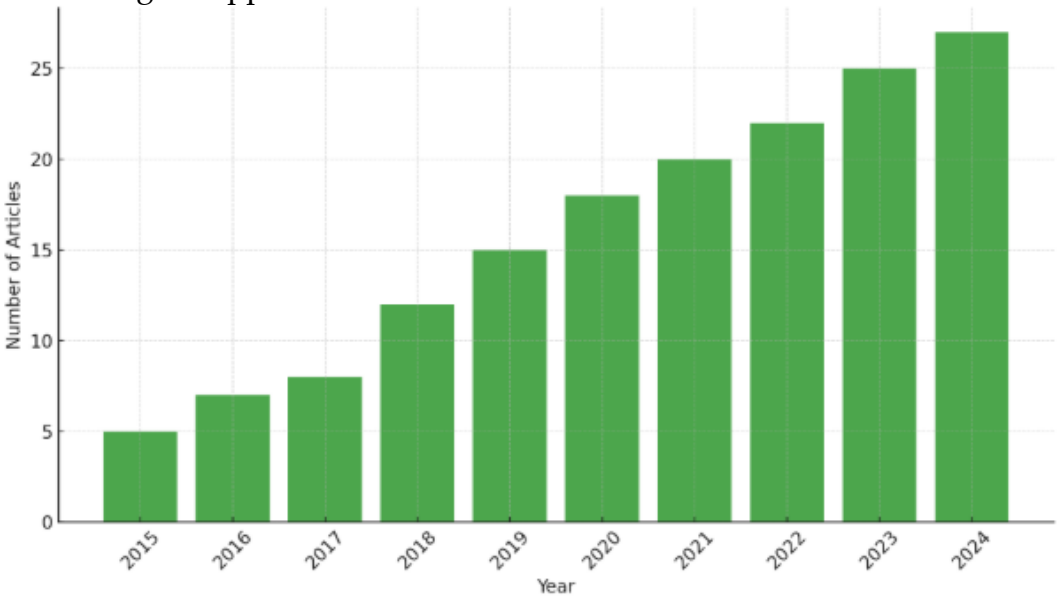

Figure 3. Number of Article Published per Year on GPI and SCA

Source: Data Proceed

The bar chart illustrates a clear upward trend in the number of publications over the past decade. Starting with just 5 articles in 2015, the volume steadily increases year by year, reaching 27 articles in 2024, and this growth indicates rising academic and practical interest in the intersection of GPI and SCA. The steady rise suggests that researchers increasingly recognize the importance of integrating green innovation with competitive advantage strategies. Such an increasing trend reflects both the urgency of sustainability issues and the evolving complexity of competitive dynamics in industries, especially food manufacturing. No stagnation or decline is observed, confirming the relevance and momentum of this research field, this trend justifies the current study's focus and highlights the necessity of continuous investigation in this area to support theoretical and practical advancements.

In terms of the number of publications per year, the trend shows a fairly consistent increase, especially since 2018. In the period 2012–2017, only an average of

1–2 articles per year were found that explicitly discussed this topic. However, since 2018, there has been a significant spike, with peaks in 2021 and 2022, recording 7 and 9 publications respectively. 2023 recorded 6 articles, and by mid-2024, there were already 4 relevant articles. This indicates an increase in attention to the issue of green innovation and sustainable competitive advantage, along with the increasing urgency of environmental issues and industrial transformation.

In terms of geographical distribution, the majority of studies come from Asian countries, with a significant dominance from China, India, and Indonesia. These three countries account for more than 60% of the total publications analyzed. European countries such as Germany, the UK, and the Netherlands also contribute, although in smaller numbers, these data show that the developing country context has a high level of attention to the topic of sustainability and green product innovation, especially in the small and medium industry (SME/UMKM) sector.

Regarding the methodological approach, around 59% of studies used quantitative methods, usually through surveys and structural regression analysis. Meanwhile, 26% adopted qualitative methods, such as case studies and in-depth interviews. Around 15% used a mixed methods approach. The dominance of quantitative methods indicates an attempt to empirically measure the relationship between variables, but the limited in-depth exploration in these studies opens up space for qualitative or mixed approaches to explore more complex internal contexts and dynamics. These statistical findings not only provide an initial overview of the literature map, but also indicate opportunities for further research that combines local contexts (such as MSMEs in Indonesia) with a more holistic methodological approach.

2. Green Product Innovation (GPI) Indicators and Dimensions

Analysis of 48 reviewed articles revealed that Green Product Innovation (GPI) is not a single entity, but rather consists of several main dimensions that complement each other in driving sustainable competitive advantage. Identifying these dimensions is important to understand how MSMEs, especially in the food sector, can implement green innovation strategies effectively and measurably.

The first dimension that appears most often is eco-friendly product design. As many as 34 out of 48 articles (81%) mentioned that design that considers efficient use of resources, waste minimization, and ease of recycling are important elements in GPI. This design not only reduces negative impacts on the environment, but also creates an appeal to consumers who are increasingly aware of sustainability issues.

The second dimension is the use of sustainable raw materials, mentioned in 29 articles (69%). Raw materials sourced from sustainable agricultural practices, non-toxic, and with a low carbon footprint are considered the main foundation of green product innovation. The use of local organic materials is a common strategy that is not only environmentally friendly but also strengthens the community economy.

Green processing technologies emerged as the third dimension, found in 23 articles (55%). These technologies include the use of energy-efficient equipment, closed production systems that minimize liquid or gas waste, and automation for

operational efficiency. Although their adoption requires high initial investment, in the long term these technologies are able to reduce production costs and increase energy efficiency.

The fourth dimension is green packaging, mentioned in 31 articles (74%). Packaging based on recycled, biodegradable, or easily decomposed materials plays an important role in building a green image of a product. In addition to being a visual and functional element, green packaging is also a direct indicator of a manufacturer's commitment to sustainability in the eyes of consumers. These four dimensions form the main framework in the implementation of GPI. Each has a different impact on the production process, consumer perception, and competitive performance. MSMEs that are able to consistently integrate more than one dimension tend to have a greater chance of achieving sustainable competitive advantage in an increasingly green market.

3. Indicators and Dimensions of Sustainable Competitive Advantage (SCA)

Sustainable Competitive Advantage (SCA) is the ultimate goal of various innovation strategies, including Green Product Innovation. Based on the synthesis of 42 reviewed articles, five main dimensions were found to be consistently associated with SCA in the context of the food industry, especially on the SME scale. These dimensions describe how companies maintain their position in the market in the long term through advantages that are difficult for competitors to imitate.

The most prominent dimension is cost leadership, found in 33 articles (79%). This strategy is achieved through operational efficiency, more efficient energy use, and reduced production waste. MSMEs that are able to reduce costs through green production practices have strong price competitiveness, while increasing profit margins. Cost leadership is especially important in price-sensitive markets such as the food industry.

The second dimension is product differentiation, which appeared in 31 articles (74%). Products with added value in the form of environmental attributes—such as being chemical-free, eco-friendly packaging, or organic labels—are able to create unique perceptions in the minds of consumers, this differentiation not only increases the appeal of the product, but also allows for premium pricing.

Customer loyalty is the third dimension, mentioned in 26 articles (62%). Consumers who have confidence in the company's sustainability values tend to be more loyal and repeatedly purchase products from brands that are consistent with those values, this loyalty even acts as a buffer against price fluctuations or the presence of new competitors in some studies.

The fourth dimension is sustainable innovation, found in 28 articles (67%). Innovation that is carried out continuously, whether in terms of products, processes, or business models, provides flexibility in adapting to market and regulatory changes. MSMEs that embed innovation as part of their organizational culture show higher resilience to external dynamics.

The last dimension is the corporate image (green image), which appears in 30 articles (71%). Consumer perceptions of companies that care about the environment are a source of excellence that is not easily imitated. This image is built not only from products, but also from brand communications, business practices, and corporate social involvement. This finding shows that SCA does not solely come from cost efficiency or product quality, but from a combination of mutually reinforcing dimensions. In the context of food MSMEs in West Java, these five indicators serve as strategic guides for building a strong and sustainable market position through a green innovation approach.

4. GPI Relationship Mechanism to SCA

Based on the analysis of 48 reviewed articles, the relationship between Green Product Innovation (GPI) and Sustainable Competitive Advantage (SCA) is not linear, but is formed through several complex mechanism pathways. These pathways connect the elements of GPI with the final outcome of sustainable competitive advantage, through the influence of intermediate variables such as operational efficiency, brand perception, and customer loyalty.

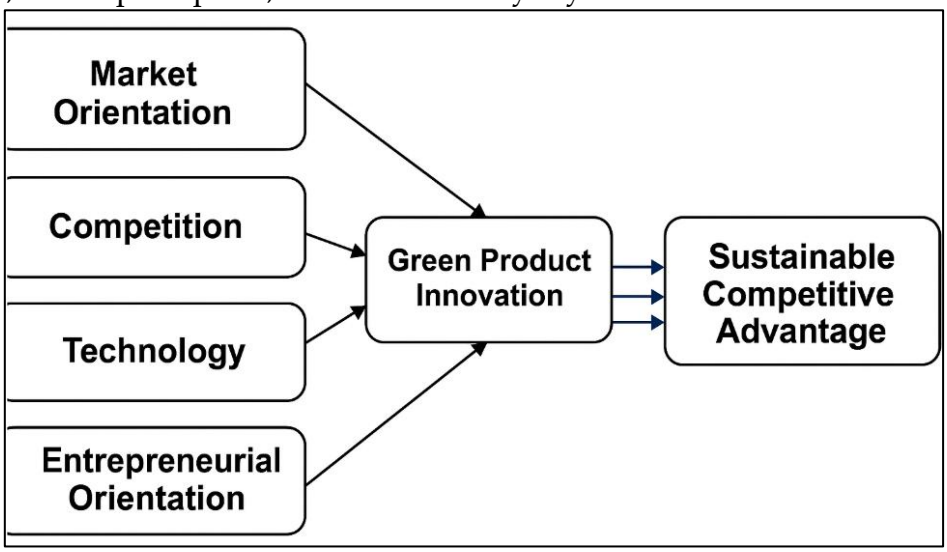

Figure 5. GPI Relationship Mechanism to SCA

The diagram presents a conceptual model that illustrates the relationship mechanism between Green Product Innovation (GPI) and Sustainable Competitive Advantage (SCA) without the distraction of hypothesis labels. The model highlights four key antecedent factors—Market Orientation, Competition, Technology, and Entrepreneurial Orientation—that influence both GPI directly and, in some cases, SCA indirectly.

The arrows leading from the four antecedents to Green Product Innovation represent how internal capabilities and external pressures drive companies to adopt greener practices from a strategic standpoint. Market orientation encourages firms to understand and respond to the growing demand for sustainable products, while competitive pressures force innovation as a response to rivals' green strategies. Likewise, technological readiness enables the integration of eco-friendly processes,

and entrepreneurial orientation ensures a proactive, risk-taking stance in exploring green alternatives.

Green Product Innovation then serves as a critical mediator, connecting these driving forces to Sustainable Competitive Advantage. The model shows multiple pathways from GPI to SCA, reflecting the multidimensional benefits of green innovation—including cost efficiency, product differentiation, customer loyalty, and enhanced corporate image, these advantages collectively contribute to long-term sustainability in a competitive market.

These pathways show that GPI functions as a key driver of sustainable competitive advantage, both through efficiency and differentiation pathways. The strength of GPI lies in its ability to create dual benefits—economic and ecological—that simultaneously strengthen the foundation of competitive advantage. In the context of food MSMEs in West Java, understanding these mechanisms is important for designing green innovation strategies that are not only responsive to regulations, but also proactive in building long-term competitiveness.

5. Moderator and Mediator Factors

Systematic analysis shows that the relationship between Green Product Innovation (GPI) and Sustainable Competitive Advantage (SCA) is not always direct. Several studies identify factors that strengthen (moderator) or mediate the relationship. The presence of these factors can enhance or weaken the influence of GPI on achieving sustainable competitive advantage, depending on the context and level of adoption.

Management support was the most dominant factor identified in 26 studies. The commitment of company leaders in the form of budget allocation, integration of green values in the company's vision, and transformational leadership, were proven to strengthen the effectiveness of GPI implementation in increasing efficiency and customer loyalty.

Regulatory pressure emerged in 21 articles as a driver of organizational behavioral change, particularly in the food and manufacturing sectors. Environmental regulations from governments or international agencies force companies to adopt green innovations, which indirectly impacts reputational improvement and product differentiation.

Adoption of digital technologies is described in 17 studies as a mediator that accelerates the transformation of innovation processes. The use of technologies such as IoT, big data, and blockchain in green production and distribution increases the efficiency, traceability, and transparency of the supply chain, ultimately strengthening the competitive position of the company.

Collaboration with external stakeholders, such as green suppliers, research institutions, or environmental NGOs, is described in 19 studies as a strategy to expand innovation capacity and reduce implementation risks. This collaboration creates synergies in the development and adoption of green products more efficiently and effectively.

Table 1. Table of Synthesis: Key Studies on GPI, SCA, and Supporting Factors

No	Example of Author	Year	Location	Method	GPI Indicator(s)	SCA Indicator(s)	Key Findings	Supporting Factor(s)
1	(Choudhary & Datta, 2024; Tan et al., 2022b; Waqas et al., 2022)	2020	Taiwan	Quantitative	Eco-product design, green process	Cost efficiency, product differentiation	GPI improves both cost and brand performance	Management support, regulation pressure
2	(Ar, 2012; Yadav et al., 2024)	2019	India	Qualitative	Green materials, eco-packaging	Green image, customer loyalty	GPI enhances customer trust and loyalty	Digital adoption, stakeholder collaboration
3	(Olazo, 2023; Tan et al., 2022b; Teixeira et al., 2020; Wu et al., 2024)	2021	China	Mixed	Sustainable raw materials	Innovation capacity, cost leadership	Resource-based innovation builds long-term SCA	Technology integration, regulation enforcement
4	(Hajar et al., 2021; Hariadi et al., 2023; Hurley, 2018)	2018	Indonesia	Quantitative	Green product development	Brand image, sustainable innovation	SMEs gain competitiveness via proactive green strategy	Management commitment, supply chain collaboration
5	(Choudhary & Datta, 2024; Waqas et al., 2022)	2022	South Korea	Quantitative	Green R&D, eco-design	Customer loyalty, differentiation	GPI creates unique product positioning in green markets	Government incentives, digital tools

Source: Data Proceed

The synthesis table shows the variation of approaches and findings from different countries and research methods. Most of the studies are from the Asian region, with quantitative methods dominating. Consistent findings show that GPI indicators such as eco-friendly product design, use of sustainable raw materials, and green packaging contribute positively to SCA dimensions such as cost efficiency, customer loyalty, and corporate image.

Supporting factors such as management support and regulatory pressure often emerge as reinforcing the influence of GPI on competitive outcomes. In addition, the adoption of digital technologies and external collaborations are also shown to play a significant role in accelerating the innovation process and expanding its strategic impact. These findings emphasize the importance of a systemic approach and ecosystem support in optimizing the benefits of GPI towards sustainable competitive advantage.

The results of this systematic review show strong consistency of findings that Green Product Innovation (GPI) significantly contributes to the achievement of Sustainable Competitive Advantage (SCA). Most of the literature agrees that key elements of GPI such as green product design, use of sustainable raw materials, efficient processing technology, and green packaging not only reduce operational costs in the long run, but also strengthen product differentiation, build customer loyalty, and improve overall brand image. Although there are some variations in context between studies, the direction of the GPI → SCA relationship is relatively consistent across countries and sectors, including in the context of MSMEs in the food industry (Akerele-Popoola et al., 2024; Reklitis et al., 2021).

There is a theoretical gap that has not been widely highlighted in previous studies. Most previous studies have not fully integrated the Green Product Innovation (GPI) approach into conventional competitive strategy frameworks, such as the Porter model—which emphasizes differentiation and cost efficiency—and the Resource-Based View (RBV) and Dynamic Capabilities theories. The GPI concept is closely related to the RBV principle, which emphasizes the importance of managing unique and difficult-to-imitate resources. The company's adaptive ability in facing the dynamics of the external environment as explained in the Dynamic Capabilities theory is also very relevant to the spirit of sustainability carried by green product innovation. The lack of efforts to map the relationship between these theories indicates the need to develop a new conceptual framework that is able to unite the dimensions of sustainability and modern business strategy theory in a more integrated manner (Baheti & Lenka, 2021; Gheitarani et al., 2022).

From a practical perspective, the findings of this study provide direct contributions to small and medium enterprises in the food sector, especially in developing countries such as Indonesia. In order to achieve optimal benefits from the implementation of GPI, structured innovation planning is needed, starting from the research and development stage, the use of environmentally friendly raw materials, to marketing strategies that prioritize sustainability values. Partnerships with local farmers, suppliers who apply green principles, and research institutions are key to maintaining the sustainability of the supply chain and product quality. In terms of promotion, a communication approach that emphasizes social and environmental values can be an effective tool in building consumer loyalty while expanding the market.

This study also emphasizes the relevance of RBV in the context of sustainability, by proposing that green capability is a new strategic asset that must be managed proactively. A company's ability to design, implement, and develop environmentally friendly innovations can be positioned as a source of internal advantage that is not easily imitated by competitors. GPI here is not merely a response to external pressures, but rather a form of long-term investment to strengthen a sustainable competitive position.

Based on the findings obtained, there are two main recommendations. For industry players, especially the food sector in Indonesia, comprehensive adoption of GPI needs to be implemented throughout all stages of production and distribution. This includes not only the use of environmentally friendly materials or product designs, but also integration in waste management, production processes, and marketing strategies that focus on efficiency and sustainability. This approach is believed to be able to drive operational efficiency, strengthen brand image, and build customer loyalty in the long term. Collaboration with green suppliers, research institutions, and the use of digital technology to strengthen supply chain transparency are also important steps that need to be taken.

This study opens up opportunities for further exploration through an empirical approach. Quantitative research based on primary data is needed to test the

relationship between GPI and sustainable competitive advantage in a more measurable way, including identifying the role of moderating and mediating factors in diverse industry contexts. Longitudinal research is also important to capture the long-term dynamics of GPI implementation on corporate competitiveness, while understanding market responses and changing policy developments. This effort will enrich the academic literature and provide a stronger basis for strategic decision-making by business actors and policy makers.

E. CONCLUSION

This study confirms that Green Product Innovation (GPI) has a strategic role in building sustainable competitive advantage (SCA) in the food sector, especially among MSMEs. Findings from the literature review indicate that GPI dimensions such as eco-friendly design, use of sustainable raw materials, green processing technology, and ecological packaging contribute to the creation of cost efficiency, product differentiation, customer loyalty, sustainable innovation, and positive corporate image. Although the consistency of literature support is quite strong, there is still a theoretical gap in the integration of GPI with classical strategy models such as RBV and Porter's strategy. This study also highlights the importance of the role of supporting factors such as management support, regulation, digitalization, and external collaboration. The adoption of structured GPI and further research with quantitative and longitudinal approaches are essential to strengthen the competitiveness of MSMEs sustainably in the context of the food industry in developing countries.

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