

Driving Firm Performance in The F&B Industry: How Green Practices Shape Operational Excellence and Competitiveness

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Abstract

Growing environmental concerns have heightened the need for sustainability in the food and beverage (F&B) industry, yet limited research has systematically examined how green practices impact firm performance. This study contributes to the literature by examining not only the direct effects of green practices but also the mediating roles of operational excellence and competitiveness. Data were collected from 320 restaurant owners, managers, and staff in Malang City, Indonesia, using a purposive sampling approach. Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed to test the predictive model. The findings reveal that green practices significantly enhance firm performance both directly and indirectly. Specifically, operational excellence and competitiveness act as key mediators, demonstrating how environmental initiatives can strengthen efficiency and market positioning. The results highlight that integrating green practices into strategic and operational frameworks is essential for achieving sustainable performance gains. This study provides novel insights into the mechanisms linking sustainability and firm outcomes, with practical implications for F&B businesses worldwide.

Keywords: Green Practices, Operational Excellence, Competitiveness, Firm Performance

1. Introduction

The development of the Food and Beverage (F&B) industry has been increasing over the years, in line with Indonesia's population growth. Despite the pandemic, Indonesia's GDP in the Food and Beverage sector demonstrates expansion and resilience as an industry (Pefindo, 2021). During the COVID-19 pandemic, the F&B industry, especially restaurants, managed to run their business well by adapting to the current changing conditions. Restaurants won customers' trust and satisfaction by providing health and safety protocols, as well as ensuring the quality of their products and services, which encouraged a sense of security (Pradana et al., 2021). Previous studies by Pradana et al. (2021) indicated that innovation and resilience in restaurants not only led to customers' satisfaction and intention to revisit and visit other restaurants but also motivated word-of-mouth marketing. Years later, increased urbanization, changing consumer preferences, and a revolution in dining experiences have spurred a surge in restaurant growth across city centres. This phenomenon has raised concerns regarding the sustainability of F&B businesses (Chiu & Hsieh, 2016). The analysis reveals that the F&B industry contributes around 30% of the total greenhouse gas emissions (Food and Agriculture Organization (FAO, 2021). In Indonesia, 66% of the consumers express significant concern about environmental issues, with 35% particularly alarmed by the worsening effects of global warming, deforestation, and food waste (Food Ingredients Asia, 2019). There is a rise in awareness and demand from F&B consumers for sustainability practices. Consumers are considering their purchases not only for their needs for products

or services but also for the impact on society and the environment (Kee et al., 2023). Another survey by Lin (2019) revealed that many consumers have started taking steps to protect the environment. This environmentally conscious market segment is anticipated to grow at a compound annual growth rate (CAGR) of 12.45% from 2022 to 2027, reaching an estimated market value of USD 19.53 million by 2027 (Statista). Therefore, F&B businesses' awareness of environmental issues is crucial to adopt sustainable practices in their business processes.

The F&B industry can achieve sustainability, reduce its impact on the environment and society, and still prioritize the quality of products and services by implementing green practices. Green practices encompass actions aimed at reducing adverse environmental effects. F&B businesses can achieve this by using local and organic ingredients, managing food waste through composting and recycling, reducing energy consumption, and using eco-friendly packaging (Chiu & Hsieh, 2016). Meanwhile, Schubert et al. (2010) categorize green practices into green actions, green foods, and green donations. In Indonesia, the collaboration between the NGO iLitterless and restaurants demonstrates green action through the recycling process of plastic waste. iLitterless runs a plastic waste recycling program by collaborating with cafes to collect and recycle waste and holding eco-friendly campaigns through many activities that are informed on www.ilitterlessindonesia.org.

The Environmental-Based View (EBV) theoretical framework underpins this study, emphasizing the alignment of environmental sustainability considerations, positioning the

business as a value system that harmonizes the interests of the environment, business operations, and society to achieve sustainable competitive advantage (SCA) (Naparín, 2024). Green practices are crucial and play a fundamental role in a business ability to survive and grow (Hu et al., 2010). Beyond positive environmental effects, green practices can enhance the competitiveness of F&B businesses by differentiating them from competitors and attracting loyal customers who prefer environmentally friendly products and experiences (Chiu & Hsieh, 2016). The differentiation that F&B businesses offer by investing in a clear sustainability distinction in their products can lead to increased sales and competitiveness (Kee et al., 2023). These green initiatives also contribute to operational excellence by optimizing efficiency in production processes, effectiveness in customer orientation, producing quality products, and achieving the best total cost and customer satisfaction (Okoth et al., 2024). Abbas & Hussien (2021) also mentioned that implementing green practices encourages F&B businesses to boost revenue, profitability, and customer turnover. Overall, environmentally friendly practices significantly impact a company's financial performance (Chiu & Hsieh, 2016). Guided by the Environmental-Based View (EBV), this study conceptualizes green practices as strategic resources that not only reduce environmental harm but also generate sustained competitive advantage. EBV highlights how environmental considerations, when integrated into organizational strategy, create value through enhanced efficiency, innovation, and market differentiation. By applying EBV, we hypothesize that green practices foster operational excellence and competitiveness, which in turn drive firm performance.

Numerous studies within the F&B sector show the integration of sustainable practices in restaurant operations. Wisker & Kwiatek (2018) failed to observe a direct effect of environmentally oriented practices on company performance; however, they noted an indirect effect through the mediation of employee-based brand equity, which can improve company performance when environmental orientation practices are adopted. In contrast, Abbas & Hussien (2021) and Perramon et al. (2014) identified additional mediating variables, such as operational performance and competitive advantage, as supportive factors for firm performance. The studies show that the enhancement of perceived image, consumer behaviour, sales, and employee contentment, rather than cost reduction, influences these outcomes. While prior research has examined the relationship between green practices and firm outcomes, much of it has been conducted in developed economies, with limited evidence from developing countries such as Indonesia, where institutional contexts, consumer behavior, and resource constraints differ significantly. Moreover, many studies treat green practices as a unidimensional construct, overlooking their complexity. Few have simultaneously considered operational excellence and competitiveness as dual mediators, leaving a gap in understanding the mechanisms through which green practices translate into firm performance.

The primary objective of the study is to examine the direct impact of green practices on firm performance and reassess their indirect effect on firm performance via competitiveness, while also considering operational excellence as another mediating factor, building upon existing research. This study differs from previous research by examining how green practices impact firm performance in developing countries, with a specific focus on Indonesia's growing F&B industry. Moreover, this study does not merely view green practices from a unidimensional perspective, but instead examines them from a multidimensional standpoint. It employs a multi-order construct to capture the complexity of green practices more comprehensively, reflected through three primary dimensions

introduced by Schubert et al. (2010): green action, green food, and green donation. Additionally, this study offers a unique investigation into the dual mediating roles of operational excellence and competitiveness. By integrating environmental aspects of business practices, the research provides valuable insights for F&B entrepreneurs, policymakers, and sustainability advocates. Using comprehensive performance metrics, the study addresses gaps in existing literature to investigate green practices in enhancing firm performance in developing countries, specifically in the F&B industries.

2. Literature Review

The hospitality in tourism is one of the most prominent and rapidly growing sectors, with the restaurant industry playing a significant role in environmental issues (Singh et al., 2017; Sulaiman & Haron, 2013). According to Kasim & Ismail (2012), the F&B industry, particularly restaurants, significantly contributes to pollution, food and plastic waste, emissions, and the extensive consumption of water and energy. Additionally, the industry involves the use of hazardous chemicals, non-recyclable packaging, improper recycling practices, and the large-scale use of resources such as energy, gas, and water, resulting in both solid and liquid waste (Hu et al., 2010).

Green Practices

On the demand side, there has been a surge in consumer demand for healthy, sustainable, and eco-friendly products and services from restaurants (Dewald et al., 2014). As consumers become more conscious of what they consume, the call for integrating sustainable practices within restaurant operations is growing (Bacig & Young, 2019). In response, restaurants are incorporating green practices into their operational strategies, including enhancing resource efficiency, promoting environmental commitments through green marketing, and offering competitively priced eco-friendly products to reduce pollution at every stage of the supply chain (Dutta et al., 2008; Kim et al., 2017).

The concept of green practices refers to environmentally friendly actions implemented by businesses to reduce their ecological footprint and minimize negative environmental impacts (Schubert et al., 2010). Tzschentke et al. (2008) describe green practices as efforts to protect the environment and create products that minimize environmental damage through eco-friendly production processes. Schubert et al. (2010) categorize green practices in the F&B industry into three areas: green action, green food, and green donation. Other frameworks, like those proposed by Kwok et al. (2016), expand on these categories, including green corporate social responsibility, eco-certifications, staff education on ecological practices, and environmental attributes related to waste management.

Research shows that implementing green practices benefits firms financially by reducing operational costs and enhancing competitiveness (Chiu & Hsieh, 2016). Linton & Kask (2017) define firm performance as the achievement of a company's internal and external goals, encompassing the total value generated from its activities for all legitimate stakeholders. Integrating green practices into business strategy not only reduces environmental impact but also enhances customer loyalty, competitiveness, and market performance, while reducing costs, mitigating risks, and improving productivity (Dangelico & Pontrandolfo, 2015; Rekik & Bergeron, 2017; Ryu

et al., 2008). Grounded in the Environmental-Based View (EBV), green practices can serve as strategic resources that reduce environmental risks while enhancing legitimacy and competitiveness. In restaurants, adopting eco-friendly actions such as waste reduction, local sourcing, and sustainable packaging not only lowers costs but also strengthens brand image and customer loyalty, leading to improved firm performance.

Hypothesis 1: Green Practices significantly relate to Firm Performance.

Operational Excellence

Operational performance in the context of environmentally friendly practices, particularly within the supply chain, reflects a company's ability to enhance production efficiency, product quality, and reduce inventory and waste (Zhu et al., 2007; Zhang & Yang, 2016). Factors such as flexibility and service quality are also critical in improving operational performance and customer satisfaction (Chavez et al., 2016). Kazancoglu et al. (2018) emphasize that efficiency is achieved through minimizing materials, waste, and production residues, while Diabat et al. (2013) evaluate operational success through customer satisfaction, supplier flexibility, effective communication, and service quality.

Achieving customer satisfaction is a critical indicator of performance in various sectors. Operational excellence, which emphasizes efficiency and effectiveness, serves as a key driver of customer satisfaction (Russell & Koch, 2009; Shehadeh et al., 2016). The sand cone framework, developed by Ferdows & De Meyer (1990), outlines a sequence of operational performance capabilities, starting with product quality, followed by dependability, flexibility, and cost efficiency. Operational excellence enables companies to implement a more consistent and reliable business strategy, with lower operational risks and costs, while increasing revenue compared to competitors (Kaplan & Pateman, 2015). Adopting green practices strengthens firms' operational systems by improving resource efficiency, product quality, and waste reduction, which are central dimensions of operational excellence.

Hypothesis 2: Green Practices significantly relate to Operational Excellence.

Green practices, such as using recycled materials, adopting green designs, and improving energy efficiency, contribute to enhanced production efficiency and pollution prevention (Cheung et al., 2015; Garmulewicz et al., 2018; Jabbour & Jabbour, 2016). However, challenges often arise during the initial implementation stages due to high upfront investments in research and development to discover innovative solutions like biodegradable materials or circular packaging (De Giovanni & Folgiero, 2023; Chuang 2014). Although initial investments may negatively impact short-term financial performance, in the long term, these practices can reduce operational costs (Zhu et al., 2006). Overall, improving operational excellence through green practices is essential for conserving resources, minimizing waste, and strengthening competitiveness (Sakshi et al., 2020). When firms achieve operational excellence, they not only reduce costs and risks but also enhance reliability, flexibility, and customer satisfaction—factors highlighted in the sand cone framework as precursors to long-term competitiveness.

Hypothesis 3: Operational Excellence significantly relates to Firm Performance.

Hypothesis 4: Green Practices significantly relate to Firm Performance through Operational Excellence.

Competitiveness

Green practices in restaurants played a pivotal role in building a positive green image and enhancing firm performance (Hwang et al., 2020; Chiu & Hsieh, 2016). Environmental innovation strengthens competitive advantages by reducing environmental investment costs, improving product value, and gaining stakeholder support (Chiou et al., 2011; Chang, 2011). By meeting eco-conscious consumer demands and regulatory requirements, green innovation fosters dynamic capabilities and sustainable advantages (Ge et al., 2020).

Competitiveness in business refers to the ability to leverage resources for differentiation, providing products or services that are preferred by consumers (Wijnands et al., 2015; Sin et al., 2024). Factors contributing to competitiveness include strategic location, good reputation, service quality, and sustainability practices. Implementing green practices can enhance a company's reputation, attract eco-conscious customers, and improve customer satisfaction (Hu et al., 2010). To achieve sustainable firm performance, customer satisfaction significantly influences occupancy rates and profits (Heo, 2017). The competitive position of a restaurant is an attempt to establish the conditions for the most complete and multifunctional use and to be uniquely different from competitors, which not only enhances short-term efficiency but also equips the restaurant to seize opportunities presented by dynamic market conditions (Yemchuk & Arpul, 2020).

Hypothesis 5: Green Practices significantly relate to Competitiveness.

Some research findings showed varied results regarding the impact of green practices on firm performance. Research indicates a positive relationship between customer satisfaction and firm performance, with higher satisfaction levels leading to enhanced financial outcomes (Otto et al., 2020; Williams & Naumann, 2011). Research on wineries finds positive effects on firm performance from implementing environmentally friendly innovation (Leenders & Chandra, 2011). Another research in Ghana reveals that green orientation enhances SME performance, including employee satisfaction, employee retention, customer satisfaction, and brand image (Amegbe et al., 2021). In contrast, Cara Aguilera-Caracuel & Ortiz-De-Mandojana (2013) found no profitability improvement, and Liu (2011) identifies higher costs and negative financial outcomes. Research adds that green practices bring down financial performance due to high costs, and excessive green innovation might lead to weaken competitiveness, highlighting the need for further research (Ghisetti & Rennings, 2011; Chen & Chang, 2011). Green practices can provide firms with valuable and inimitable resources that strengthen competitiveness by improving brand reputation, product value, and alignment with eco-conscious consumer demands. Firms that successfully integrate sustainability into their operations often achieve differentiation in crowded markets, gaining stakeholder trust and customer loyalty, which are crucial drivers of firm performance. While some studies show inconsistencies—such as higher costs potentially weakening short-term profitability—evidence increasingly suggests that competitiveness mediates the relationship between green practices and firm performance.

Hypothesis 6: Competitiveness significantly relates to Firm Performance.

Hypothesis 7: Green Practices significantly relate to Firm Performance through Competitiveness.

3. Research Method

This research was conducted in Malang City, a city with fast-growing restaurants in Indonesia. The Indonesian Association of Cafe and Restaurant Entrepreneurs revealed that restaurant growth in Malang City will reach 20 percent in 2023. The research population comprises restaurants in Malang City that engage in green initiatives. Sample searched from the Statistic Bureau of Malang where there are 505 restaurants (BPS, 2023). However, this study is limited to data that does not show how many restaurants have initiatives to carry out environmentally friendly practices. Since there is no register showing which restaurants are adopting eco-friendly practices, it is necessary to conduct pre-screening by asking questions regarding their participation in such practices. This study tried to contact every restaurant and asked if they had any initiatives to run a sustainable business practice. In the process, problems were found in implementing green practices which varied in each restaurant and not all restaurants joined the environmental care community. The classification of levels will make this study difficult, and the restrictions made might reduce the contribution of the research. Nevertheless, only those restaurants that verify they have adopted green practices qualify for the subsequent phase. Restaurants that fail to respond, decline to take part, or lack a clear understanding of green practices are excluded from the sample gathered. This approach aids the study in minimizing selection bias by ensuring that only restaurants fitting the criteria associated with the phenomenon are included. Hence, a purposive sampling technique was employed to select samples that possess specific desired characteristics based on predefined criteria. Because of limitations in accessibility, this study opted to gather responses from owners, managers, and experienced staff. According to Hair et al. (2022), using larger samples produces a more trustworthy solution. This research gathered data from 320 respondents. Considering the number of parameters, using a ten times rule, the minimum sample size required is 300 respondents; the number of samples in this study fulfils the minimum requirement.

The questionnaire was answered by staff who have worked for over one year, managers, or owners of restaurants in Malang City. Restaurant staff contribute directly to the engagement with and implementation of sustainability programs. A minimum of one year's experience is necessary to guarantee that staff are adequately involved with the restaurant's sustainability procedures. The manager is responsible for sustainability practices in day-to-day operations, while the owner of owner-operated restaurants makes decisions about resource use and environmental initiatives.

Potential participants were informed about the goals of the research, the voluntary aspect of their involvement, and the rigorous measures in place to ensure their information remains strictly confidential throughout the study. To collect primary data, the questionnaires were distributed to restaurants in Malang City that had initiated green practices and had agreed to participate. In order to make sure that there were no ambiguities and that the sentences would convey the intended meaning, the questionnaire was pre-tested with a small group of qualified respondents before the full implementation. The clarity and inclusiveness of the questions are optimized with feedback, which is in line with the best practices of survey research design. The collected data will be used only for this research. The study report will provide figures, facts, graphs, and tables, but no names of individuals or institutions will appear in the report. The researchers will treat all information in the strictest confidence and not disclose any information shared with them to any other person or institution. Using a five-point Likert scale, the study involved respondents rating their agreement with statements on

a scale of 1 to 5.

The research instrument was developed through a comprehensive review of related literature. The Green Practice variable was developed from Perramon et al. (2014), Green Action and Green Donation (Schubert, 2010), and Green Food (Legrand et al., 2010). The operational excellence item was conceptualized based on Ferdows & De Meyer (1990) and Vencataya et al. (2016), who implemented the sand cone operational excellence model. The competitiveness items were adopted from Yemchuk & Arpul (2020) who developed elements of restaurant competitiveness, including restaurant position, image, cuisine, service, entertainment, pricing, and marketing. The firm's performance items indicated economic performance (Perramon et al., 2014), customer satisfaction (Xue et al., 2019), operating cost (Abdou et al., 2014) for economic performance, Xue et al., (2019), Abdou et al., (2014) and employee skill (Pradana & Safitri, 2023). All the instruments adapt to the perspective of the food processing business. SEM-PLS was used to conduct the analysis and test the data to create predictive models. This research constructed a second-order model for green practices to evaluate the reflective values of its dimensions. The process of data analysis encompassed both descriptive and quantitative analyses. Utilizing descriptive analysis helps to provide an understanding of the characteristics of the respondents. The outer model assesses convergent validity, discriminant validity, and construct reliability, which involves evaluating R-Square, Q-Square, and Goodness of Fit (GoF). The hypothesis test was carried out by an inner model that considered direct, indirect, and total effects. In this research, there are 7 hypotheses.

4. Results

The findings of distributing the questionnaire showed the participation of 320 restaurants as a unit of analysis. Respondent characteristics include position and age. Most respondents were staff (162 respondents, 50.6% of the total), followed by managers in second place (104 respondents, 32.5% of the total), and owners in third place (54 respondents, 16.9% of the total). This is because staff are more accessible for participation in surveys because they are more likely to be at work locations. Staff frequently possess first-hand experience and insights into implementing green practices at their place of work. They can deliver a more in-depth and accurate understanding of how these practices affect company performance. Most of the survey participants were aged between 25 and 30 years, comprising 44.6% of the total respondents, with the age range of 20 to less than 25 years following closely behind (27.1% of the total). Considering that most respondents in this survey were staff (50.6%), those aged 25 to less than 30 years and 20 to less than 25 years were more often found among staff because at that age, they are just entering the world of work and looking for initial experience in their career. They work in entry-level positions or as staff in a variety of industries, including the restaurant. The distributed and completed questionnaire results in various answers from the statement items that are categorized under the tested variables. Green Practice (GP) encompasses Green Action (GA), Green Food (GF), and Green Donation (GD), collectively forming a second-order construct. In addition, there are Operational Excellence (OE), Competitiveness (CO), and Firm Performance (FP). Appendix 1 lists the answers from respondents for each variable, including the average item and standard deviation.

4.1 Outer Model Analysis

Validity Test

To assess construct validity, researchers examine the factor loading values, which are connected to the concept that a construct's measures should exhibit strong correlations. The factor loading value, which represents the convergent validity, is utilized to assess the validity of a construct by examining the relationship between a latent variable and its indicators. An accepted guideline for confirming convergent validity is that the value of the loading factor must exceed 0.7 (Hair et al., 2022). Based on the standardized loading estimate output in Figure 1, we can conclude that all loading factors are statistically significant because they have loading factor values greater than 0.70. In addition, during the validity testing process, discriminant validity is also examined to measure how effectively one construct can be differentiated from another. Elevated levels of discriminant validity indicate that a construct is distinct and precisely reflects the concept being assessed. To test discriminant validity, Hair et al., (2022) recommended verifying the cross-loading values to ensure that each variable exceeds

0.7. The cross-loading values for all indicators are higher than those for other variables. Therefore, the items that make up the construct are capable of elucidating the variables employed in the study, confirming their validity (Appendix 1).

Reliability Test

As noted by Wong (2019), reliability test aims to show the accuracy, consistency, and dependability of instruments in measuring constructs. Two methods for assessing the reliability of a construct with reflective items. The standard for establishing construct reliability is that the values of both composite reliability and Cronbach's alpha should be greater than 0.70. Table 1 displays the results of the reliability test. The latent constructs have high reliability, including the latent constructs of Green Practices, Operational Excellence, Competitiveness, and Firm Performance. Each possesses a Cronbach's alpha and a composite reliability value greater than 0.70, showing all variable reliability.

Variable	AVE	Cronbach's Alpha	Composite Reliability	Conclusion
Green Practices (GP)	0.766	0.847	0.907	Reliable
Operational Excellence (OE)	0.668	0.876	0.910	Reliable
Competitiveness (CO)	0.549	0.863	0.895	Reliable
Firm Performance (FP)	0.606	0.869	0.902	Reliable

Table 1: Reliability Test Results
Source: Primary Data Processing (2024).

Inner Model Analysis

The identification of the performance of green practices in restaurants from customer perceptions that form key green practices in restaurants has been carried out by Wang (2012). This research emphasizes the role of restaurants as a unit

implementing green practices. Hence, the inner model will reveal the effect of green practices performance on the business. The inner model represents the second phase in the data analysis process. There are several item components that are criteria for assessing the structural model, namely the R-Square, Q-Square and Goodness of Fit values.

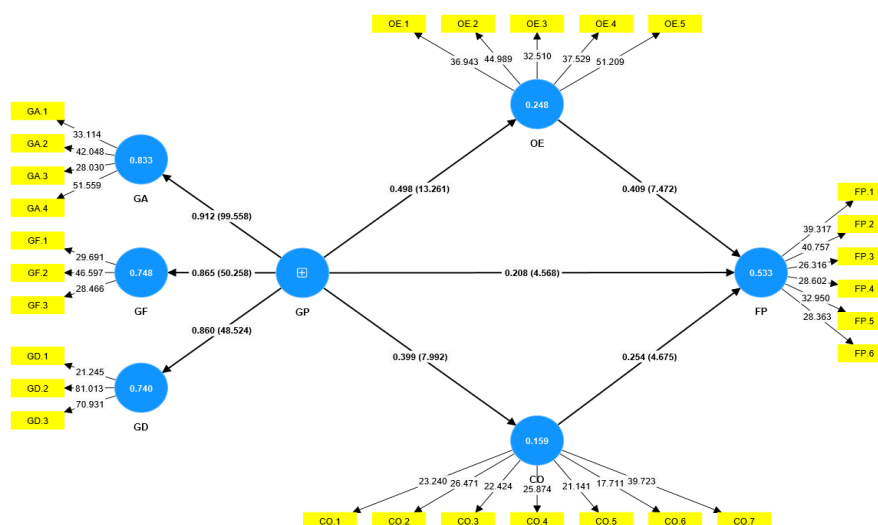


Figure 1: The Calculation Result of the Mode
Source: Primary Data Processing by SmartPLS (2024)

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Wong (2019), explains that R-Square measures the independent variable, accounted for how much variation in the dependent variable is. It measures the level of explanatory power of the independent variable in relation to the variance

observed in the dependent variable. An R-Square value of 0.75 suggests a strong relationship, 0.50 shows a moderate one, and 0.25 signifies a weak relationship (Hair et al., 2022). Table 2 shows the R-Square results.

Variable	R-Square	Adjusted R-Square
Operational Excellence (OE)	0.248	0.246
Competitiveness (CO)	0.159	0.157
Firm Performance (FP)	0.533	0.528

Table 2. R-Square Test Results
Source: Primary Data Processing (2024)

The Adjusted R-Square value for OE stands at 0.246, indicating that Green Practices (GP) accounts for 24.6% of the variance in Operational Excellence (OE). The value of Adjusted R-Square for Z2 is 0.157, signifying that Green Practices (GP) explains 15.7% of the variation in Competitiveness (CO). Finally, in terms of Y, the Adjusted R-Square value is 0.528, showing that Green Practices (GP), Operational Excellence (OE), and Competitiveness (CO) have a moderate ability to explain Firm Performance (FP) at 52.8%. Although the mediation variable does not exhibit a particularly strong R-Square value, the model shows an overall capacity to explain the variance in the firm

performance variable. The variability in firm performance can be explained by a combination of green practices, operational excellence, and competitiveness.

Inner model analysis involves assessing predictive relevance. This is required to determine the accuracy of the observation value, using a blindfolding procedure to evaluate the Q-Square value. If the value is greater than 0, the observation value is deemed good; if the value is less than 0, the observation value is poor (Chin, 1998). Table 3 displays the Q-Square results.

Variable	Q-Square Predict
Operational Excellence (OE)	0.259
Competitiveness (CO)	0.243
Firm Performance (FP)	0.152

Table 3: Q-Square Test Results
Source: Primary Data Processing (2024)

The next step in the examination of the inner model comprises the Goodness of Fit analysis. The Goodness of Fit concept serves as a statistical measure to evaluate the level of correspondence between a model and the observed data. It helps identify the gap between observed and expected values as per the model. In Structural Equation Modelling (SEM), the goodness of fit metric assesses how accurately the observed frequencies align with the expected frequencies. This helps in determining the suitability of the model in representing the data. The GoF calculation results show a value of 0.501, which classifies the model in this study as achieving 50.1% fit. However, Hair et al., (2022) recommends that Goodness of Fit should not be used.

The confirmation of the hypothesis is achieved by conducting hypothesis testing, where the level of significance or critical value (alpha) is set at 5 percent and the t-statistic is greater than the t-table value at the same critical value. The determination to confirm or refute the hypothesis hinges on the comparison of the t-statistic to the t-table value, considering a p-value that falls within the 95% confidence interval. Meanwhile, testing a mediation hypothesis involves assessing whether the mediating variable plays a role as a mediator or not.

Direct effect refers to the direct and observable influence or impact of one variable on other variables without the involvement of intermediary variables. The results are intended to evaluate if the hypothesized variable has a direct relationship with the dependent variable. Table 4 contains the outcomes of the direct and indirect effect hypotheses.

Hypothesis Test

Hypothesis	t-statistics	p-value	Test Results	Conclusion
H1: Green Practices $\square$ Firm Performance	4.568	0.000	4.568 > 1.960 0.001 < 0.050	H1: accepted
H2: Green Practices $\square$ Operational Excellence	13.261	0.000	13.261 > 1.960 0.000 < 0.050	H2: accepted
H3: Operational Excellence $\square$ Firm Performance	7.472	0.000	7.472 > 1.960 0.000 < 0.050	H3: accepted
H4: Green Practices $\square$ Operational Excellence $\square$ Firm Performance	6.392	0.000	6.392 > 1.960 0.000 < 0.050	H4: accepted

H5: Green Practices ☐ Competitiveness	7.992	0.000	$7.992 > 1.960$ $0.000 < 0.05$	H5: accepted
H6: Competitiveness ☐ Firm Performance	4.675	0.000	$4.675 > 1.960$ $0.000 < 0.050$	H6: accepted
H7: Green Practices ☐ Competitiveness ☐ Firm Performance	3.653	0.000	$5.982 > 1.960$ $0.000 < 0.050$	H7: accepted

Table 4: The Result of Hypothesis Testing
Source: Primary Data Processing (2024)

Table 4 presents the results corresponding to each hypothesis. The results of Hypothesis 1 show that Green Practices significantly improve Firm Performance, so Hypothesis 1 is accepted. The results of Hypothesis 2 show that Green Practices significantly improve Operational Excellence, so Hypothesis 2 is accepted. The results of Hypothesis 3 show that Operational Excellence significantly improves Firm Performance, so Hypothesis 3 is accepted. Hypothesis 4 is confirmed as the findings indicate that Operational Excellence partially mediates the effect of Green Practices on Firm Performance. The results of Hypothesis 5 show that Competitiveness significantly improves Firm Performance, so Hypothesis 5 is accepted. The results of Hypothesis 6 show that Green Practices significantly improve Competitiveness, so Hypothesis 6 is accepted. Hypothesis 7 is confirmed as the findings indicate that Competitiveness partially mediates the effect of Green Practices on Firm Performance.

Discussion

This study provides valuable insights for restaurants on incorporating green practices into their business to meet customer demands while promoting environmental sustainability and improving. Restaurants, as significant contributors to environmental issues, generate considerable food and plastic waste, emissions, and consume substantial amounts of water and energy (Kasim & Ismail, 2012). Particularly in the post-pandemic recovery period, adopting green practices becomes crucial. These practices not only enhance energy efficiency and business agility but also address environmental challenges, leading to improved productivity, cost savings, and a stronger commitment to sustainability (Kauffmann & Cusmano, 2022). This study explores how the key dimensions of green practices—green action, green food, and green donation—drives firm performance in the restaurant industry. Green action is the restaurant's primary way to demonstrate its environmental commitment, compared to its green food offerings and donations. Green actions can improve the restaurant's reputation as a sustainable and eco-conscious dining destination.

This research examines the mediating roles of operational excellence and competitiveness in linking green practice to enhance firm performance. The results of this study align with previous research (Perramon et al., 2014; Abbas & Hussein, 2021; Chiu & Hsieh, 2016), indicate that green practices positively influence firm performance. If we look closely, the results of a two-stage approach testing reveal that at the low-order construct level, green action plays the most significant role in representing green practices compared to green food and green donation. In practice, restaurants prioritize internal efforts, such as conserving resource use, using eco-friendly tableware, separating waste into several categories, and reducing produce waste. However, the F&B industry still gives limited attention to green food, which serves as a primary revenue driver, and green

donations, which reflect restaurants' social responsibility initiatives. Some studies have demonstrated that green innovation is needed to improve environmental performance, strengthen competitive advantage, and boost market success by enhancing product value and fostering stakeholders' support (Chiou et al., 2011; Chang, 2011; Ge et al., 2019). For instance, the research by Leenders & Chandar (2006) and Dangelico & Potrandolfo (2015) emphasizes that green innovation and developing environmentally sustainable capabilities positively impact overall firm performance.

The findings in this study reveal that green practices positively enhanced operational excellence in restaurants. These practices, which include sustainability initiatives, reduce energy and material usage, foster better stakeholders' relationships, lower costs, and improve product quality (Çankaya & Sezen, 2019). The sand cone framework by Ferdows & De Meyer (1990), highlights a structured progression in operational performance, starting with product quality as the foundation for customer satisfaction and improved operations.

Initially, green practices in restaurants were perceived as costly and incompatible with high-quality production due to significant upfront investment in R&D and sustainable materials (Carbonara, 2007; De Giovanni & Folgiero, 2023). However, the growing demand for eco-friendly products and collaborative procurement strategies among restaurants has made these practices more feasible and affordable. Negotiations with suppliers have enabled cost-effective access to high-quality materials and equipment, facilitating green implementation at lower costs (Geminarqi & Purnomo, 2023). Enhanced product quality in green restaurants is achieved by adhering to stringent food safety standards, ensuring consistent raw material quality, standardizing and optimization of product processes. These efforts to increase production efficiency, minimize waste, lower inventory levels, and reduce energy consumption (Geminarqi & Purnomo, 2023; Zhu et al., 2006; Jabbour & Jabbour, 2016).

Dependability, as the second tier of the sand cone framework, is reflected through reliable supply chains, consistent material quality, timely and reliable service, guaranteed quality and safety materials, and standardized processes that minimize errors and waste (Pagell, 2009; Geminarqi & Purnomo, 2023). Employee training plays a critical role in maintaining quality and safety, as well-trained employees reduce risks, solve problems effectively, and adhere to safety standards (Lee 2000). The adoption of technology, including data analytics in customer service, further supports operational flexibility by adapting to shifting customer preferences (Rao, 2005; Geminarqi & Purnomo, 2023). These elements align with the sand cone framework, demonstrating how flexibility builds on quality and dependability.

The final tier, cost efficiency, is achieved through process optimization, effective inventory management, and strategic technology use, allowing businesses to reduce operational expenses (Handfield, 2002; Geminarqi & Purnomo, 2023). This

finding supports earlier studies emphasizing cost reduction through practices like recycling and reverse logistics, which reduce material waste and address inefficiencies (Garmulewicz et al., 2018). Recycling, for instance, reduces production costs by reusing scrap materials, conserving resources, and saving energy (Horbach et al., 2012; Cheung et al., 2014).

Although initial investments in green initiatives can be substantial, employing an efficient production process and adopting a cost-leadership strategy yields long-term benefits. These include cost savings, improved resource efficiency, and enhanced operational performance, aligning with the goals of operational excellence (Jabbour & Jabbour, 2016; Zhu et al., 2006).

The third findings of this study highlight that green practices significantly enhance firm performance when mediated through operational excellence. This aligns with evidence showing that companies adopting eco-friendly and implementing cost-effective initiatives can achieve both profitability and sustainability (Fok et al., 2023). Corporate environmental sustainability practices contribute substantially to operational performance by promoting resource conservation and reducing waste, which in turn boosts profitability and competitiveness (Dadhich & Hiran, 2022; Sakshi et al., 2020). Furthermore, environmental practices improve customer satisfaction, positively impacting financial performance and reflecting enhanced organizational effectiveness and efficiency in financial metrics (Golovkova et al., 2019; Dieste et al., 2021).

This study finds that green practices in restaurants significantly enhance competitiveness. Innovation in green practices, such as implementing sustainable sourcing, waste reduction, and eco-friendly service concepts, helps businesses differentiate themselves by offering value that aligns with environmentally conscious consumer preferences. These practices also contribute to operational efficiency, social responsibility, and compliance with regulations, further strengthening the brand image and the restaurants' competitive position (Hwang et al., 2020; Namkung & Jang, 2017). By integrating green initiatives, restaurants can create unique and sustainable advantages, meeting both customer and market demands.

Competitiveness is closely linked to improved firm performance, as it reflects the firm's ability to differentiate itself and meet market demands effectively (Wijnands, 2015). Key competitive elements, such as high-quality products, innovative services, efficient resource utilization, and strong customer orientation, directly impact a restaurant's ability to succeed in a competitive market (Yemchuk & Arpul, 2020). Effective management, skilled labour, and advanced production processes enhance customer satisfaction and financial performance by improving efficiency and creating a differentiated market presence (Le & Ikram, 2022).

The findings reveal that competitiveness mediates the relationship between green practices and firm performance. Green practices foster competitiveness by enhancing brand reputation among customers (Yemchuk & Arpul, 2020). This competitive edge translates into better financial outcomes as businesses attract more environmentally conscious customers and optimize their business (Cantele & Cassia, 2020). For example, restaurants implementing green innovations can offer unique dining experiences while reducing environmental impact, achieving both operational excellence and stronger competitive advantages compared to competitors.

The findings of this study also strongly support the

Environmental-Based View (EBV), which posits that firms can transform environmental resources and practices into sources of sustained competitive advantage. By adopting green practices such as sustainable sourcing, waste reduction, and eco-friendly packaging, restaurants in this study not only reduced their ecological footprint but also enhanced operational excellence and competitiveness. These results reinforce EBV's central idea that environmental initiatives, when embedded in core strategies, become valuable, rare, inimitable, and non-substitutable (VRIN) resources that drive superior firm performance. The mediating roles of operational excellence and competitiveness further highlight that the benefits of green practices extend beyond direct environmental gains—they reshape internal processes and external positioning, thereby fostering long-term resilience and market success.

For managers, the results suggest the need to prioritize green actions (e.g., efficient resource use, waste separation, energy conservation) as immediate steps toward operational excellence. Policymakers should design incentives—such as tax benefits, subsidies for eco-innovation, or certification programs—that lower the financial burden of adopting sustainable technologies. Entrepreneurs and restaurant owners can differentiate their brands by investing in green certifications, promoting transparency in sustainability practices, and integrating customer-facing initiatives such as eco-friendly menus and donation programs. Taken together, these actions not only enhance financial performance but also strengthen trust among environmentally conscious consumers.

Although this study provides robust evidence from the restaurant sector in Indonesia, future research should expand in three directions. First, longitudinal studies are needed to capture the long-term effects of green practices on operational efficiency and financial performance, especially since initial costs may obscure delayed benefits. Second, comparative studies across different service industries (e.g., hotels, retail, tourism) could uncover industry-specific dynamics in how green practices influence competitiveness. Third, integrating direct measures of environmental performance (e.g., carbon footprint reduction, waste diversion rates, or energy savings) would provide a more holistic assessment of the impact of green practices. This integration would bridge business performance with environmental sustainability outcomes, thereby strengthening both theoretical and practical contributions.

Conclusion

This research was conducted to explore the green practices in the F&B industry, understanding a better grasp of the mediation role of operational excellence and competitiveness in driving firm performance. The findings reveal how green action, green food, and green donation reflect green practices offered an improvement in firm performance. The results indicate that operational excellence and competitiveness both play important roles in mediating the relationship between green practices and firm performance. However, operational excellence emerged as a stronger mediator. Efforts to enhance operational excellence can lead to a more substantial impact on firm performance. Further investigation into how green practices influence business capabilities and competitive advantage could provide valuable insights for theory development. For practical implications, the F&B industry should focus on increasing their use of organic plant-based products from local farmers, conserving energy and resources, and conserving energy and resources, and engaging in environmental initiatives such as donations and activities with communities. These steps can

enhance their green involvement and contribute to improved performance in the long-term. Implementing green practices benefits businesses in multiple ways. Green practices offer restaurants the opportunity to maximize their performance, optimizing operations and strengthening their competitive standing. Enhancing green practices throughout all aspects of restaurant operations is crucial for future success.

This study contributes to theory by extending the Environmental-Based View (EBV), showing that green practices act as strategic resources that enhance competitiveness and firm performance, particularly through operational excellence. Practically, the findings suggest that restaurants should prioritize initiatives such as energy efficiency, local organic sourcing, and waste reduction to improve performance, while policymakers can support adoption with incentives, eco-certifications, and supplier collaborations. However, the study is limited to restaurants in Malang City, relied on managerial perspectives rather than customer views, and used a cross-sectional design, which restricts causal and long-term insights. Future research should adopt longitudinal approaches, include customer perspectives, and compare across industries, while also incorporating objective environmental measures such as carbon footprint reduction to better capture the sustainability impact of green practices.

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