# From Practices to Sustainability: The Role of Sustainable Supply Chain Management Performance in SMEs

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**ABSTRACT**

This research examines the relationship between supply chain management practices, sustainable supply chain management performance, and firms sustainability in Shallot Processed Agroindustry SMEs in East Java, Indonesia. Based on the SSCM concept, a PLS-based SEM approach was used to highlight 168 licensed SMEs. The research results reveal that SCMP directly influence sustainable supply chain management performance and firms sustainability. As a mediator, SSCMP significantly strengthens the influence of SCMP on Firms Sustainability. The results of this research show that the implementation of good supply chain management practices not only has an impact on increasing the competitiveness of SMEs but can also support environmental preservation. Theoretically, this research contributes to the SSCM literature as well as providing practical implications for SME actors. By involving technology and digitalisation as well as continuous innovation in supply chain operations, SMEs can significantly increase operational resistance and ensure long-term firms sustainability.

## 1. INTRODUCTION

Sustainability has become a first priority in global economic development. In particular, it is becoming more significant from the viewpoint of such environmental issues as ecology and resources. Also, social inequality and poverty prevention must both be considered as top priorities. Some readers will come out of the page with mixed feelings because of the commercial messages or pictures seen on our site. Increasing pressure from governments, consumers, and international regulatory bodies have made sustainability a fundamental part of company strategies [1].

In the present environment, small and medium enterprises (SMEs), which are a major force in economic growth and employment creation, are encountering even greater difficulties in carrying out effective Sustainable Supply Chain Management (SSCM) [2]. Globally, supply chains account for more than 90% of the environmental impact generated by one firm. They are thus a crucial area for work toward sustainability [3]. In countries like Indonesia, these problems are exacerbated by the fact that supply chains are disorganized and infrastructure is not enough.

Exploring the role of SSCM in addressing sustainability issues from a strategic perspective, the agroindustry of shallot processing in East Java, a major production center for foodstuff in Indonesia, serves as a useful case study [4-6]. By understanding sustainable supply chain practices, the resilience of SMEs is enhanced. It reduces waste and in the long run contributes to their development.

On the one hand, it extends the Triple Bottom Line framework, rooted in Collingwood's knowledge of its function as a judging matrix for dissertation proposals at bachelor level or above. This framework takes into consideration social and environmental factors as well as economic ones so that combined, they encourage business operations meeting with diverse public approval [7]. Changing the emphasis from merely seeking profit to being concerned with both returning a benefit to society and looking after our ecological environment [8].

Sustainable Supply Chain Management is a strategic approach that incorporates economic, social, and environmental facets for supply chain management [9]. But Supply Chain Management Practices (SCMP) take in various techniques and strategies to make sure efficiency is maintained while purchasing, production, distribution, and other energy-consuming operation processes are pursued together with sustainable development principles [10].

Sustainability for SMEs is interpreted as the measure of whether or not it will be possible for a company to carry on with its operation over the long haul, while at the same time combining economic, social, and environmental factors [11]. With the help of teams and interactive participation, widespread adoption of SSCM technology tends to show high efficiency and savings for firms. These findings have been widely confirmed [12]. However, most research has so far been focused on large corporations, leaving gaps in our current understanding of how SSCM transfers to SMEs and can be effectively put into practice in them, especially those striving for development yet on the periphery of national or transnational production chains. The important fact: although

this is becoming better known and being independently developed in a number of countries, SMEs continue to run into numerous obstacles when implementing SSCM.

By survey, most instances of research were aimed at large enterprises. The application of SSCM in SMEs of rather underdeveloped economies is not yet well understood [5, 6]. Previous research mainly concentrated on developing the economic aspect of sustainable supply chains. The social and natural with respect to small-scale enterprises has still not been adequately explored [1]. It is an under-researched area with a gap to be filled.

Furthermore, few studies have been completed on how digital technologies can be utilized as enablers in the implementation of SSCM for SMEs [13]. Limited access to technology, inadequate finances, and insufficient understanding of sustainable practices make these problems even harder to solve.

Another important area of research is that there are currently no empirical studies that link the direct effect of SCMP on SME sustainability through validation in intermediates. Most people who have done studies in this area are still working at the idea level or doing small case surveys, not much real empirical data or evidence bearing on how successful farmers implement SSCM can be found in agro-industry SMEs. Some latest studies have indicated that financial management and supply-chain resiliency are essential factors in staying sustainable over the long term. But with limited empirical validation [14]. In addition to the scarcity of studies on SCM in agriculture, the Indonesian cocoa industry has yet to adopt sustainable practices and therefore it is still too early for conclusive results [15]. Meanwhile, the Indonesian textile and clothing industry has actually started using SSCM, but obstructions to standardize how sustainability is measured are numerous [16].

At this juncture, though environmental education and green supply management have been identified as crucial factors in improving the sustainability performance of organizations, how well they work in SMEs within Indonesia completely lacks any examination [16]. Meanwhile, cooperative efforts such as joint sharing and resources integration in supply chains have shown promising benefits, but they deserve further empirical investigations in SMEs [17]. A third under-explored area is the role of information technology infrastructure in supporting green supply-chain initiatives for Indonesian manufacturing SMEs [18].

Therefore, this study aims to fill the gap in empirical evidence with a more comprehensive, data-driven approach to evaluate the impact of SCMP on SME sustainability. This research hopes to fill the text based on these empirical studies, both contributing to further development of the theory and giving concrete methods for SMEs to improve their competitiveness through SSCM.

This study's objective is to look at how supply chain management (SCMP) affects SMEs' sustainability by means of SSCM being an intermediary variable. Based on qualitative data from Indonesia's agroindustry sector, the research will employ structural equation modeling and does it indeed look at the intershuffles [8]. The study's results are expected to yield a new category of materials on SSCM and practical advice for supplier-manufacturers in their quest for more efficient processes both over time and without ceasing to seek an equitable profit.

## 2. LITERATURE REVIEW

Sustainable Supply Chain Management (SSCM) is a comprehensive and strategic enterprise encompassing material, information, and fiscal capital, which stresses sustainability. The concept of SSCM seeks to integrate economic, social, and environmental considerations into supply chain processes, thus ensuring that businesses survive in the long term and lowering their impact on the planet. As Industry 5.0 emerges over the next 50 years, the rapidly accelerating digitization of all social factors will be an important enabler to further spur this transformation.

A variety of new technologies, including artificial intelligence (AI), blockchain technology, and big data analysis, are now rapidly spreading and gaining widespread use throughout this overall transformation of the supply chain [19]. With these advances, firms can track materials in real time, optimize logistics according to demand, and ensure they conform to environmental guidelines, ultimately cutting wastage and gas emissions [20].

SSCM's founding principle is the Triple Bottom Line (TBL) approach, a strategy that combines economic growth and social responsibility with environmental preservation. Economically, organizations that are sustainable look to reduce costs on a number of different fronts. By adopting environmentally conscious sourcing policies, companies can reap the benefits of increased efficiency and savings while also benefiting from streamlined operations [21].

Socially, ethical business practices guarantee people are treated as they should be, workers fairly paid good wages with safe working conditions; good relations are established between firms and staff at all levels can participate freely in decision-making together toward the creation of a more harmonious society. Happily, this has led many businesses to emphatically adopt aspects of SSCM, which is environmentally oriented, and engage in activities that will benefit all life on earth, such as zero emissions technology or fiber-packed vegetation cultivation systems to prevent absolutist poverty [22]. For all these reasons, regulatory push has played a pivotal role in encouraging corporations to take up sustainable supply chain practices. Governments around the world are stiffening environmental regulations, imposing carbon taxes, and other measures to boost green business models in a direction beneficial for specializing labels and production methods.

The result is that companies that integrated sustainability into their supply chain will enhance brand image, attract more eco-conscious consumers, and win the advantage in markets. In 2024, the company buying a sustainable supply chain could achieve significant benefit. Indeed, the trend of sustainable procurement has taken off recently. A business that chooses ethical suppliers, emphasizes green practices, and transparent supply chains according to fair trade standards is on the cutting edge [20]. The move towards sustainable logistics solutions is evident as well. Many industries are shifting to low-emission vehicles with renewable energy-driven warehouses and AI-fully managed inventory systems that minimize carbon emissions on the job [23].

Strategies for waste management have altered too. Companies now aim with biodegradable packaging, closed-loop production cycles, and upcycling techniques to align supply chain practices more closely to the circular economy's principles [24]. New digital solutions like blockchain provide complete visibility in supply chains, allowing firms to track

raw materials, verify claims of ethical sourcing, and reduce the risk of fraud [25].

Despite the many advantages of sustainable supply chain management, there are still difficulties in introducing it worldwide. For instance, high costs mean that most companies cannot afford all those funding sources for start-up projects or retrofitting operations—yet under such circumstances, subsidies become meaningless; without clearly defined indicators of sustainability benchmarking (which could instead be used as an excuse for something far less ambitious), there is an absence of understanding what sustainability actually means [26].

Research consistently shows, however, that companies pursuing solid, long-term sustainability strategies demonstrate greater resilience in times of trouble [23]. With today's consumer preferences steering toward eco-friendly brands (and businesses being encouraged by both supply chain demands and regulatory policy to join this way), companies have no choice but to introduce environmentally friendly measures [27].

So when considering the future, the developments in AI-driven analytics, automation, and machine learning will play a major role in shaping what finally emerges as SSCM for smart cities. These changes will improve forecast ability, allowing businesses to find and deal with inefficiencies before they become serious drains on resources, help managers optimize resource allocations more easily than ever before, etc. This chapter explores the chances to realize a shadow win in areas that are not necessarily very hard kernels for machine learning, such as power generation and distribution. With growing concern about climate change, carbon neutrality is set to become the worldwide standard for enterprises. Corporations are actively preparing for net-zero carbon emissions. They are introducing renewable energy sources, sustainable transport methods, and even some innovative ways to offset greenhouse gases [28].

The following section sums up what we have learned: The establishment of SSCM has already begun to transform from top to bottom the way companies do business in modern society and beyond, thus benefiting not only their corporate performance but also making beneficial contributions directly towards mankind's future environment and human life itself. Organizations that incorporate SSCM into their operations in full measure not only ensure compliance with regulations, but they indeed create sustainable value. They elevate an enterprise's reputation and help nurture trust among consumers. This will help build a more sustainable global economy [23]. While sustainability will undoubtedly continue as a major factor shaping future innovation and competitiveness, SSCM provides the nexus that promises to tie together all major components of today's supply chains.

## 3. MATERIAL AND METHOD

### 3.1 Study area

This research was conducted in the two largest shallot centres in East Java Province, namely Nganjuk Regency and Probolinggo Regency. With total shallot production of 173,060.8 tonnes/year and 81,237.3 tonnes/year in each region, East Java Province is the largest shallot-producing province in Indonesia after Central Java Province [29]. This research location was chosen based on considerations of ease of access and transparency of data provided by related parties to support the research being conducted.

### 3.2 Sample size

The population of this study was 1,166, which is the entire SMEs of the shallot processing agroindustry in East Java. This population was chosen with the consideration that onion agro-industry SMEs in East Java face complex problems in running their business, especially in the supply chain network, which includes economic sustainability, environmental sustainability, and social sustainability. Meanwhile, the sample in this research was carried out purposively using the snowball sampling technique to obtain a sample size of 168 legalised shallot processing agro-industries.

### 3.3 Method

This study employs a quantitative method approach using the Structural Equation Modeling (SEM) analysis tool based on Partial Least Squares (PLS), processed with SmartPLS4 software. The study is designed to examine both direct and indirect relationships between exogenous variables, such as supply chain management practices, with endogenous variables, namely firm sustainability, as well as the mediating variable, which is sustainable supply chain management performance. Primary data was collected through a structured and systematic questionnaire, distributed to Shallot Processed Agroindustry SMEs as the main respondents.

The PLS-SEM approach was chosen over covariance-based SEM (CB-SEM), such as AMOS, because this study aims to test predictive relationships between variables and explore a complex model with a relatively small sample size. PLS-SEM is more suitable for research focused on predicting dependent variables, compared to AMOS, which is better suited for testing well-established theoretical models with large sample sizes. Additionally, PLS-SEM is more robust in handling non-normally distributed data and can process models that include latent variables with both reflective and formative indicators.

In the context of this research, where the primary objective is to evaluate the direct and indirect impact of supply chain management practices on firm sustainability with the role of a mediating variable, the PLS-SEM method is more flexible in dealing with complex relationships and causal models that have not been fully developed in the existing literature. Furthermore, PLS-SEM provides more efficient parameter estimation for smaller sample sizes, making it well-suited for this study, given the limited number of respondents.

Another advantage of PLS-SEM is its ability to analyze exploratory models, making it more effective for studies that seek to identify patterns of relationships between variables rather than merely confirming existing theories. In contrast, AMOS, which is CB-SEM-based, is better suited for research that has a well-established theoretical framework with strong hypotheses and requires an overall goodness-of-fit assessment. Therefore, the selection of PLS-SEM in this study is based on the need to examine variable relationships in a dynamic business environment, particularly in the context of Shallot Processed Agroindustry SMEs, where sample size limitations and data variability must be carefully considered.

This research uses data analysis in two stages, namely: (1) an outer model test used to ensure validity (convergent and discriminant validity) as well as reliability (composite reliability and Cronbach's alpha) of the research instrument,

and (2) an inner model test used to evaluate goodness of fit through the SRMR index with a cut-off ≤ 0.10 and NFI with a cut-off ≥ 0.90, as well as calculating R-squared and Q-squared to measure the strength of the model as a whole. structural. Next, hypothesis testing is carried out by assessing the path coefficient, effect size, and p-value with a standard value of <0.5 to define the level of significance of the relationship between variables. Apart from that, this analysis also identifies direct and indirect relationships, both between variables and mediated by third variables that interactively influence the shallot agroindustry supply chain system in the research area.

## 4. RESULTS

### 4.1 Goodness of fit test

Based on Table 1, the SCMP variable (X), SSCMP variable (M), and firms sustainability (Y) show an R-squared number with a value close to 0.67 so that the model can be said to be dominant.

**Table 1.** Measure of fit structural model test result

| No. | Variables | R-Squared | Q-Squared |
|-----|-----------|-----------|-----------|
| 1. | SCMP (X) | - | - |
| 2. | SSCMP (M) | 0.416 | 0.416 |
| 3. | Firms Sustainability (Y) | 0.630 | 0.827 |

Based on the structural model testing results presented in Table 1, the R-squared value for the SSCMP (M) variable is 0.416, indicating that approximately 41.60% of its variability can be explained by SCMP (X). According to the general classification in PLS-SEM analysis, this falls within the moderate range, suggesting that sustainable supply chain management practices (SCMP) play a significant role in shaping sustainable supply chain management capabilities (SSCMP). However, this also implies that 58.4% of SSCMP's variability is influenced by other factors outside the model, such as government regulations, stakeholder pressure, or the adoption of green technologies. While SCMP contributes to strengthening SSCMP, external influences should also be taken into account to gain a more comprehensive understanding of the factors driving SSCMP.

Furthermore, the R-squared value for the Firm Sustainability (Y) variable stands at 0.630, meaning that SCMP (X) and SSCMP (M) collectively explain 63.0% of the variations in firm sustainability. This suggests that the model has a relatively strong ability to describe how these factors influence a company's sustainability. The practical implication of this finding is that sustainable supply chain strategies (SCMP) and supply chain management capabilities (SSCMP) play a crucial role in enhancing corporate sustainability. Therefore, companies looking to improve their sustainability performance should focus on strengthening their sustainable supply chain strategies and capabilities through initiatives such as investments in sustainable practices, improving operational efficiency, and fostering stronger collaborations with suppliers and customers who share similar sustainability goals.

Additionally, the predictive power of the model is further reinforced by the Q-Squared ($Q^2$) value for Firm Sustainability (Y), which stands at 0.827. This high value suggests that the model is not only effective in explaining the observed data but also has a strong predictive capability for unobserved data. The practical takeaway from this result is that the model can serve as a valuable tool for companies when making strategic decisions aimed at enhancing sustainability. In other words, businesses can use these insights as a guide for developing sustainability-driven strategies in operations, management policies, and strategic partnerships with key stakeholders.

In conclusion, the model used in this study demonstrates a strong ability to explain the relationship between SCMP, SSCMP, and corporate sustainability. However, to further expand the interpretation of effect sizes and provide deeper practical implications, it is important to acknowledge that external factors beyond the model may also significantly impact SSCMP and firm sustainability. Future research should consider incorporating additional variables such as government regulations, stakeholder pressures, green technology adoption, and organizational culture to develop a more holistic understanding of what drives corporate sustainability.
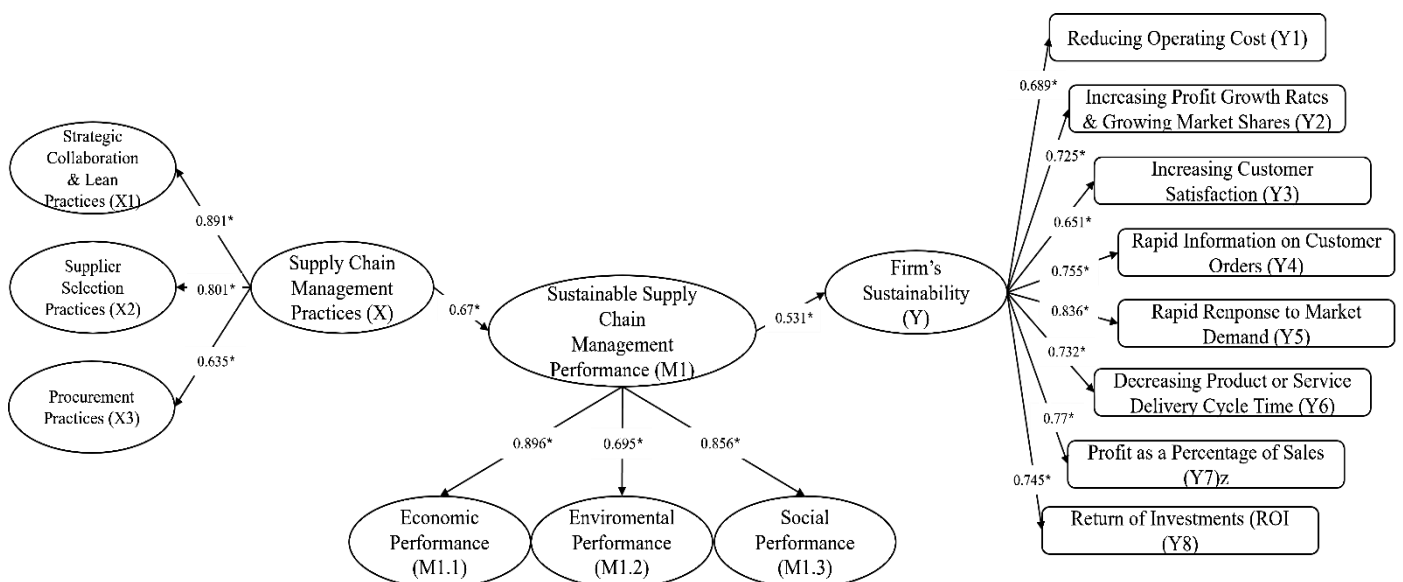


**Figure 1.** The relationship model among variables

## 4.2 Model test

Based on the final research model shown in Figure 1, the results of testing the outer and inner models for the relationships between variables are presented below.

The results presented in Table 2 provide a clear indication of the direct influence relationships between the studied variables. The first hypothesis (H1) examines the direct impact of Sustainable Supply Chain Management Practices (SCMP) (X) on Sustainable Supply Chain Management Capabilities (SSCMP) (M). The path coefficient for this relationship is 0.670, with a p-value of $< 0.001$, confirming statistical significance at the 5% level. Additionally, the effect size is 0.674, indicating a strong impact of SCMP on SSCMP. This finding suggests that 67% of the variance in SSCMP is explained by SCMP, meaning that companies implementing stronger sustainable supply chain practices tend to develop higher sustainability-oriented supply chain capabilities. The positive sign of the path coefficient further confirms that improvements in SCMP will directly enhance SSCMP. From a practical standpoint, this highlights the critical role of supply chain sustainability strategies in shaping a company's ability to manage sustainable supply chain operations effectively. Organizations should focus on strengthening SCMP through initiatives such as eco-friendly procurement, supplier engagement in sustainability, and the adoption of green logistics, as these practices significantly contribute to building strong SSCMP.

**Table 2.** Results of testing the relationship between direct influences variable

| H | Path Analysis | Path Coefficient | Effect Size | P-Value | Desc. |
|---|---|---|---|---|---|
| H1 | X → M | 0.670 | 0.674 | <0.001** | Sig. |
| H2 | M → Y | 0.531 | 0.530 | <0.001** | Sig. |

** significant level at 0.05 (5%)

The second hypothesis (H2) assesses the direct influence of SSCMP (M) on Firm Sustainability (Y), revealing a path coefficient of 0.531 and an effect size of 0.530. The p-value of <0.001 confirms that the relationship is statistically significant, and the positive path coefficient suggests a direct and strong positive correlation. This means that 53.1% of the variance in firm sustainability can be explained by SSCMP, highlighting its critical role in determining corporate sustainability outcomes. The practical implication of this result is that firms with stronger sustainable supply chain management capabilities are more likely to achieve long-term sustainability goals. Organizations that focus on optimizing their SSCMP—such as by improving supplier collaboration, integrating sustainability metrics into performance assessments, and fostering circular economy practices—are more likely to experience substantial improvements in overall corporate sustainability.

The effect size values for both hypotheses (0.674 for H1 and 0.530 for H2) indicate that these relationships are not only statistically significant but also have substantial practical implications. In the context of sustainability-driven supply chain strategies, these findings reinforce the importance of investing in SCMP to build strong SSCMP, which in turn enhances firm sustainability. Companies that fail to develop their supply chain sustainability capabilities may struggle to keep up with regulatory pressures, consumer expectations, and competitive advantages linked to sustainable business practices.

Given the substantial effect sizes observed, the study underscores the need for companies to prioritize sustainable supply chain initiatives as a strategic approach to long-term sustainability. Policymakers and business leaders should consider integrating sustainability into supply chain decision-making processes, leveraging technology and innovation to enhance supply chain transparency and resilience. Future research could further explore moderating factors such as industry type, firm size, or market conditions, which may influence the strength of these relationships and provide additional insights into how firms can maximize sustainability outcomes through their supply chain strategies.

Based on the research model depicted in Figure 1, the analysis not only examines the relationships between direct influence variables but also evaluates the relationships between indirect influence variables. The results of these tests are presented in Table 3.

Hypothesis testing was conducted using SmartPLS 4 software, as shown in Table 3. The results confirm that all hypothesized relationships between direct influence variables are significant, as the p-value is less than 0.05 (5%).

**Table 3.** Results of testing the relationship between indirect influence variables

| No. | Path Analysis | Path Coeff. | Effect Size | P-Value | Desc. |
|---|---|---|---|---|---|
| | | Indirect Influences Mediator | | | |
| 1 | X→M→Y | 0.356 | 0.358 | < 0.001** | Sig. |

** significant level at 0.05 (5%)

The findings presented in Table 3 shed light on the indirect relationships between key variables, particularly the role of Sustainable Supply Chain Management Capabilities (SSCMP) (M) as a mediator in the relationship between Sustainable Supply Chain Management Practices (SCMP) (X) and Firm Sustainability (Y). The results indicate that SSCMP plays a partial mediating role, meaning that while SCMP has a direct impact on firm sustainability, part of its influence is also channeled through SSCMP.

In the first mediation analysis, SSCMP is examined as a bridge between SCMP and its outcomes. The analysis shows an indirect path coefficient of 0.299, with a p-value of <0.001, confirming statistical significance. The effect size of 0.296 suggests a moderate influence. Since SCMP also has a direct impact on SSCMP, this mediation is partial, indicating that while adopting sustainable supply chain practices is crucial, it is equally important to develop strong supply chain management capabilities to maximize the impact. In practical terms, this means that businesses that invest in sustainability efforts—such as green procurement, supplier engagement, and eco-friendly logistics—are more likely to develop the internal capabilities needed to sustain these initiatives over time. Without a well-developed SSCMP, even the best sustainability strategies may fall short of their full potential.

The second mediation analysis takes a broader perspective, examining how SSCMP bridges the relationship between SCMP and firm sustainability. Here, the indirect path coefficient is 0.356, with a p-value of <0.001 and an effect size of 0.358, further reinforcing the importance of SSCMP in the sustainability equation. The partial mediation observed means that SCMP still has a direct influence on firm sustainability, but its impact is significantly enhanced when SSCMP is strengthened. This highlights that sustainability is not just

about adopting the right practices—it's about building the right capabilities to support those practices in the long run. Companies that excel in SSCMP—by integrating data-driven sustainability monitoring, fostering circular economy practices, and strengthening supplier relationships—are better positioned to achieve lasting sustainability goals.

The effect sizes in both analyses indicate that while SSCMP is a key factor, external influences such as regulatory policies, market dynamics, and stakeholder expectations also play a crucial role in shaping firm sustainability. Future research could explore these additional dimensions to gain a more comprehensive understanding of how firms can navigate the complexities of sustainable supply chain management more effectively.

The findings of this study carry valuable implications for business leaders, policymakers, and researchers alike. For business leaders, the message is clear: strong supply chain sustainability strategies alone are not enough—companies must also develop the management capabilities to sustain them. Without a well-established SSCMP framework, sustainability efforts may remain fragmented or fail to deliver long-term value. This means investing in technology-driven supply chain transparency, workforce training, and cross-functional collaboration to embed sustainability into the company's core operations. Businesses that successfully align SCMP with SSCMP will not only meet sustainability benchmarks but also gain a competitive advantage in an increasingly eco-conscious market.

For policymakers, the study underscores the importance of policies that encourage not only sustainable practices but also capability-building within firms. Regulatory frameworks that promote supplier sustainability compliance, financial incentives for green innovation, and industry-wide collaboration on sustainability goals can accelerate corporate sustainability efforts. Governments and industry bodies should consider developing programs that support companies in strengthening their SSCMP, ensuring that sustainability is not just a compliance requirement but a fundamental business strategy.

From a research perspective, this study opens up further discussions on the role of external moderating factors, such as industry type, company size, or economic conditions, which could influence the strength of the relationships observed. Exploring these dimensions would help businesses tailor their sustainability strategies based on their specific operational contexts.

Ultimately, the key takeaway from these findings is that supply chain sustainability is a two-step process: first, implementing sustainable practices, and second, developing the capabilities to manage and optimize them effectively. Companies that fail to do both may struggle to achieve meaningful and long-lasting sustainability impact. To thrive in an increasingly sustainability-driven business environment, organizations must embed sustainability into both their strategies and their operations, ensuring that every link in the supply chain contributes to a resilient, responsible, and forward-thinking future.

Analysis of the research model is to see the influence of exogenous variables on endogenous variables by looking at the model results of the analysis (not partial for each relationship between variables). Through the results of the complete analysis, it can be seen which exogenous variables have a stronger influence on the endogenous variables. Through tests of indirect influence and total influence (total

effect), it can be used to explain how the goals of the system can be achieved.

**Table 4.** Total influence of path coefficient

| Path Variables (Eksogen → Endogen) | | Path Coeff. | Effect Size | P-Value | Desc. |
|---|---|---|---|---|---|
| SCMP (X) | Firms Sustainability (Y) | 0.473 | 0.475 | < 0.001 | Sig. |

The results presented in Table 4 provide insight into the total influence of Sustainable Supply Chain Management Practices (SCMP) (X) on Firm Sustainability (Y). The analysis shows that the total path coefficient is 0.473, with a p-value of <0.001, confirming that the relationship is statistically significant. Additionally, the total effect size of 0.475 indicates a moderate to strong influence, reinforcing the importance of SCMP in shaping a company's sustainability performance.

This means that SCMP contributes 47.3% to Firm Sustainability (Y), highlighting its substantial role in driving corporate sustainability outcomes. In other words, nearly half of a company's sustainability performance can be attributed to its adoption and implementation of sustainable supply chain practices. This underscores the strategic necessity of integrating SCMP into corporate sustainability initiatives, as companies that actively engage in sustainable procurement, green logistics, waste reduction, and ethical supplier partnerships are significantly more likely to enhance their overall sustainability.

However, while SCMP plays a crucial role, the remaining 52.7% of firm sustainability is influenced by other factors, including internal management capabilities, regulatory policies, market dynamics, stakeholder engagement, and technological innovation. This suggests that while SCMP is a key driver, it must be supported by other sustainability-focused strategies to maximize its impact.

The findings also reinforce the importance of SSCMP (Sustainable Supply Chain Management Capabilities) (M) as a complementary factor. Since SSCMP plays a mediating role in the relationship between SCMP and Firm Sustainability, optimizing firm sustainability efforts requires not only strengthening SCMP but also enhancing SSCMP. Companies that fail to develop the necessary capabilities to manage sustainable supply chain practices effectively may struggle to fully capitalize on their sustainability initiatives.

For business leaders, this study provides a clear directive: investing in SCMP is one of the most effective ways to enhance corporate sustainability. However, to maximize impact, companies must go beyond simply implementing sustainable practices—they must build the internal capabilities (SSCMP) needed to sustain and optimize these initiatives. Organizations should focus on training personnel, integrating sustainability metrics into performance evaluations, and leveraging digital tools for better supply chain visibility to ensure long-term success.

For policymakers, the findings highlight the need to support and incentivize SCMP adoption across industries. Regulatory frameworks should encourage companies to implement sustainable sourcing policies, circular economy principles, and carbon footprint reduction measures. By providing financial incentives, certification programs, and industry-wide sustainability guidelines, policymakers can help businesses transition towards a more sustainable operational model.

From a research perspective, these results open the door for further investigation into other contributing factors that influence firm sustainability, such as corporate governance, industry competition, and technological innovation. Future studies could explore how different industry sectors vary in their SCMP adoption and how external pressures shape sustainability outcomes.

## 5. DISCUSSION

### 5.1 The influence of supply chain management practices on sustainable supply chain management performance

SCMP have a significant direct influence on SSCMP, with a path coefficient value of 0.670 and a p-value <0.001, which means this relationship is statistically significant. The effect size value of 0.674 indicates that the effect of this independent variable is quite large, namely around 67% of the variation in SSCMP can be explained by SCMP. These findings provide an understanding that the higher the quality and intensity of the implementation of SCMP, the better the resulting sustainable performance.

This research is supported by the resource-based view (RBV) theory, which states that strategic resources, such as effective SCMP, can be the main driver of a firm's competitive advantage and sustainability. A study supports these findings by showing that implementing green management practices [30], such as transparent tracking and collaboration between partners in the supply chain, can improve cost efficiency and environmental performance simultaneously. Thus, these findings are consistent with existing literature on the relationship between strategic practices and sustainability [30].

This finding is also relevant to the triple bottom line concept, which emphasises the importance of economic, environmental, and social aspects in company performance. The elements such as green product design and waste management have a direct impact on the sustainability of a firm's operations [14], thus strengthening the argument that strategic SCMP play an important role in sustainable performance. In the context of dynamic adaptation, this research also supports dynamic capability theory, which states that a company's ability to respond to external changes through effective SCM can increase competitiveness and sustainability. Firms that implement sustainable practices in the supply chain are better able to face market and environmental challenges [31], in line with the finding that SCMP have a significant positive influence on sustainability performance [14].

In addition, The importance of a cross-functional approach in supply chain sustainability [20]. Sustainability practices involving environmental management, social inclusion, and operational integration have a significant impact on a company's competitiveness. These results provide a relevant framework for viewing the finding that sustainability-orientated SCMP directly improve broader supply chain performance [20].

Previous study added that elements such as green purchasing, green manufacturing, and environmentally friendly information systems have a direct positive impact on firms sustainability [18]. These elements can be used as an integral part of a sustainability strategy to support better supply chain performance, as illustrated by the results of this research [18]. In a broader theoretical framework, meta-analysis [32] shows that the adoption of sustainability practices in supply chains has a positive relationship with company performance, covering financial, market, and operational aspects. These findings further strengthen the results that the implementation of SSCMP not only has a significant impact on sustainability but also increases profitability and efficiency [32].

This research also provides practical insight, especially for supply chain managers, that sustainable erformance improvement requires the integration of strategic practices in daily operations. These findings are relevant for a wide range of industrial sectors, where sustainability is increasingly becoming a top priority. These results reflect the need to increase investment in information systems, product design, and waste management to strengthen efficiency and sustainability.

These findings not only support existing theory and literature but also provide strong empirical evidence that effective SCMP contribute significantly to sustainable performance. This research offers a strategic foundation for establishing operational sustainability as an integral part of SCMP.

Empirical findings show that strategic collaboration and lean practices are important elements in SCMP, with an average value of 3.76, which is in the quite good category. Respondents assessed that the firm's efforts in building strategic collaboration with supply chain partners were quite optimal, especially in the Just-In-Time (JIT) supply method aspect, which had an average value of 3.98. As many as 57.1% of respondents gave a good assessment of JIT, indicating that this approach is highly appreciated in reducing waiting times and optimising stock. Research supports these findings by showing that JIT increases increases responsiveness to market changes as well as supply chain flexibility to market changes [31, 33].

In empirical findings regarding close relationships with customers, the average score reached 3.95, also included in the quite good category, with 57.7% of respondents giving a good rating. This shows that the company is considered quite successful in building strategic relationships with customers, which allows them to be more responsive to market needs. This strategy is relevant to the findings of previous study [14], which states that strategic relationships with customers are able to encourage innovation and operational efficiency.

However, empirical findings on the inventory security aspect show an average value of 3.69, slightly lower than other indicators in strategic collaboration. Even though it is in the quite good category, respondents indicated the need for improvement in ensuring optimal stock availability without being excessive. The data-based stock management can increase efficiency and reduce the risk of excess inventory [30].

In empirical findings related to supplier selection practices, the average value of 3.12 indicates that the supplier selection strategy is considered quite good by respondents. However, the value of 2.86 on the Few Suppliers item indicates that the company has not fully optimised strategic relationships with a small number of major suppliers. Some noted that strategic relationships with suppliers can improve supply stability and operational efficiency through product diversification [20] and innovation practices to maintain competitiveness [34].

On the Many Suppliers item, empirical findings show an average value of 3.44, with 36.9% of respondents giving a

good rating. This supplier diversification approach is appreciated because it allows companies to maintain supply flexibility, especially in the face of market uncertainty. This strategy helps reduce the risk of dependence on a single source of supply.

Empirical findings on procurement practices, with an average value of 2.58, indicate that this element still needs greater attention. Respondents gave subcontracting a low rating, with an average score of 2.20, where 31% of respondents rated it poor. Several studies note that a lack of an integrated procurement strategy can hamper supply chain efficiency [18].

On the other hand, the empirical findings on third-party logistics are more positive, with an average value of 3.29, which is in the quite good category. As many as 39.3% of respondents gave a good rating, indicating that several companies have utilised third-party logistics to increase operational flexibility and efficiency. Previous study notes that effective logistics outsourcing can provide significant cost savings and allow companies to focus on their core competencies [22].

Empirical findings on electronic procurement show that the average value of 2.49 still falls within the sufficient category, reflecting that the use of technology in the procurement process is not yet optimal. Previous study highlights that e-procurement can enhance transparency and collaboration in the supply chain, making this an important area that needs improvement to increase corporate efficiency [30]. However, the effectiveness of technology adoption in the supply chain does not solely depend on the implementation of an e-procurement system but also on the organization's readiness to adopt digitalization more broadly. Previous research indicates that digitalization in the supply chain can improve transaction speed [35], reduce administrative costs, and enhance supply accuracy and predictability. Therefore, companies must consider technology readiness, invest in digital infrastructure, and provide workforce training to ensure that the implemented technology contributes optimally to supply chain efficiency and sustainability.

Overall, empirical findings indicate that strategic collaboration and lean practices have performed quite well, whereas other elements such as supplier selection practices and procurement practices require further attention. Emphasizing the strengthening of strategic collaboration and technology integration, such as e-procurement, can help companies enhance overall supply chain performance. This strategy is not only relevant for increasing efficiency but also essential for ensuring business sustainability in the future. Although the implementation of sustainable supply chain management practices (SCMP) has been proven to positively impact sustainable supply chain management capabilities (SSCMP) and corporate sustainability, applying this strategy on a smaller scale, such as in SMEs, still faces certain challenges.

In the context of SMEs, adopting sustainable supply chain management is often more challenging compared to larger companies that have more resources. Limited capital, inadequate digital infrastructure, and workforce capacity are the primary obstacles to effectively adopting SSCM practices. Therefore, SMEs need to take a gradual approach to adopting sustainable supply chain technology. The use of simpler cloud-based systems can be a starting point before investing in more complex systems. Additionally, collaboration with suppliers or larger companies that have already adopted SSCM can be

an effective strategy to accelerate the implementation of SSCM in SMEs. Supply chain partners who are more advanced in sustainability implementation can provide SMEs with access to technology, training, and higher sustainability standards, enabling them to adapt more easily to global sustainability demands.

Beyond technology and collaboration, human resource readiness is also a key factor in supporting the more effective implementation of SSCM. Companies, especially SMEs, need to enhance their workforce capacity through training and skill development in sustainable supply chain management. By improving expertise in using digital systems and analyzing supply chain data, the effectiveness of SSCM implementation can be significantly enhanced. On the other hand, support from external stakeholders, including governments and industry associations, plays a crucial role in accelerating SSCM adoption in the SME sector. Regulations promoting supply chain transparency, financial incentives for green technology adoption, and sustainability certification programs can encourage SMEs to be more proactive in integrating sustainability principles into their supply chains.

With an integrated strategy that combines technological advancements, increased collaboration, and policy support, SMEs can gradually adopt SSCM without experiencing significant operational disruptions. Moreover, by incorporating sustainability into long-term business strategies, SMEs can enhance their competitiveness in markets that increasingly demand socially and environmentally responsible business practices. Therefore, the implementation of SSCM, supported by technology integration and improved managerial capabilities, becomes a key factor in achieving long-term sustainability across businesses of all scales.

## 5.2 The influence of SSCMP on firms sustainability

Based on empirical findings, the average value of the firm's sustainability variable (Y) is 3.68, which reflects that the majority of respondents assess the firm's efforts in achieving sustainability to be in the quite good category. These results show that the firm has attempted to carry out strategic steps through eight key indicators that reflect the firm's sustainability. This success cannot be separated from the direct role of SSCMP (M), which significantly contributes to firms sustainability through economic, environmental, and social dimensions.

Empirical findings on the reducing operating cost indicator show an average value of 3.61, with the Production Efficiency item having the highest value, where 63.7% of respondents rated it as good. Respondents identified that optimising production efficiency had a major impact on reducing operational costs. This is closely related to the dimensions of economic performance, especially cost reduction. Previous study supports these findings [18], showing that operational efficiency in supply chain management can reduce waste and reduce costs significantly.

On the Increasing Profit Growth Rates & Growing Market Shares indicator, empirical findings show an average value of 3.44, with the item Increase in Agro-Industry Profits getting the highest rating, where 42.3% of respondents rated it as good. Respondents appreciated the company's success in managing market share and increasing profits, which is closely related to business growth in the economic dimension. Previous study supports these findings [36], stating that supply chain sustainability can encourage companies to be more

competitive in the market through efficiency and product innovation.

Empirical findings on the increasing customer satisfaction indicator show an average value of 3.81, which makes it one of the indicators most valued by respondents. The Customer Satisfaction Level item received the highest score, with 76.2% of respondents giving a good rating. This shows that the company's success in increasing customer satisfaction cannot be separated from their efforts in the social dimension, especially in employee turnover. A previous study shows that social sustainability, including workforce well-being, can directly improve customer experience and company reputation [37].

The rapid confirmation of customer orders indicator also received high appreciation from respondents based on empirical findings, with an average value of 3.96. The Confirmation Speed of Customer Satisfaction item has the highest score, where 63.7% of respondents rated it as good. This reflects that efficiency in the company's supply chain workflow has supported a rapid response to customer needs. This success is closely related to the environmental performance dimension, especially energy efficiency. A previous study supports this finding, stating that resource efficiency accelerates a company's response to customer needs [38].

In the rapid response to market demand indicator, empirical findings show an average value of 3.77, with the ability to respond to changes in demand item getting the highest value. As many as 63.1% of respondents considered that the company was quite responsive to market changes. This rapid response reflects the company's success in implementing waste reduction, allowing them to allocate resources more efficiently. A previous study supports these findings by stating that rapid adaptation to market changes is the result of good supply chain management [30].

The decreasing product or service delivery cycle time indicator with an average value of 3.76 also shows positive results from empirical findings. As many as 61.3% of respondents rated the delivery deadline fulfilment item as good, indicating that the company had succeeded in speeding up the product cycle without sacrificing service quality. This effort is closely related to economic performance, which emphasises cost efficiency and business growth. A previous study stated that supply chain optimisation can shorten product cycles, increase efficiency, and provide competitive advantages [39].

In the profit as a percentage of sales indicator, empirical findings show an average value of 3.68, with the Delivery Percentage Consistency item having the highest value. As many as 58.9% of respondents rated this aspect as good, indicating that successful supply chain management supports the stability of company profits. Cost efficiency and high productivity through the economic performance dimension are the main drivers of this success.

The last indicator, Return on Investment (ROI), has an average value of 3.51 based on empirical findings. The Return on Investment item received the highest appreciation, with 58.9% of respondents assessing it as good. However, the investment in new technology item showed room for improvement, with only 4.8% of respondents rating it as excellent. This shows that companies need to increase investment in technology to support supply chain efficiency. Previous study stated that the integration of green technology can improve energy efficiency and provide long-term competitive advantages [38].

Overall, the empirical findings show a strong relationship between SSCMP (M) and firms sustainability indicators (Y). Respondents assessed that the implementation of SSCMP (M), which involves economic efficiency, environmental optimisation, and social sustainability, has a direct impact on firms sustainability. By increasing investment in new technologies and strengthening social programs, companies can ensure more solid sustainability in the future.

## 6. CONCLUSION

This research proves that SCMP play a significant role in improving the sustainability of shallot processing agroindustry SMEs in the East Java Province. Based on the triple bottom line, the implementation of SSCM practices has a positive impact on sustainable supply chain performance. Some things that need to be emphasised are:

1. SCMP contributes directly and significantly to improving SSCMP with a strong influence on operational efficiency, cost reduction, and waste management practices.
2. SSCMP mediates the relationship between SCMP and firms sustainability, which has a positive impact on competitiveness, customer satisfaction, and environmental sustainability.
3. The model tested has produced a good level of predictive validity with path coefficient values indicating the significance of the relationship between variables.

In the context of the shallot processing agro-industry SMEs, it is necessary to involve the integration of cutting-edge technology, strategic collaboration, and the application of continuous innovation to be able to adapt to face supply chain challenges while supporting sustainable business growth. Technically, these findings provide strategic guidance for business actors, especially agro-industry SMEs, to increase business efficiency, competitiveness, and business sustainability amidst complex and continuously developing market dynamics.

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