INTEGRATING SUSTAINABLE SUPPLY CHAIN PRACTICES AND RISK MANAGEMENT: STRATEGIES TO ENHANCE MSMES PERFORMANCE IN INDONESIA

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Abstract

This study aims to investigate the implementation of Sustainable Supply Chain Management Practices (SSCMP) in Micro, Small, and Medium Enterprises (MSMEs), which are important contributors to economic development but are still limited in their implementation. Through exploring the role of Supply Chain Risk Management (SCRM) as a mediating and moderating variable in improving MSME Sustainable Performance (SP). This study aims to provide a comprehensive understanding of how effective SCRM implementation can significantly affect MSME performance and sustainability. This study adopts a quantitative approach, building on previous studies to formulate hypotheses and conceptual frameworks, and adding a new variable, SCRM. Exploratory Factor Analysis was conducted to align the indicators with the specific conditions of MSMEs in Indonesia. Data were collected from 152 MSMEs in various sectors and processed using SEM-PLS to evaluate the proposed model and test the hypotheses. The findings reveal that SSCMP has a significant positive impact on SP and SCRM. SCRM was found to have a significant positive influence on SP, as well as a significant mediating role in the relationship between SSCMP and SP, thus enhancing the positive impact of SSCMP on performance. Other findings indicate that SCRM does not act as a moderating variable in the relationship between SSCMP and SP, indicating that its influence is more mediating than interactive. This study contributes theoretically by showing that SSCMP positively influences SP and SCRM, with SCRM acting as a significant mediator, but fails to support its role as a moderator in the relationship.

Keywords: Sustainable Supply Chain Management Practices, Supply Chain Risk Management, Sustainable Performance, MSMEs

INTRODUCTION

Sustainability has become a major concern in the twenty-first century, especially with the increasing awareness of climate change, environmental degradation, environment, and scarcity of natural resources (Schaltegger et al., 2016). Increasing pressure from society and governments has pushed businesses to contribute more to environmental conservation, including through global initiatives such as the Sustainable Development Goals (SDGs) introduced by the United Nations. The SDGs require the industrial sector, including MSMEs, to integrate environmental, social, and economic aspects into the production process.(United Nations).In Indonesia, the issue of sustainability is starting to receive attention, one of which is in the Micro, Small, and Medium Enterprises (MSMEs) sector (Purwoko et al., 2023).

The implementation of SSCM in the Indonesian MSME sector is still relatively low due to the constraints faced, such as limited capital, technology, and skilled human resources in implementing sustainable practices. Research shows that financial availability for green innovation development is an important criterion in SSCM practices.(Maya Novitasari, 2021). Lack of access to information and education regarding the importance of sustainable supply chain management is also a barrier for MSMEs in adopting SSCM.(Ari Sulistiogo, 2019). MSMEs in Indonesia focus more on short-term sustainability than on long-term impacts on the environment and society.(Setyadi, 2019).

Studies show that effective implementation of SSCM can provide many benefits, including increased operational efficiency, reduced costs, and improved corporate reputation in the eyes of consumers who are increasingly concerned about environmental issues.(Nel & Simon, 2020).In addition to the implementation of SSCM, Supply Chain Risk Management (SCRM) is an important aspect that needs to be considered. Risks in the supply chain can arise from various factors such as disruptions in raw material supply, price fluctuations, demand uncertainty, and regulatory changes.(Valinejad et al., 2022).SCRM can also act as a mediator that connects the implementation of SSCM with Sustainable Performance (SP).(Paul et al., 2022).This is due to SCRM's ability to identify potential risks that can disrupt sustainable supply chain processes and design effective mitigation strategies.(Liu et al., 2022).The combination of SSCM and SCRM can improve the resilience of MSMEs to external disruptions and enhance their ability to achieve better SP. Integration between these

two approaches is essential to improve MSME SP in facing challenges in the global market.(Xing, 2023).

SSCMP has been widely implemented in various developed countries and large companies, but its implementation on an MSME scale is still minimal.(Hisjam, 2019). SCRM has not been widely studied as a mediating variable in the context of MSMEs, even though risks in the supply chain, such as demand fluctuations, supply disruptions, and environmental uncertainty, have a significant impact on the sustainability of MSME operations.(Brotherhood & Maulana, 2023). There are not many studies that examine SCRM as a mediating variable between SSCMP and SP, but several studies show the importance of the relationship between the three variables. SCRM that focuses on risk management can help companies to better implement SSCM and achieve SP (Aylak, 2022).

Several studies have shown that although there is increasing recognition of the importance of integrating SCRM into sustainability efforts, research that specifically addresses SCRM as a moderating variable between SCRM practices and sustainability performance is still limited. Abbasi et al., (2016) emphasized that effective supply chain management can improve sustainable performance by focusing on environmental collaboration, which serves as a moderating factor in the relationship between green supply chain practices and sustainability outcomes.

This study will examine the influence of Sustainable Supply Chain Management Practices on Sustainable Performance of MSMEs in Indonesia, with Supply Chain Risk Management acting as a mediating and moderating variable.

REVIEW OF LITERATURE

Sustainable Supply Chain Management Practices (SSCMP)

Supply Chain Management (SCM) is an important field of study and practice that focuses on the efficient flow of goods, services, and information from suppliers to consumers. SCM involves managing the various activities that transform raw materials into finished products and deliver them to consumers through a well-coordinated distribution system (Tanaka & Fitriani, 2024). This coordination is essential to create a supplier network that can respond effectively to market changes and consumer demand. The demand for the importance

of environmental preservation has given rise to a derivative concept of SCM that integrates the "triple-bottom-line" principle, which emphasizes the importance of economic, environmental, and social dimensions in the supply chain, namely Sustainable Supply Chain Management (Xing, 2023).SSCM involves managing the flow of materials, information, and financial resources while taking sustainability goals into account.

According to research conducted by (Purwandaru et al., 2023), which defines SSCM as supply chain management that integrates economic, environmental, and social dimensions to meet customer demand and stakeholder expectations. Sustainable Supply Chain Management Practices (SSCMP) is the Integration of sustainability principles into all aspects of supply chain management, including procurement, production, distribution, and waste management. These practices aim to minimize negative impacts on the environment and society and create long-term value for all stakeholders (Aylak, 2022). SSCMP focuses not only on operational efficiency and cost reduction, but also on social and environmental responsibility (Sari et al., 2021). There are many variables in SSCM practices developed by various researchers and academics, one of which is research conducted by (Zailani et al., 2012) which classifies SSCM practices into two dimensions, namely Environmental Purchasing and Sustainable Packaging.

Sustainable Performance (SP)

The ability of an organization to achieve its objectives while ensuring that its operations are environmentally responsible, socially just, and economically viable. This concept is increasingly important in the context of modern business, as companies are expected to focus not only on financial profits but also on the social and environmental impacts of their operations (Yang & Wang, 2023).Effective communication and information sharing among partners are essential to implementing sustainable practices and achieving shared sustainability goals (Reklitis et al., 2021). Stakeholder involvement in the decision-making process can result in more innovative solutions and better alignment of sustainability goals across the supply chain (Yontar & Ersöz, 2020). The SP concept consists of Economic, Social, and Environmental performance.

Supply Chain Risk Management (SCRM)

A systematic approach to identifying, analyzing, and managing risks that can affect supply chain performance. The era of globalization, where businesses are becoming more complex, makes SCRM increasingly important to ensure smooth operations and sustainability of the company (Yang & Wang, 2023). Mitigation strategies in SCRM can take various forms, such as supplier diversification, investment in technology for better visibility and tracking, and the creation of continuity plans (Nel & Simon, 2020). Effective SCRM not only helps organizations protect operations but also increases resilience and competitive advantage in the market. Divided into two derived variables, namely Risk Mitigation and Risk Evaluation & Planning.

Risk Mitigation (RM) is a stage in SCRM that is important for ensuring the resilience and efficiency of the supply chain in an increasingly complex and uncertain global environment. According toUm, J. and Han, (2020), emphasizing supply chain resilience, defined as the dynamic capability for success, along with appropriate risk mitigation strategies, is critical in a highly uncertain global supply chain environment. Proactive mitigation strategies can significantly improve supply chain risk management performance by reducing vulnerability and increasing responsiveness to disruptions.(Can Saglam et al., 2021). Risk Evaluation & Planning (REP) is a critical component of SCRM, enabling organizations to identify, assess, and mitigate risks effectively. Risk Evaluation is the first step in SCRM, enabling organizations to identify potential risks and their impact on supply chain performance.

Sustainable Supply Chain Management Practices and Supply Chain Risk Management

Several recent studies have shown that SSCMP has a significant relationship with SCRM. This is important because it can reduce risk while increasing SP. Research by Hossan Chowdhury & Quaddus, (2021) illustrates that managing sustainability practices is critical to mitigating sustainability risks and improving market performance, thereby strengthening the linkage between SSCM and Risk Management. According to (Fitriasari, 2020), the role of management in monitoring and following up on uncertainties is crucial to adapting business models to suit changing dynamics, which is particularly relevant in the context of sustainable practices. A proactive approach enables MSMEs to anticipate challenges and adjust

operations, thereby improving sustainability performance. Based on the above description, the first hypothesis developed is as follows:

H1a: Sustainable Supply Chain Management Practices Influence Risk Mitigation

H1b: Sustainable Supply Chain Management Practices Influence on Risk Evaluation & Planning

Sustainable Supply Chain Management Practices and Sustainable Performance

SSCMP, especially Environmental Purchasing and Sustainable Packaging, has been the focus of research in recent years. Strategic Environmental Purchasing encourages collaboration between supply chain partners and improves the sustainable performance of organizations (Arora et al., 2020).Businesses that prioritize environmental considerations in their purchasing decisions tend to achieve greater sustainability by aligning operations and broader environmental goals. Adopting Sustainable Packaging contributes significantly to Sustainable Performance (Hanumsari et al., 2021).Likewise, integrating environmental considerations into the packaging process can reduce waste and increase resource efficiency, thereby improving overall Sustainable Performance. Both practices are positively correlated with performance, and implementing Environmental Purchasing and Sustainable Packaging practices can enable companies to achieve significant improvements in sustainable performance metrics (Israr, A. and Siddiqui, 2020). Based on this, the second hypothesis formulated is as follows:

H2: Sustainable Supply Chain Management Practices influence on Sustainable Performance

Supply Chain Risk Management and Sustainable Performance

SCRM involves identifying, assessing, and mitigating risks in the supply chain that have a direct impact on a company's ability to achieve sustainable performance. This is in line with the findings Zainab et al., (2021) which states that proactive sustainability strategies have a positive effect on the sustainability performance of the Company. This finding suggests that integrating risk with sustainability initiatives can result in better overall performance. The risk mitigation guide for MSMEs outlines a structured approach to identifying and categorizing risks that are critical to allocating resources effectively and ensuring long-term growth (Safiye Turgay, 2023). This not only helps mitigate risks, but also aligns with sustainability practices that can improve performance outcomes (Sutrisno &

Kumar, 2022) emphasizes that developing better risk evaluation methodologies tailored for MSMEs can significantly improve their sustainability by managing the impact of business risks.

H3a: Risk Mitigation affects Sustainable Performance

H3b: Risk Evaluation & Planning influences Sustainable Performance

SSCMP, SP, and SCRM as Mediating Variables

Integrating Environmental Purchasing and Sustainable Packaging practices can lead to improved supplier management and enhanced customer reputation, and most importantly to risk mitigation in the supply chain.(Nsikan et al., 2022).This integration enables companies to develop expertise in managing sustainability-related risks which ultimately contributes to better performance outcomes. The mediating role of SCRM in the relationship between SSCMP and SP is crucial, as it can enhance the positive impact of SSCM on sustainable competitive advantage.(Vafaei et al., 2019).The next hypothesis that was developed is as follows:

H4a: Sustainable Supply Chain Management Practices influence Sustainable Performance mediated by Risk Mitigation

H4b: Sustainable Supply Chain Management Practices influence Sustainable Performance mediated by Risk Evaluation & Planning

SSCMP, SP, and SCRM as Moderating Variables

Integration of sustainability into SCRM not only addresses environmental issues but also contributes to economic and social dimensions. Studies show that SSCMP positively influences sustainable performance, especially when moderated by SCRM. Wibowo et al. (2024) highlight how sustainability orientation in the batik industry leads to improved economic performance through improved environmental practices. Another study conducted by X. Liu et al. (2022) emphasizes that effective risk management in the supply chain can reduce the uncertainty that hinders sustainable performance. The role of SCRM as a moderator in this relationship is increasingly recognized, as research conducted by Owuor (2019) also found that proactive supply chain risk management practices can significantly improve supply chain performance by addressing internal and external risks. The interaction between SSCMP and SCRM suggests that organizations that adopt a comprehensive risk

management strategy are better positioned to realize the benefits of sustainable practices. Based on these findings, the following hypotheses are formulated:

H5: Sustainable Supply Chain Management Practices influence Sustainable Performance, moderated by Risk Evaluation & Planning.

RESEARCH METHOD

Population and Sample

A sample is a part of a population selected to participate in research.(Hair J et al., 2014).Having the goal of concluding the population without having to study each individual. Sample selection can be done randomly, stratified, or purposive sampling, depending on the purpose of the study and the nature of the population. Determining the sample size depends on the indicators, the number of variables, and the complexity of the model. provides recommendations for an appropriate sample size in a study, namely 100 to 200 respondents, and a sample size of at least 10 times the number of structural paths.

The largest number of paths in this research model is 2, which means the minimum sample size is 20. In order to ensure adequate statistical power and take into account the complexity of the model, which consists of 24 indicators, the use of a medium effect size with a desired power level of 0.80, a sample size of 150 respondents is considered good. Therefore, the number of samples in this study was 150, consisting of stakeholders in MSMEs in Indonesia.

Data Analysis

Primary data were collected by distributing questionnaires divided into two parts. The first part contains questions related to demographic information and business information from respondents, and the second part contains statements that measure each construct, using a Likert scale from 1 to 5 points. The SSCMP indicators were adopted from research conducted by (Arora et al., 2020) and research conducted by (Zailani et al., 2012) which has facilitated Environmental Purchasing and Sustainable Packaging. Indicators related to Sustainable Performance were adopted from research conducted by (Arora et al., 2020). Related indicators: Supply Chain Risk Management adopted from research conducted by (El Baz & Ruel, 2021)

Exploratory Factor Analysis (EFA) was conducted to test the instruments. The results showed several significant changes in the factor structure that formed the main variables in this study, so it was necessary to remove several variables from the survey instrument. This change not only affected the grouping of variables in SSCMP and SCRM but also led to a revision of the framework used to explain the relationship between these variables concerning Sustainable Performance. The indicators related to SSCMP, which were originally measured with 10 items, changed to 4 indicators covering the purchase and use of sustainable packaging. The four indicators formed the construct 'Sustainable Supply Chain Management Practices'. The indicators related to SP which originally consisted of 9 statement indicators, changed to 3 statements covering sustainability performance and formed the construct 'Sustainable Performance'. The indicators related to SCRM which originally consisted of 12 statements, changed to two factors. The first factor consisted of 4 indicators focusing on mitigation and formed the construct 'Risk Mitigation', and the other 3 indicators focusing on evaluation and planning in SCRM and formed the construct 'Risk Evaluation and Planning'.

This study uses Structural Equation Modeling-Partial Least Squares (SEM-PLS) to test the relationship between Sustainable Supply Chain Management Practices (SSCMP), Sustainable Performance (SP), Risk Mitigation (RM), and Risk Evaluation & Planning (REP). In its implementation, it is divided into two tests, namely outer model and inner model testing.

Research Model

Based on the hypothesis that has been made, the research framework is shown in Figure 1.

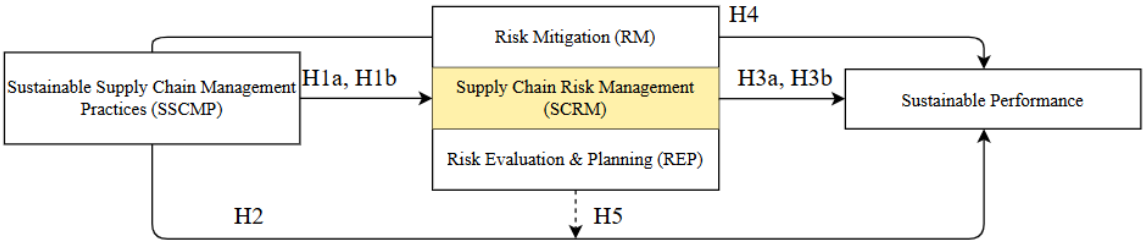

Figure 1.
Research Model

RESULTS AND DISCUSSION

Measurement Model Evaluation

The measurement model was tested to measure its validity and reliability. The results of convergent validity, indicator outer loadings, and Average Variance Extracted (AVE) tests are presented in Table 1. The results show that all indicators have outer loadings above the accepted threshold of 0.60, indicating adequate convergent validity. The AVE values for all structures are above 0.50, indicating that the latent variables account for most of the variance. Cronbach's Alpha and Composite Reliability (CR) were used to measure reliability. Both values exceed the acceptable threshold of 0.70, indicating that the structures have good internal consistency.

Fornell-Larcker criteria and cross-loadings were used to test discriminant validity. The results of the study confirmed discriminant validity because the square root of AVE of each structure was greater than its correlation with other structures. This indicates that these indicators have a stronger loading on their respective constructs compared to other constructs. Discriminant validity to meet the FL criteria has been confirmed, as shown in Table 2.

Table 1.
Construct Outer Model

Construction	Items	Outer Loading	AVE	Cronbach's Alpha	CR
Sustainable Supply Chain Management Practices	SSCMP1	0.874	0.766	0.898	0.929
	SSCMP2	0.856			
	SSCMP3	0.898			
	SSCMP4	0.874			
Sustainable Performance	SP1	0.903	0.854	0.915	0.946
	SP2	0.945			
	SP3	0.924			
Risk Mitigation	RM1	0.905	0.748	0.886	0.922
	RM2	0.883			
	RM3	0.879			
	RM4	0.786			
Risk Evaluation & Planning	REP1	0.877	0.740	0.824	0.895
	REP2	0.894			
	REP3	0.808			
REP as Moderation	SSCMP * REP	2,040		1,000	1,000

Table 2.
Fornell-Larcker Criterion

	SSCMP	SP	RM	REP	REP as Moderation
SSCMP	0.875	0.725	0.686	0.718	-0.758
SP		0.924	0.740	0.748	-0.583
RM			0.865	0.749	-0.590
REP				0.860	-0.609
REP as Moderation					1,000

Structural Model Evaluation

Figure 2 shows the results of the bootstrapping analysis in this study. The path coefficient values can be seen in Tables 3 and 4, which show the results of direct and indirect hypothesis tests. Almost all hypotheses are supported because they have good coefficient values with an average T-statistic above 1.96 in accordance with the principles of Hair et al (2017) and a P-value below 0.50.

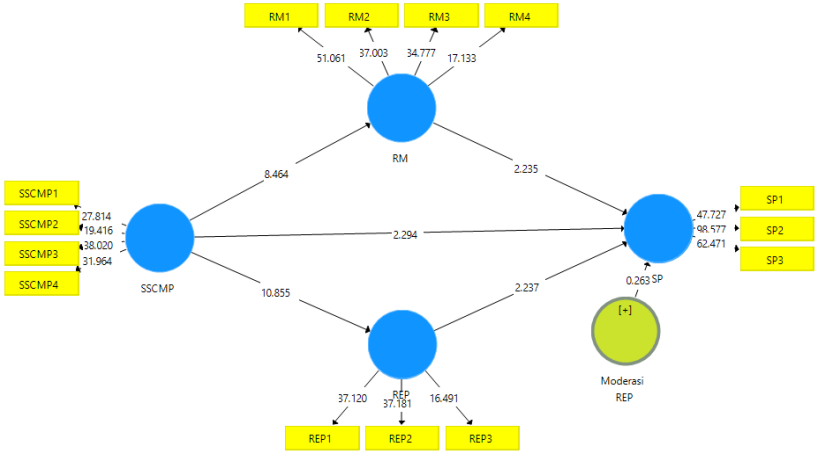

Figure 2.
Hypothesized Model

The estimated relationship between SSCMP, SP, and SCRM was evaluated using a structural model. The results showed that SSCMP has a significant impact on SP and the SCRM derivative dimensions, namely RM and REP. This finding indicates that effective SSCMP directly improves the ability of mitigation strategies and the performance of MSMEs. On the other hand, the SCRM derivative dimensions, namely RM and REP, also have a significant impact on SP. This indicates that risk mitigation, evaluation, and planning directly improve the performance of MSMEs. The mediating role of SCRM through RM and

REP shows significant results on the relationship between SCCMP and SP. However, the role of REP as a moderator is not supported in the relationship between SSCMP and SP, with a P-value of 0.793. These results indicate that REP has a weak and insignificant influence; in other words, it does not strengthen or weaken the relationship between SSCMP and SP.

Table3.
Path Estimates

Hypothesis	Standard Deviation	T Statistics (|O/STDEV|)	P-values	Results
SSCMP→RM	0.081	8,464	0.000	H1a Accepted
SSCMP→REP	0.066	10,855	0.000	H1b Accepted
SSCMP→SP	0.133	2.294	0.022	H2 Accepted
RM→SP	0.140	2.235	0.026	H3a Accepted
REP→SP	0.137	2.237	0.026	H3b Accepted

Table 4.
Mediation and Moderation Path Estimates

Hypothesis	Standard Deviation	T Statistics (|O/STDEV|)	P-values	Results
SSCMP→RM→SP	0.104	2,068	0.039	H4a Accepted
SSCMP→REP→SP	0.096	2.296	0.022	H4b Accepted
SSCMP*REP→SP	0.036	0.263	0.793	H5 Not Accepted

Discussion

First, this study shows that Sustainable Supply Chain Management Practice has a positive influence on Supply Chain Risk Management in MSMEs in Indonesia. The results of this study are in accordance with research conducted by Almohtaseb in Jordan, which shows a direct correlation between SSCMP and SCRM (Almohtaseb et al., 2024). The increasing awareness of environmental responsibilities among MSMEs will encourage a more proactive approach to managing supply chain risks (Kot, 2018). This awareness is important because it is in line with increasing stakeholder pressure for sustainable practices, thus improving the overall risk management framework in businesses. By integrating sustainability into the supply chain, businesses can not only mitigate risks but also improve resilience and performance in an increasingly competitive environment.

Second, Sustainable Supply Chain Management Practice has a positive influence on Sustainable Performance in MSMEs in Indonesia. The results of this study are as follows: research conducted Purwoko et al., (2023) which highlights that prioritizing environmental responsibility in the supply chain can improve market competitiveness for MSMEs in Indonesia, showing a clear link between sustainability practices and performance outcomes. By implementing SSCMP, encouraging environmental collaboration, and implementing a robust performance measurement system, MSMEs will be able to significantly improve sustainability outcomes and overall performance.

Third, this study shows that Supply Chain Risk Management has a positive influence on Sustainable Performance in MSMEs in Indonesia. Seen from the results of the study conducted on two SCRM derivative variables. Following the research conducted (Sari et al., 2021) which shows that SCRM practices have a positive impact on the sustainable performance of MSMEs by enabling them to identify, assess, and mitigate risks associated with supply chain operations. Findings (Almohtaseb et al., 2024) emphasizes that effective supply chain management practices significantly impact MSME performance, including sustainability outcomes. By implementing effective risk management strategies, MSMEs can improve operational efficiency, stability, and overall sustainability, thereby contributing to long-term success in a competitive market.

Fourth, this study also shows that Supply Chain Risk Management has a significant mediating role in the relationship between Sustainable Supply Chain Management Practice and Sustainable Performance in MSMEs in Indonesia. Seen from the results of the study conducted on two SCRM derivative variables, namely Risk Mitigation and Risk Evaluation & Planning, which have positive and significant results. The results of this study are as follows: the research Sun et al., (2022), which explains the role of SCRM in mediating the relationship between SSCMP and SP by proposing a model that illustrates how sustainable supply chain strategies can generate sustainable competitive advantage through effective risk management. By effectively integrating risk management strategies into a sustainability framework, SMEs can improve performance and contribute to broader sustainability.

Fifth, Supply Chain Risk Management, especially Risk Evaluation & Planning, does not have a significant moderating role in the relationship between Sustainable Supply Chain

Management Practice and Sustainable Performance in MSMEs in Indonesia. This indicates that the influence of SSCMP on SP is more significant directly without the need to involve moderation through risk management. To improve sustainable performance, MSMEs are advised to focus on direct implementation of SSCMP, such as resource efficiency, application of environmentally friendly materials, and process transparency, while continuing to develop risk management as a supporting element that strengthens the stability of supply chain operations. This is in accordance with research (Katsaliaki et al., 2022), which emphasized that although supply chain disruptions can affect resilience, risk assessment and planning do not significantly improve the relationship between SSCMP and SP. The focus should be on developing a comprehensive strategy that integrates various aspects of supply chain management rather than relying solely on risk as a moderating factor.

Sustainable Supply Chain Management Practices and Supply Chain Risk Management

The results of this study indicate that Sustainable Supply Chain Management Practice has a positive influence on Supply Chain Risk Management in MSMEs in Indonesia. Judging from the results of the study conducted on two SCRM derivative variables, namely Risk Mitigation and Risk Evaluation & Planning, which have positive and significant results. The results of this study are in accordance with research conducted by Almohtaseb in Jordan, which shows a direct correlation between SSCMP and SCRM (Almohtaseb et al., 2024). The beginning of MSME awareness of environmental responsibility will encourage a more proactive approach in managing supply chain risks (Kot, 2018).

Sustainable Supply Chain Management Practices with Sustainable Performance

The results of this study indicate that Sustainable Supply Chain Management Practice has a positive influence on Sustainable Performance in MSMEs in Indonesia. The results of this study are consistent with research conducted by Purwoko et al. (2023), which highlights that prioritizing environmental responsibility in the supply chain can increase market competitiveness for MSMEs in Indonesia, showing a clear relationship between sustainability practices and performance outcomes.

Supply Chain Risk Management with Sustainable Performance

The results of this study indicate that Supply Chain Risk Management has a positive influence on Sustainable Performance in MSMEs in Indonesia. Judging from the results of

the study conducted on two SCRM derivative variables, namely Risk Mitigation and Risk Evaluation & Planning, which have positive and significant results. The results of this study are consistent with the research conducted by (Sari et al., 2021), which shows that SCRM practices have a positive impact on the sustainable performance of MSMEs by enabling them to identify, assess, and mitigate risks related to supply chain operations.

The Role of Supply Chain Risk Management Mediation in the Relationship between Sustainable Supply Chain Management Practice and Sustainable Performance

The results of this study indicate that Supply Chain Risk Management has a significant mediating role in the relationship between Sustainable Supply Chain Management Practice and Sustainable Performance in MSMEs in Indonesia. Judging from the results of the study conducted on two SCRM derivative variables, namely Risk Mitigation and Risk Evaluation & Planning, which have positive and significant results. The results of this study are in accordance with the research of Sun et al. (2022), which explains the role of SCRM in mediating the relationship between SSCMP and SP by proposing a model that illustrates how a sustainable supply chain strategy can generate sustainable competitive advantage through effective risk management.

The Moderating Role of Supply Chain Risk Management in the Relationship between Sustainable Supply Chain Management Practice and Sustainable Performance

The results of this study indicate that Supply Chain Risk Management, especially Risk Evaluation & Planning, does not have a significant moderating role in the relationship between Sustainable Supply Chain Management Practice and Sustainable Performance in MSMEs in Indonesia. This is indicated by a very small moderation coefficient value (0.009), with T-statistics of 0.263 and P-values of 0.793, far below the significant threshold. REP does not strengthen or weaken the relationship between SSCMP and SP. Indicating that the influence of SSCMP on SP is more significant, directly without the need to involve moderation through risk management.

CONCLUSION

The findings of this study emphasize the important role of SSCMP in improving SP, with SCRM playing a mediating role in the relationship. The implementation of

comprehensive SSCMP and a focus on good risk mitigation strategies are important to achieve good sustainable supply chain performance and to stay ahead in the market.

This research provides several managerial implications that can be applied in MSMEs, namely; (1) Strengthening the implementation of SSCMP by adopting practices that support sustainability such as the use of environmentally friendly materials and optimizing resource efficiency, (2) developing SCRM strategies by developing a more strategic approach through RM and REP, and (3) strategic collaboration in the supply chain can create a supply chain that is more resilient to risk and strengthen SP.

The study has several limitations that can be used as suggestions for future research, namely; (1) the limited number of MSMEs samples of 152 does not describe the actual conditions in MSMEs practices in Indonesia, so future research should use a large sample that can represent all industries; (2) the lack of exploration of SCRM variables so that it does not represent an adaptive supply chain risk management model; (3) testing of the research instrument uses a limited sample, so the results may be different if tested with a large sample. Future research should be retested to find a construct that is more representative in the context of MSMEs.

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