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THE IMPACTS OF SUPPLY CHAIN AMBIDEXTERITY AND RESOURCE FLEXIBILITY ON SUPPLY CHAIN RESILIENCE IN MANUFACTURING SMES IN BANDUNG, INDONESIA

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Abstract: The supply chain, which is an important part of business and production operations, can help manufacturing SMEs increase their competitiveness and strengthen their position in the market. The purpose of this study is to analyze the effect of extraordinary agility and resource flexibility on supply chain resilience. The research method used is a quantitative approach with the analysis technique Partial Least Square-Structural Equation Modeling (PLS-SEM). The number of samples used in this study was 194 respondents, chosen through a simple random sampling technique. The results show that resource flexibility has a positive effect on supply chain agility and streamlining. Supply chain agility also has a positive and significant impact on supply chain resilience, while lean supply chain cannot mediate this relationship. Finally, an agile supply chain also mediates the relationship between resource flexibility and supply chain resilience. The results of this study can be used as a reference for manufacturing SMEs in developing effective supply chain management strategies to increase their supply chain resilience.

Keywords: agile supply chain, lean supply chain, resource flexibility, supply chain ambidexterity, supply chain resilience

Abstrak: *Rantai pasokan, yang merupakan bagian penting dari operasi bisnis dan produksi, dapat membantu UKM manufaktur meningkatkan daya saing dan memperkuat posisi di pasar. Tujuan dari penelitian ini adalah menganalisis pengaruh ketangkasan luar biasa dan fleksibilitas sumber daya terhadap ketahanan rantai pasokan. Metode penelitian yang digunakan adalah dengan menggunakan pendekatan kuantitatif dengan teknik analisis Partial Least Square-Structural Equation Modeling (PLS-SEM). Jumlah sampel yang digunakan dalam penelitian ini sebanyak 194 responden dengan teknik simple random sampling. Hasil penelitian menunjukkan bahwa fleksibilitas sumber daya memiliki pengaruh positif terhadap kelincahan dan kerampingan rantai pasokan. Ketangkasan luar biasa rantai pasokan juga memiliki pengaruh positif dan signifikan terhadap kelincahan dan kerampingan rantai pasokan. Terakhir, kelincahan rantai pasokan memiliki pengaruh positif dan signifikan terhadap ketahanan rantai pasokan, sementara kerampingan tidak memiliki pengaruh signifikan terhadap ketahanan rantai pasokan. Terakhir, kelincahan menjadi mediator dalam hubungan antara fleksibilitas sumber daya dan ketahanan rantai pasokan, sementara kerampingan tidak dapat menjadi mediator dalam hubungan ini. Hasil studi ini dapat digunakan sebagai referensi bagi UKM manufaktur dalam mengembangkan strategi manajemen rantai pasokan yang efektif untuk meningkatkan ketahanan rantai pasokan mereka.*

Kata kunci: *ambidexterity rantai pasokan, fleksibilitas sumber daya, ketahanan rantai pasokan, rantai pasokan ramping, rantai pasokan yang lincah*

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INTRODUCTION

The supply chain is an important aspect of business and production operations, especially for manufacturing SMEs. An effective and efficient supply chain can help manufacturing SMEs improve their competitiveness and strengthen their position in the market. Small and medium industries (SMEs) play a significant role in the national and regional economy (Bayraktar et al. 2009; Lenny Koh et al. 2007). However, it should also be noted that SMEs face many challenges and risks, including supply chain risks. These risks can disrupt the flow of production and supply, reduce the resilience of the supply chain, and threaten the continuity of business and production. Thus, supply chain resilience is an important factor in ensuring business continuity.

Flexibility of skills and resources is one component that can affect supply chain resilience (Burin et al. 2020). In addition, the management capability of supply chain actors is also a factor that can affect supply chain resilience (Novak et al. 2021; Pettit et al. 2019; Adobor, 2020). The ability of an organization to combine and utilize various knowledge and experience in dealing with complex and dynamic challenges is called ambidexterity. On the other hand, resource flexibility refers to an organization's ability to adjust its resources to anticipate changes in demand and market conditions (Alamsjah and Asrol, 2022; Aslam et al. 2020). These two important components, ambidexterity and resource flexibility, can significantly influence supply chain resilience. The ability of an organization to combine and utilize various knowledge and experience in dealing with complex and dynamic challenges is called ambidextrous. On the other hand, resource flexibility refers to an organization's ability to change its resources to meet market demands and changing market conditions (Uhlenbruck et al. 2003).

The ability of an organization to adapt resources to demand and market conditions is known as resource flexibility (Ngo and Loi, 2008). An effective and efficient supply chain model is often described by an agile supply chain and a lean supply chain. Nevertheless, the two have different ways of dealing with the supply chain. An agile supply chain emphasizes close cooperation between stakeholders in the supply chain, flexibility, speed, and the ability to adapt to rapidly changing demands and market conditions. On the other hand, a lean supply chain emphasizes efficiency and waste reduction (De Meuse et al. 2010; DeRue et al. 2012; Wendler, 2016; Duarte et al. 2011; So and Sun, 2010; Agus and Hajinoor, 2012). The lean supply chain also emphasizes reducing inventory and optimizing supply chain performance (Cudney and Elrod, 2011). In uncertain situations, manufacturing SMEs with the ability to adapt quickly and make the right decisions can improve their competitiveness and strengthen their position in the market (Banterle et al. 2014; Taneja et al. 2016). Thus, manufacturing SMEs wishing to increase the resilience of their supply chain must pay attention to these two factors.

Ambidexterity can be increased by strengthening organizational capabilities in integrating knowledge and experience from various sources (Partanen et al. 2020). Meanwhile, resource flexibility can be increased by increasing flexibility and speed in making decisions related to organizational resource adjustments (Srinivasan and Swink, 2018). Williams (2011) explained that flexible decision-making was related to adjusted resources in the face of uncertainties as outcomes from management actions. Ambidexterity and resource flexibility are two key factors that manufacturing SMEs should pay attention to in order to improve their supply chain resilience and strengthen their competitiveness in a dynamic and uncertain market. Previous studies demonstrated that ambidexterity and resource flexibility have been identified as factors that can increase supply chain resilience (Burin et al. 2020; Aslam et al. 2018; Wang et al. 2021; Lee and Rha, 2016; Belhadi et al. 2022). However, research on the relationship between ambidexterity, resource flexibility, and supply chain resilience in manufacturing SMEs is still limited. Therefore, this study aims to analyze the effect of supply chain ambidexterity and resource flexibility on supply chain resilience in manufacturing SMEs in Bandung. It is hoped that the results of this research can provide insights and recommendations for manufacturing SMEs to improve their supply chain resilience.

METHODS

The population of this research comprises all manufacturing SMEs in the city of Bandung, which is divided into 30 districts and 151 villages. Purposive sampling was used, and the sample criteria were owners or managers of SMEs who had worked in manufacturing SMEs in the city of Bandung for at least one year. This research examined 150 SMEs in three sub-districts

with the greatest growth potential: Panyileukan District (4 villages), Ujung Berung District (5 villages), and Batununggal District (8 villages). The sample size was based on Heizer et al. (2014), stating that the minimum sample for AMOS analysis should be 100.

The number of samples used in this study was 194, taken from the population using a simple random sampling technique. Several reasons for using the simple random sample technique are to ensure that every member of the population has an equal chance of being selected, thereby reducing the chance of bias and obtaining reliable and accurate results. Moreover, using a simple random sample ensures representativeness, where the final sample is representative of the population, making it easier to generalize the results to the larger population. In this study, the collected data was then analyzed using regression analysis techniques to test the research hypothesis. The population in this study consists of all manufacturing SMEs operating in Bandung City, Indonesia. Additionally, this study uses the method of path analysis (path analysis) to test the mediation hypothesis. According to Celli (2022), mediating variables are used to determine the mechanism underlying the relationship between the independent variables and the dependent variable. This technique is used to evaluate how much influence the mediating variables (Agile Supply Chain and Lean Supply Chain) have on the relationship between endogenous variables (Supply Chain Resilience) and exogenous variables (Supply Chain Ambidexterity and Resource Flexibility).

Resource flexibility helps organizations adjust their resources (Benzidia and Makaoui, 2020). This enables organizations to quickly respond to market changes and maintain organizational competitiveness (Ngo and Loi, 2008; Umam and Sommanawat, 2019). On the other hand, an agile supply chain emphasizes flexibility, speed, and the ability to adapt to rapidly changing demands and market conditions. Thus, an agile supply chain can help companies respond to market changes and build a more resilient supply chain (Benzidia and Makaoui, 2020). Agility includes agility at various levels of organization, human resources (HR), and work methods (Munteanu et al. 2020; Ahmad et al. 2020). On the other hand, a lean supply chain emphasizes efficiency and waste elimination. Therefore, organizations that use a lean supply chain can optimize the use of their resources and build a more efficient and productive supply chain (Agus and Hajinoor, 2012).

Supply chain ambidexterity is the ability of an organization to create a supply chain that is efficient (lean) and flexible (agile) at the same time. Supply chain ambidexterity plays an important role in achieving a balance between efficiency and flexibility in managing the supply chain (Alamsjah and Asrol, 2022). Agile supply chain and lean supply chain are different models of supply chain management. Agile supply chains emphasize speed, flexibility, and adaptation to change, while lean supply chains emphasize efficiency in the supply chain (Umam and Sommanawat, 2019; Agus and Hajinoor, 2012). The two can be used together as part of a supply chain ambidexterity strategy, enabling organizations to achieve optimal efficiency and flexibility. Lean supply chains can optimize processes and minimize waste, improving supply chain efficiency (Liu et al. 2013). Meanwhile, with an agile supply chain, organizations can improve their ability to survive and grow in a constantly changing business environment. Supply chain ambidexterity helps organizations deal with uncertainty and complexity in a fast-changing business environment (Chan et al. 2017).

In the face of changing market and customer needs, an agile supply chain approach emphasizes speed and flexibility. Organizations can change strategies, redesign business processes, and adjust products or services according to customer needs, making the company more prepared and responsive to market changes and uncertainties (Sriyakul et al. 2019). Lean supply chain management aims to reduce production time and costs by eliminating waste and non-value-adding activities. The goal is to increase organizational efficiency, productivity, and reduce production costs (Arif-Uz-Zaman and Nazmul, 2014). Leanness and agility approaches in supply chain management can have a positive impact on supply chain resilience (Praharsi et al. 2021; Al-Refaie et al. 2020). The advantages of leanness and agility are considered capable of strengthening organizational capabilities in dealing with change and uncertainty (Teece et al. 2016; Gligor and Holcomb, 2012; Fayezi et al. 2017).

In lean supply chain management, organizations seek to reduce production time and costs by eliminating waste and non-value-adding activities. This effort aims to increase organizational efficiency and productivity and reduce production costs (Arif-Uz-Zaman and Nazmul Ahsan, 2014). Leanness and agility approaches in supply chain management can have a positive impact on supply chain resilience (Praharsi et al. 2021; Al-Refaie et al. 2020). The advantages of leanness and agility are considered capable of strengthening organizational capabilities in dealing with change and uncertainty (Teece et al. 2016; Gligor and Holcomb, 2012; Fayezi et al. 2017). Lean supply chains help organizations become more efficient and adapt production costs to market needs, while flexible supply chains allow organizations to adapt and overcome market challenges quickly and flexibly (Chan et al. 2017; Siagian et al. 2021). Thus, a flexible and lean supply chain can help increase supply chain resilience by helping organizations deal with change and uncertainty (Qrunfleh and Tarafdar, 2013; Ayoub and Abdallah, 2019). Therefore, the hypotheses in this study are concluded as follows:

H1. Resource flexibility has a significant effect on agile supply chain
H2. Resource flexibility has a significant effect on lean supply chain
H3. Supply chain ambidexterity has a significant effect on lean supply chain
H4. Supply chain ambidexterity has a significant effect on supply chain agility
H5. Agile supply chain has a significant effect on supply chain resilience
H6. Lean supply chain has a significant effect on supply chain resilience
H7. Agile supply chain mediates the relationship between resource flexibility and supply chain resilience
H8. Lean supply chain mediates the relationship between resource flexibility and supply chain resilience
H9. Lean supply chain mediates the relationship between supply chain ambidexterity and supply chain resilience
H9. Agile supply chain mediates the relationship between supply chain ambidexterity and supply chain resilience

This study uses the Partial Least Squares (SmartPLS) multivariate analysis method to analyze the data and examine the effect of the relationship of the independent variables on the dependent variable with a linear regression approach (Figure 1). The reason for choosing the SmartPLS method as a multivariate statistical technique in this study is that the number of samples used fulfills the requirements for using SmartPLS in analyzing complex relationships between variables.

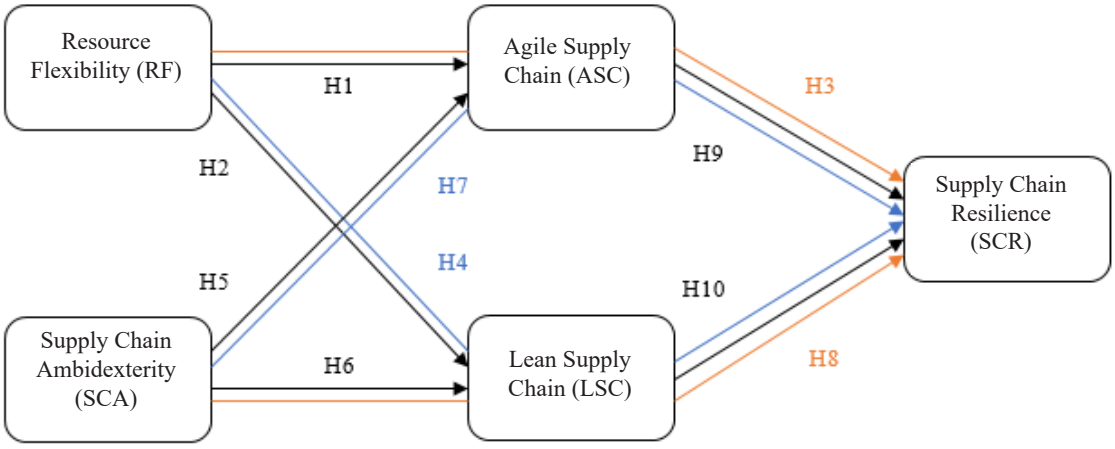

Figure 1. Conceptual framework

RESULTS

The first stage of the analysis test carried out with the PLS method was to determine the value of the loading factor from the latent variable constructs. The loading factor value is the correlation coefficient of a construct in explaining latent variables. The purpose of this stage is to analyze constructs that can significantly represent latent variables and identify any constructs that may be less reliable (Gerber and Price 2018; Wang 2020). After conducting an analysis to determine the variables that contribute the most to the variance of the data, factor rotation is performed to obtain the factor loading. The loading factor value can be used to evaluate how significantly the variables affect the dependent variable. SmartPLS analysis graph in Figure 2.

The results of the analysis of the factor loading value show that overall, all latent variable constructs used have a factor loading value above 0.7. That is, each construct in this study is able to strongly contribute to explaining the variability of latent variables. Therefore, all the constructs in this research can be used. The detailed results of the standard loading factor values for all variables can be seen in Table 1.

The analysis test was continued with the reliability and validity test of the variables. The reliability and validity tests were carried out to ensure that the data obtained from variable measurement instruments in quantitative research were reliable. In this case, reliability refers to the consistency and stability of the measurements made, while validity refers to the extent to which the measurement instruments used can measure constructs or variables (Table 2).

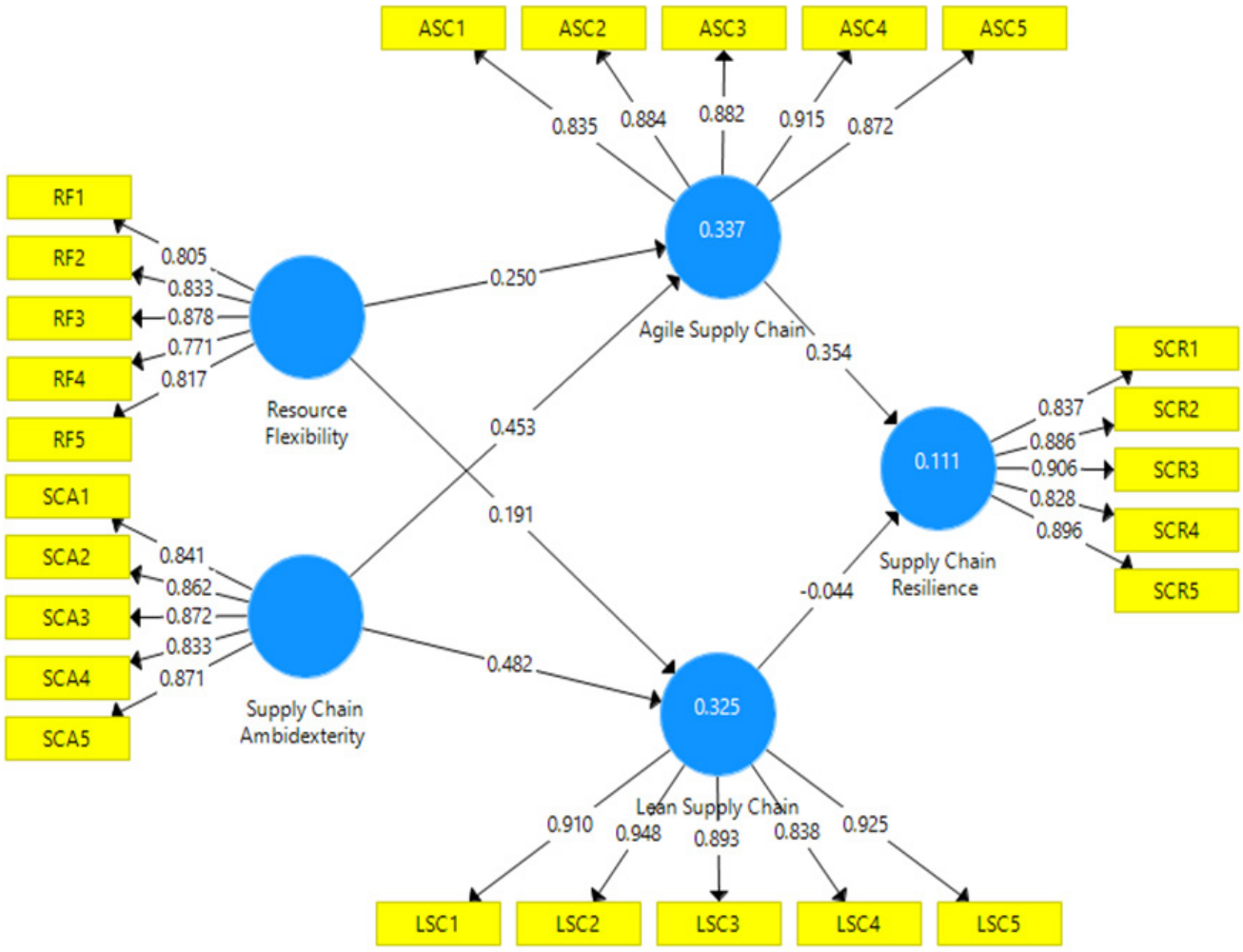

Figure 2. SmartPLS analysis graph

Table 1. Standard loading factors

Variables	Agile supply chain (ASC)	Lean supply chain (LSC)	Resource flexibility (RF)	Supply chain ambidexterity (SCA)	Supply chain resilience (SCR)
Demand forecasting (ASC1)	0.835				
Flexible inventory management (ASC2)	0.884				
Centralized workflows (ASC3)	0.882				
Robust supplier management strategy (ASC4)	0.915				
Integrated process (ASC5)	0.872				
Networked Channel (LSC1)		0.910			
Waste elimination (LSC2)		0.948			
Continuous improvement (LSC3)		0.893			
Just-in-time (LSC4)		0.838			
SCM Synchronization (LSC5)		0.925			
The ability to integrate resource (RF1)			0.805		
The ability to configure resource (RF2)			0.833		
Proactive Logistics flexibility (RF3)			0.878		
Relationship Flexibility (RF4)			0.771		
Network Flexibility (RF5)			0.817		
The ability to excel of quality (SCA1)				0.841	
The ability to excel of delivery (SCA2				0.862	
The ability to excel of flexibility (SCA3)				0.872	
The ability to excel of cost (SCA4)				0.833	
The ability to excel of business performance (SCA5)				0.871	
Capabilities to adapt in uncertain environment (SCR1)					0.837
Recovery and response (SCR2)					0.886
Robustness (SCR3)					0.906
Redundancy (SCR4)					0.828
Collaboration ability (SCR5)					0.896

Table 2. Construct reliability and validity

Variables	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Agile Supply Chain	0.926	0.944	0.771
Lean Supply Chain	0.943	0.957	0.816
Resource Flexibility	0.881	0.912	0.676
Supply Chain Ambidexterity	0.909	0.932	0.733
Supply Chain Resilience	0.922	0.940	0.759

The reliability test results in Table 2 show that the agile supply chain variable obtained a Cronbach's Alpha value of 0.926 and Composite Reliability of 0.944. The Cronbach's Alpha value for the lean supply chain is 0.943, and the Composite Reliability value obtained is 0.957. Furthermore, the resource flexibility variable obtained Cronbach's Alpha and Composite Reliability values of 0.881 and 0.912, respectively. The supply chain ambidexterity variable obtained a Cronbach's Alpha value of 0.909 and Composite Reliability of 0.932. Lastly, for the supply chain resilience variable, the Cronbach's Alpha and Composite Reliability values were 0.922 and 0.940, respectively. All these variables have Cronbach's Alpha and Composite Reliability values above 0.7, indicating that the variables used in this study are reliable. In the validity test, the Average Variance Extracted (AVE) value obtained for the agile supply chain variable is 0.771, for the lean supply chain

is 0.816, for resource flexibility is 0.676, for supply chain ambidexterity is 0.733, and for supply chain resilience is 0.759. All AVE values obtained from these variables are above 0.5, indicating good convergent validity. Furthermore, to examine the relationship between one variable and another, this study uses regression analysis. Direct hypothesis testing is carried out to find out whether there is a direct relationship between the independent and dependent variables. The results of testing the hypotheses directly can be seen in Table 3.

Direct hypothesis testing is considered significant if the T-statistic value of the effect of a variable on other variables is greater than 1.96, and the p-value is less than 0.05. The results of direct hypothesis testing in Table 3 show that the first hypothesis, namely the relationship between resource flexibility and agile supply chains, has a T-statistic value of 3.474 with a p-value of 0.001. This shows that the relationship between the two variables is statistically significant. The T-statistic value of the second hypothesis test, which examines the relationship between resource flexibility and lean supply chains, is 3.269 with a p-value of 0.001, thus it is concluded that resource flexibility has a significant effect on lean supply chains. Thus, the second hypothesis is also supported, stating that resource flexibility has a significant effect on lean supply chains. The results of the study are consistent with the findings of Fayezi et al. (2017), which state that resource flexibility has a positive relationship with supply chain agility. Additional support for this finding is also provided by the study of Chan et al. (2017), who showed that organizational flexibility, especially in the form of strategic flexibility and manufacturing flexibility, is an important factor contributing to supply chain agility.

The results of testing the third hypothesis showed a T-statistic value of 6.758 and a p-value of 0.000. Thus, the third hypothesis is accepted, indicating that supply chain ambidexterity has a significant effect on supply chain agility. Furthermore, the results of testing the fourth hypothesis show a T-statistic value of 8.220 and a p-value of 0.000. Thus, the fourth hypothesis is also accepted, indicating that supply chain ambidexterity has a significant effect on lean supply chains. This result is in line with the findings of Khorasani (2018); an agile supply chain system can increase an organization's ability to survive in an unpredictable business environment. Aslam et al. (2018) also support this by showing that supply chain ambidexterity has a positive effect on supply chain agility.

The fifth hypothesis examines the effect of agile supply chain on supply chain resilience. The results demonstrated a significant effect with a statistical T-value of 4.488 and a p-value of 0.000. Thus, the fifth hypothesis is accepted. This means that a higher level of agility is more likely to improve supply chain resilience in manufacturing SMEs. Meanwhile, the sixth hypothesis, which states that lean supply chain demonstrated an insignificant result on supply chain resilience with a T-statistics value obtained of 0.507 and a p-value of 0.613 (>0.05). This indicates that the hypothesis is rejected. The justification for this insignificant effect is that while lean supply chain practices may lead to cost reduction and efficiency, they can also make supply chains more vulnerable to disruptions in SMEs due to their focus on minimizing inventory and maximizing just-in-time delivery. The implication is that SMEs need to adopt a more holistic approach to supply chain management that balances efficiency with resilience. They need to recognize that disruptions are inevitable and build contingency plans to mitigate their impact.

Table 3. Hypothesis test results of the direct effect

	Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T-statistics (|O/STDEV|)	P Values	Information
H1	RF → ASC	0.250	0.255	0.072	3.474	0.001	Supported
H2	RF → LSC	0.191	0.191	0.058	3.269	0.001	Supported
H3	SCA → ASC	0.453	0.456	0.067	6.758	0.000	Supported
H4	SCA → LSC	0.482	0.484	0.059	8.220	0.000	Supported
H5	ASC → SCR	0.354	0.359	0.079	4.488	0.000	Supported
H6	LSC → SCR	-0.044	-0.037	0.088	0.507	0.613	Not Supported

Note: RF= Resource Flexibility; SCA= Supply Chain Ambidexterity= ASC= Agile Supply Chain; LSC= Lean Supply Chain; SCR= Supply Chain Resilience

Furthermore, to test the relationship between variables using mediating factors of leanness and agility, an indirect hypothesis test is carried out. According to Gawronski (2009), an indirect measure of values could be a useful tool to integrate the results from self-report measures, considering the influence of socially desirable responding. Indirect measures aim at inferring participants' implicit preferences considering their performance on an experimental paradigm. Moreover, Danioni et al. (2020) confirmed that when answering questions about values, people may only give responses that they believe are socially desirable and portray them in a positive light. Since values are seen as something desirable, this makes it more likely for social desirability to affect how people assess them. Considering this, it is important for researchers to account for social desirability when measuring values. Danioni et al. (2020) suggest that social desirability should be an integral component of values measurement and should be controlled for with indirect measures. The results of indirect hypothesis testing in this study obtained the results as shown in Table 4.

The results of testing the hypothesis in Table 4 found statistical results from the seventh hypothesis, which states that resource flexibility has an influence on supply chain resilience through agile supply chain mediation. The results of the analysis show a T-statistic value of 2.299 with a p-value of 0.023. That is, the seventh hypothesis is accepted. These results demonstrate the importance of an agile supply chain in linking resource flexibility with overall supply chain resilience. Furthermore, the eighth hypothesis, which states that resource flexibility affects supply chain resilience through lean supply chains, shows insignificant results. The T-statistic value obtained was 0.467, and the p-value was 0.467. The T-statistic value obtained was less than 1.96, and the p-value obtained was more than 0.05, which means that there is no significant effect of resource flexibility on supply chain resilience mediated by lean supply chains in this study. Therefore, the eighth hypothesis of this study was rejected. This finding supports Alamsjah and Asrol's research (2022), which found no significant effect of supply chain ambidexterity on supply chain performance.

The ninth hypothesis, which states that supply chain ambidexterity affects supply chain resilience through agile supply chain mediation, the T-statistic value obtained is 4.224, and the p-value is 0.000. These findings suggest that agile supply chain mediation has an important role in the relationship between supply chain ambidexterity and supply chain resilience. Thus, the ninth hypothesis is accepted. These results confirm the importance of having an agile supply chain in strengthening the link between supply chain ambidexterity and supply chain resilience. These results support the research by Aslam et al. (2018), supply chain agility has a direct effect on supply chain ambidexterity. Meanwhile, in testing the tenth hypothesis, the T-statistics value was 0.459, and the p-value was 0.647. The T-statistics value obtained is less than 1.96, and the p-value obtained is more than 0.05. Thus, the tenth hypothesis in this study was rejected. These findings show the importance for organizations to pay attention to and improve capabilities in incorporating innovation and resource flexibility into their supply chains to increase supply chain resilience. In addition, these results also confirm that agile supply chain and lean supply chain have a positive and significant impact on supply chain resilience, so they can be used as relevant mediating factors to increase supply chain resilience. This shows that SMEs need to consider and improve the effectiveness and efficiency in their operations to ensure the chain.

Table 4. Hypotheses test result indirect effect

	Hypothesis	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T-statistics (|O/STDEV|)	P Values	Information
H7	RF → ASC → SCR	0.088	0.092	0.038	2.299	0.023	Supported
H8	RF → LSC → SCR	-0.008	-0.006	0.018	0.467	0.641	Not Supported
H9	SCA → ASC → SCR	0.160	0.163	0.038	4.224	0.000	Supported
H10	SCA → LSC → SCR	-0.021	-0.021	0.047	0.459	0.647	Not Significant

Note: RF= Resource Flexibility; SCA= Supply Chain Ambidexterity= ASC= Agile Supply Chain; LSC= Lean Supply Chain; SCR= Supply Chain Resilience

Supply chain ambidexterity involves the simultaneous use of two approaches, namely lean supply chain and agile supply chain, to achieve optimal efficiency and flexibility in managing the supply chain. Lean supply chains focus on efficiency by reducing waste and non-value-added activities in the supply chain, whereas agile supply chains aim to increase flexibility and adaptability to market changes. By combining these two approaches, organizations can achieve an optimal balance between efficiency and flexibility in managing their supply chain. This allows organizations to be more responsive to market changes and reduce the risk of uncertainty while still achieving high efficiency in supply chain operations (Manzouri et al. 2013; Lenny et al. 2007; Alamsjah and Asrol, 2022).

Manufacturing MSMEs are expected to perform well in an environment that provides supportive economic policies, important supporting policies, and sound business policies. Supportive economic policies include a stable macroeconomic environment, low inflation rates, and an enabling business environment. With such policies, MSMEs can access affordable credit, secure raw materials, and export their products with reduced barriers, thus boosting their competitive advantage. Important supporting policies, on the other hand, include policies that foster innovation, technology transfer, and entrepreneurship. In a rapidly changing business environment, manufacturing MSMEs require such policies to adopt new technologies, develop new products, and improve their overall production processes. Finally, sound business policies refer to policies that promote good business practices, such as efficient accounting, support for compliance, and legal frameworks that protect intellectual property rights. These policies enhance the reputation of MSMEs, increase investor confidence, and support the expansion of their businesses.

Managerial Implications

The results imply that in a lean supply chain, resource flexibility can help organizations optimize supply chain performance and reduce waste. With the right resource flexibility, organizations can ensure that the resources used match their production and supply needs. Resource flexibility affects both agile and lean supply chains in different ways. In an agile supply chain, resource flexibility helps organizations maintain their competitiveness in a dynamic market. Meanwhile, in a lean supply chain, resource flexibility helps organizations optimize supply chain performance, reduce waste, and eliminate non-value-added activities (Khorasani et al. 2020). Both agile and lean supply chain models have different approaches to managing supply chains, but both can serve as mediators in the relationship between resource flexibility and supply chain resilience. The implication is that these two models can help organizations build a strong and resilient supply chain, so they can survive in an unstable and ever-changing business environment. By selecting the appropriate supply chain model and using the right resource flexibility, organizations can increase their ability to survive and grow amidst the changes that occur in the business.

As implications, by using lean supply chains to optimize processes and agile supply chains to increase flexibility and adaptability, organizations can develop more resilient supply chains, which can help them stay competitive in increasingly competitive markets. Supply chain ambidexterity plays a key role in simultaneously developing a lean supply chain and an agile supply chain. This helps organizations achieve an optimal balance between efficiency and flexibility in managing their supply chain. The results show that lean and agile supply chains function as mediators in the relationship between ambidexterity and supply chain resilience. The conclusion from these findings is that organizations can create more resilient and responsive supply chains by combining lean supply chains and agile supply chains. Supply chain ambidexterity, lean supply chain, agile supply chain, and supply chain resilience are intertwined and impact each other in supply chain management. Therefore, it is important for organizations to adopt an integrated and holistic strategy to optimize the supply chain and increase competitiveness in a competitive market.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The results show that resource flexibility has a significant effect on both types of supply chains: agile and lean. In other words, resource flexibility plays an important role in influencing an organization's ability to adapt to market changes and achieve operational efficiency (lean). Hypothesis testing also shows that supply chain ambidexterity has a large impact on different types of supply chains: lean and agile. This

shows how important an ambidexterity approach is to manage the entire supply chain by combining the flexibility and efficiency advantages of both. In addition, the lean and agile supply chain mediation function found that agility can act as a mediator between resource flexibility and supply chain resilience. Supply chain agility can positively link resource flexibility to supply chain resilience. However, there is no evidence that lean supply chains have a mediating effect in this relationship. The results of the study show that agile methods are very important to increase supply chain resilience. To improve operational efficiency, lean supply chains are still useful, but do not directly affect supply chain resilience. Therefore, organizations may consider prioritizing developing supply chain agility over addressing the challenges and uncertainties in an ever-changing marketplace.

Recommendations

As practical implications, the findings showed that manufacturing SMEs in Bandung City need to pay attention to the flexibility of their resources and supply chain ambidexterity to increase supply chain resilience. By considering these two factors, manufacturing SMEs can increase the flexibility and adaptability of their supply chain to face various challenges that may occur in the future. In addition, increasing the agile supply chain can also help manufacturing SMEs in increasing the resilience of their supply chains. In a rapidly changing and dynamic business era, having an agile and adaptive supply chain will enable SMEs to be better prepared to deal with various changes and uncertainties that may occur. Thus, paying attention to these factors can help SMEs in increasing their resilience and competitiveness in an increasingly competitive market.

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