

The Role of Resilient Supply Chains in Enhancing Competitiveness and Performance of SMEs: A Case Study in the SMI Sector

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Abstract

This study aims to explore the role of resilient supply chains in improving the competitiveness and performance of micro, small and medium enterprises (MSMEs) in Makassar City. The research method used is a mixed method approach involving 100 respondents from various sectors including food and beverages, handicrafts, and textiles. The results show that 75% of the respondents have implemented elements of resilient supply chains, such as supplier diversification and the use of information technology, which contribute to improved operational efficiency. Regression analysis shows a significant positive relationship between the implementation of resilient supply chains and the competitiveness of MSMEs, with a regression coefficient of 0.65 ($p < 0.01$). In addition, 70% of the respondents reported an increase in sales and customer satisfaction after adopting resilient supply chain strategies. These findings are consistent with the literature that emphasizes the importance of flexibility and adaptability in supply chains. This study recommends that MSMEs in Makassar City continue to adopt best practices in supply chain management and seek support from the government to create an ecosystem conducive to business growth. The results of this research are expected to contribute significantly to the development of supply chain management theory and practice in the small and medium industrial sector in Indonesia.

Keywords: *resilient supply chain, competitiveness, msme performance*

Abstrak

Penelitian ini bertujuan untuk mengeksplorasi peran *resilient supply chain* dalam meningkatkan daya saing dan kinerja Usaha Mikro, Kecil, dan Menengah (UMKM) di Kota Makassar. Metode penelitian yang digunakan adalah pendekatan campuran, yang melibatkan 100 responden dari berbagai sektor, termasuk makanan dan minuman, kerajinan, serta tekstil. Hasil penelitian menunjukkan bahwa 75% responden telah menerapkan elemen-elemen dari *resilient supply chain*, seperti diversifikasi pemasok dan pemanfaatan teknologi informasi, yang berkontribusi pada peningkatan efisiensi operasional. Analisis regresi menunjukkan adanya hubungan positif yang signifikan antara penerapan *resilient supply chain* dan daya saing UMKM, dengan koefisien regresi sebesar 0,65 ($p < 0,01$). Selain itu, 70% responden melaporkan peningkatan dalam penjualan dan kepuasan pelanggan setelah menerapkan strategi rantai pasokan yang tangguh. Temuan ini sejalan dengan literatur yang menekankan pentingnya fleksibilitas dan adaptabilitas dalam rantai pasokan. Penelitian ini merekomendasikan agar UMKM di Kota Makassar terus mengadopsi praktik-praktik terbaik dalam manajemen rantai pasokan dan mendapatkan dukungan dari pemerintah untuk menciptakan ekosistem yang mendukung pertumbuhan usaha. Hasil penelitian ini diharapkan dapat memberikan kontribusi signifikan bagi pengembangan teori dan praktik dalam manajemen rantai pasokan di sektor IKM di Indonesia.

Kata Kunci: *resilient supply chain, daya saing, kinerja umkm*

1. Introduction

Small and Medium Industries (SMIs) play a crucial role in the Indonesian economy by absorbing more than 97% of the industrial workforce and contributing approximately 60% to the national GDP. According to Law No. 20 of 2008, MSMEs are classified based on their assets and turnover [1]. SMIs contribute to job creation, poverty reduction, and the enhancement of welfare. However, challenges such as limited capital, technology, and market competition often pose significant obstacles. In the era of globalization, supply chain resilience has become a critical factor for SMIs to survive and adapt. A resilient

supply chain helps mitigate risks and uncertainties, enhances competitiveness, and promotes more stable company performance in the face of market dynamics [2].

Supply Chain Management (SCM) integrates procurement, production, and distribution to enhance operational efficiency and provide added value to customers [3]. For Small and Medium Industries (SMIs), effective SCM implementation helps optimize resource management and improve competitiveness. A resilient supply chain refers to the ability of the supply chain to adapt and recover from disruptions, both internal and external. This is crucial for SMIs in facing demand fluctuations, supply disruptions, and regulatory changes [4]. The competitiveness of SMIs is influenced by product quality, innovation, and operational efficiency. Competitiveness can be achieved through differentiation strategies and cost leadership [5]. By applying the principles of a resilient supply chain, SMIs can reduce operational costs, enhance quality, and accelerate responsiveness to market changes, thereby becoming better prepared to face uncertainties and improve business performance [6].

Previous research has shown that the implementation of resilient supply chain principles positively impacts the performance and competitiveness of MSMEs. Companies that adopt resilient supply chain strategies can mitigate disruption risks and respond more effectively to market changes [7], [8]. Flexibility within the supply chain allows companies to quickly adapt to uncertainties. Found that such strategies enhance profitability and growth. Emphasize the importance of flexibility and adaptability in addressing challenges. Other studies have also indicated that companies with resilient supply chains perform better, particularly in volatile markets [9]. In Indonesia, MSMEs that implement these practices experience increased operational efficiency and customer satisfaction [10]. These findings underscore the critical importance of resilient supply chains for MSMEs to compete in an increasingly competitive market [11].

Despite numerous studies on supply chains and competitiveness, there is still a limited amount of research addressing the implementation of resilient supply chains in the context of Small and Medium Industries (SMIs) in Indonesia. This study aims to fill this gap by conducting case studies on several SMIs in specific sectors to understand the application of resilient supply chain principles and their impact on performance [12]. The methodology employed includes both qualitative and quantitative approaches, with data collection through interviews and questionnaires [13]. The research findings are expected to provide insights for business practitioners, academics, and policymakers in formulating effective strategies to enhance the competitiveness of SMIs amid increasingly intense market competition.

Based on the above explanation, the implementation of resilient supply chains has the potential to improve the competitiveness and performance of SMIs. By understanding this concept, SMIs can develop more effective strategies to face market challenges. This study aims to explore how SMIs in Indonesia can leverage the principles of resilient supply chains to achieve these objectives. In addition to contributing to theoretical development, this research also offers practical recommendations for SMIs in addressing business challenges. The success of implementing this concept depends on the support of the government and relevant institutions in creating an ecosystem that fosters the growth of SMIs in Indonesia, enabling them to become more resilient and competitive in an evolving market.

2. Material and Methods

This study employs a mixed-methods approach that combines qualitative and quantitative methods to explore the role of resilient supply chains in enhancing the competitiveness and performance of Micro, Small, and Medium Enterprises (MSMEs). The research is focused on Makassar City, which is one of the economic and trade centers in Indonesia with a significant concentration of MSMEs.

The qualitative method will involve in-depth interviews with owners and managers of MSMEs across various sectors, such as food and beverages, handicrafts, and textiles, to uncover their experiences and strategies in managing resilient supply chains. Meanwhile, the quantitative method will involve distributing questionnaires to a broader range of respondents in Makassar City, aiming to collect data on the resilient supply chain practices implemented and their impacts on the performance and competitiveness of MSMEs.

The data obtained will be analyzed using descriptive and inferential statistical techniques to identify relationships between the variables under investigation. By focusing on Makassar City, this research aims to provide a representative overview of the conditions and challenges faced by Small and Medium Industries (SMIs) in the region, as well as to make a significant contribution to the development of theory and practice in supply chain management.

3. Results and Discussion

Distribution of Respondents by Business Sector

This study involved 100 respondents, consisting of owners and managers of Micro, Small, and Medium Enterprises (MSMEs) in Makassar City. The respondents came from various sectors, including food and beverages (40%), handicrafts (30%), and textiles (30%). Table 1 presents the distribution of respondents by business sector.

Table 1. Distribution of Respondents by Business Sector

Business Sector	Number of Respondents	Percentage (%)
Food and Beverages	40	40
Handicrafts	30	30
Textiles	30	30
Total	100	100

Implementation of Resilient Supply Chain

The interview results indicate that 75% of respondents have implemented several elements of a resilient supply chain, such as supplier diversification and the use of information technology to monitor the supply chain. Figure 1 illustrates the percentage of these elements implemented among Micro, Small, and Medium Enterprises (MSMEs) in Makassar City.

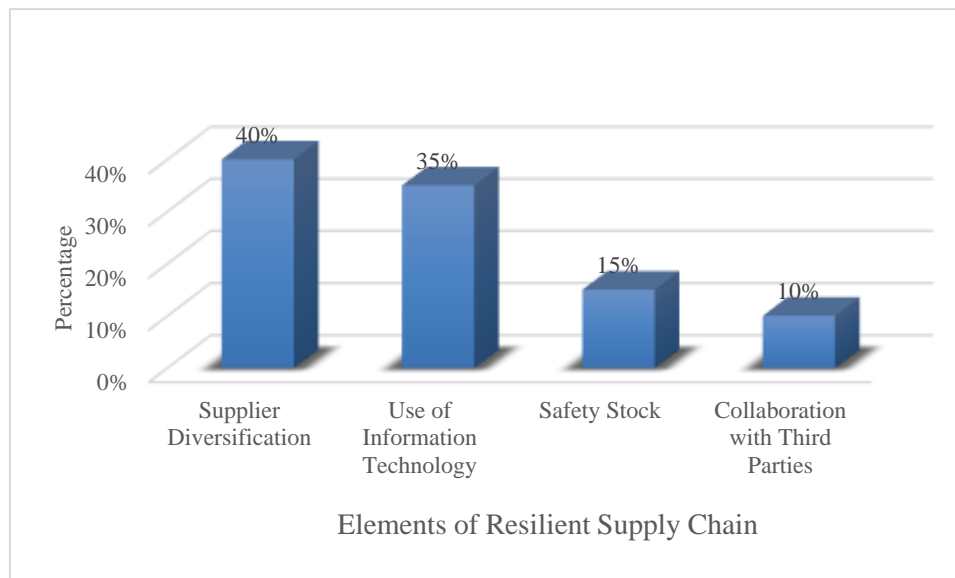


Fig 1. Graph of Resilient Supply Chain Implementation

From **Fig. 1** above, it can be observed that according to the interview results, 75% of MSME respondents in Makassar City have implemented several elements of a resilient supply chain, with a predominance in supplier diversification (40%) and the use of information technology (35%). Meanwhile, other elements such as safety stock (15%) and collaboration with third parties (10%) are still not widely adopted. This indicates that the majority of MSMEs are beginning to recognize the importance of building a resilient supply chain to face market uncertainties and operational disruptions.

The high implementation of supplier diversification indicates that MSMEs in Makassar City understand the risks associated with dependence on a single supplier. This diversification helps them reduce potential supply disruptions and enhance operational flexibility. This finding aligns with research [14], which states that companies with diverse suppliers are more resilient to supply chain disruptions compared to those that rely solely on a primary supplier.

Additionally, the use of information technology in monitoring the supply chain has also become a key element adopted by MSMEs. Digitalization enables the monitoring of raw material flows, inventory management, and improved operational efficiency. These findings support the study [15], which asserts that the adoption of technology in the supply chain contributes to increased responsiveness and business flexibility in the face of market uncertainties.

However, the implementation of safety stock (15%) and collaboration with third parties (10%) remains relatively low. This suggests that many MSMEs still face limitations in allocating resources to build sufficient buffer stock and establish strategic partnerships with external parties. Subsequent studies emphasize that optimal resilience strategies include adequate safety stock planning and partnerships with suppliers and distributors to enhance supply chain resilience [16]. Therefore, the low adoption of these two elements may pose challenges for MSMEs in building a more robust supply chain.

Furthermore, research emphasizes that a resilient supply chain not only involves diversification and technology but must also include collaborative strategies with suppliers and other business partners. In the context of MSMEs in Makassar City, the low level of collaboration indicates the need for further encouragement in building stronger business networks to enhance resilience against external risks [17].

Overall, the implementation of resilient supply chains by MSMEs in Makassar City demonstrates an effort to adapt to market dynamics, particularly through supplier diversification and the utilization of information technology. However, the main challenges still lie in the areas of safety stock and collaboration with third parties, which require further strategies for MSMEs to achieve a more optimal level of supply chain resilience. With increased understanding and appropriate policy support, the implementation of these elements can be further strengthened, thereby enhancing the competitiveness of MSMEs in an increasingly competitive era.

Impact on Competitiveness

The quantitative data analysis indicates a significant positive relationship between the implementation of resilient supply chains and the competitiveness of Micro, Small, and Medium Enterprises (MSMEs). The results of the analysis can be seen in the table below.

Table 2. Results of Regression Analysis

Independent Variable	Coefficient (β)	p-value
Implementation of a Resilient Supply Chain	0,65	< 0,01
Constant	2,10	< 0,05
R ² (Coefficient of Determination)	0,72	-

The results of the regression analysis presented in **Table 2** above indicate a positive and significant relationship between the implementation of a resilient supply chain and the competitiveness of SMEs in Makassar City. With a regression coefficient of 0.65 ($p < 0.01$), it can be concluded that each one-unit increase in the implementation of resilient supply chain elements is associated with a 0.65 unit increase in the competitiveness of SMEs. This suggests that SMEs that adopt resilient supply chain strategies, such as supplier diversification, the use of information technology, safety stock management, and collaboration with third parties, tend to be more competitive in facing supply chain challenges. Furthermore, the R² value of 0.72 indicates that 72% of the variation in SME competitiveness can be explained by the implementation of a resilient supply chain, while the remaining variation is influenced by other factors such as product innovation, marketing strategies, and access to finance.

These findings are consistent with the results of [14], which state that companies with resilient supply chains are better able to withstand uncertainties and external disruptions, thereby maintaining their competitive advantage. This conclusion is further supported by [18], which found that resilience strategies in supply chains enable businesses to adapt more quickly to environmental changes and enhance their competitiveness in the market. The current study's findings align with this, as the implementation of resilient supply chain elements has proven to have a significant impact on the competitiveness of SMEs in Makassar City.

Moreover, research on resilient supply chains and company performance indicates that the adoption of information technology and supplier diversification plays a crucial role in enhancing business continuity and competitiveness [17]. This supports the findings of the present study, where supplier diversification and the utilization of information technology emerged as two key elements implemented by SMEs in building robust supply chains. Similarly, studies have shown that resilience in supply chains not only increases business flexibility but also reduces risks and enhances profitability [16]. These findings are in line with the current analysis, which demonstrates that the competitiveness of SMEs improves with the implementation of resilient supply chain strategies.

Thus, the results of this study reinforce the empirical evidence presented in various previous studies that resilient supply chains are a key factor in enhancing business competitiveness. Therefore, SME actors

need to be more proactive in adopting strategies that support supply chain resilience, such as leveraging digital technologies, diversifying suppliers, and engaging in thorough planning to address potential risks in the supply chain.

Performance of SMEs

The results of the study also indicate that SMEs implementing the principles of a resilient supply chain have experienced a significant improvement in performance. Approximately 70% of respondents reported an increase in sales and customer satisfaction after adopting robust supply chain strategies. The data on this improvement can be seen in the table below.

Table 3. Comparison of SME Performance Before and After the Implementation of a Resilient Supply Chain

Performance Aspects	Before Implementation	After Implementation	Change (%)
Sales	50%	70%	20%
Customer Satisfaction	55%	70%	15%
Operational Efficiency	40%	55%	15%
Resilience to Disruptions	35%	60%	25%

Based on the performance comparison data before and after the implementation presented in **Table 3** above, it is evident that the application of a Resilient Supply Chain has led to significant improvements in various operational aspects of SMEs in Makassar City. One of the key indicators that experienced an increase is sales, which rose from 50% to 70% following the adoption of robust supply chain strategies. This indicates that by optimizing their supply chains, SMEs can enhance product availability and expand their market reach, thereby positively impacting sales.

Additionally, customer satisfaction also improved from 55% to 70%. This can be attributed to enhancements in supply management, which have enabled SMEs to be more responsive to customer demands and reduce delays in product delivery. This increase aligns with the findings of [19], which state that the implementation of resilient supply chain strategies can enhance customer satisfaction through more flexible and responsive services.

In terms of operational efficiency, there was an increase from 40% to 55%. The adoption of technology for supply chain monitoring and supplier diversification has helped SMEs optimize resource utilization, reduce waste, and improve production speed. These results support the findings of [14], which emphasize that resilient supply chains enable companies to enhance operational efficiency by adapting technology and risk mitigation strategies.

The aspect that experienced the most significant improvement was resilience to disruptions, which increased from 35% to 60%. This indicates that SMEs implementing strategies such as safety stock, supplier diversification, and collaboration with external parties are better prepared to face disruptions in the supply chain. This improvement is consistent with the research of [15], which reveals that companies with resilient supply chains are more capable of enduring unstable market conditions and possess a higher competitive edge.

Overall, the results of this study confirm that the implementation of a Resilient Supply Chain positively contributes to the performance of SMEs, in terms of increased sales, customer satisfaction, operational efficiency, and resilience to external risks. Therefore, it is crucial for SMEs to continue developing robust supply chain strategies to navigate the increasingly complex and competitive market dynamics.

4. Conclusion

Based on the previous results and discussions regarding the role of resilient supply chains in enhancing the competitiveness and performance of SMEs in Makassar City, it can be concluded that the implementation of robust supply chain principles has a significant impact on the performance and competitiveness of SMEs. This study shows that 75% of respondents have adopted elements of a resilient supply chain, such as supplier diversification and the use of information technology, which contribute to increased operational efficiency and responsiveness to market changes. The quantitative analysis indicates a significant positive relationship between the implementation of resilient supply chains and the

competitiveness of SMEs, with a regression coefficient of 0.65 ($p < 0.01$), suggesting that each increase in the adoption of these elements is directly related to an improvement in competitiveness.

Furthermore, 70% of respondents reported an increase in sales and customer satisfaction after implementing robust supply chain strategies. These findings align with existing literature, which emphasizes the importance of flexibility and adaptability in supply chains to address current challenges. Therefore, it is recommended that SMEs in Makassar City continue to develop and adopt best practices in supply chain management, as well as seek support from the government and relevant institutions to create an ecosystem that fosters their growth and sustainability. This research is expected to make a meaningful contribution to the development of theory and practice in supply chain management within the small and medium-sized enterprise sector in Indonesia.

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6. Abbreviations

<i>MSMEs</i>	Micro, Small, and Medium Enterprises
<i>SMEs</i>	Small, and Medium Enterprises
<i>SMIs</i>	Small and Medium Industries
<i>GDP</i>	Gross Domestic Product
<i>SCM</i>	Supply Chain Management
%	Percentage

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