

The Role of Supply Chain Agility in Competitive Advantage: A Dynamic Capabilities Theory Approach

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ARTICLE INFO

Article history:

Received Oct 08, 2024

Revised Oct 18, 2024

Accepted Oct 18, 2024

Available online Dec 10, 2024

Keywords:

Supply Chain Agility;
Competitive Advantage;
Dynamic Capabilities



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ABSTRACT

The textile and textile products (TPT) sector in Indonesia is currently facing a downturn in performance and a decline in its competitive standing relative to other nations. Research indicates that while supply chain agility does not have a direct effect on the competitive advantage of garment SMEs in Pekalongan, it does have a significant impact when mediated by resilience capability. The study focuses on owners of garment SMEs located in the Pekalongan region, utilizing purposive sampling as the method for selecting participants. Structural equation modeling (SEM) is employed for data analysis. The findings reveal that hypotheses H1 and H3 lack support, given their P-values exceed 0.05, while H2 receives support with a P-value of 0.090, which is below the significance threshold of 0.1. Furthermore, hypotheses H4 and H5 are confirmed with P-values lower than 0.01. In terms of mediation effects, H6 is supported with a P-value of 0.046, whereas H7 and H8 do not hold, as their P-values are above 0.05. Overall, the results imply that although supply chain agility does not directly enhance the competitive advantage of garment SMEs in Pekalongan, it significantly contributes to this advantage when mediated by resilience capability, indicating that the relationship between supply chain agility and competitive advantage is fully mediated.

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INTRODUCTION

In today's fast-paced business landscape, organizations must consider various factors to remain competitive within their respective industries. A competitive advantage is essential for navigating these challenges. Companies can enhance their competitive edge by innovating their production and distribution processes. Research by Jahed et al. (2022) indicates that the implementation of Supply Chain Management (SCM) not only boosts competitive advantage directly but also does so significantly through the mediation of Supply Chain Agility (SCA) and partnership quality. Furthermore, agility emerges as a critical determinant influencing both firm performance and competitive advantage in the context of supply chain resilience (Abeysekara et al., 2019). However, studies by Thongrawd et al. (2020); Wu et al. (2017) suggest that in certain scenarios, supply chain agility does not significantly impact competitive advantage, highlighting inconsistencies in the relationship between these two constructs.

The textile and textile products (TPT) industry exemplifies this phenomenon, as it faces declining performance despite its substantial contribution to Indonesia's non-oil and gas economy. Currently, Indonesia struggles to compete with 20 other countries in the global textile market (Kumbara, 2020). The textile sector's contribution to the Gross Domestic Product (GDP) of the non-oil and gas manufacturing industry has dropped from 7.08% in 2019 to 5.97% in 2023 (Badan Pusat Statistik, 2024). Additionally, the number of layoffs in the textile industry surged to 64,855 in 2023, compared to 25,114 in 2022 (Kementerian Tenaga Kerja RI, 2024).

To enhance competitive advantage and organizational performance, textile companies can adopt a differentiation strategy (Islami et al., 2020). Moreover, Afraz et al. (2021) identified resilience capability as another avenue for building competitive advantage. This aligns with the Dynamic Capabilities Theory, which serves as the foundational theory for this study, explaining how organizations can develop, integrate, and reorganize their internal and external resources to adapt to rapidly changing business environments (Ferreira & Coelho, 2020; D. J. Teece, 2007; D. J. Teece et al., 1997).

From this, it can be seen that there is still a research gap related to supply chain agility to competitive advantage. This study introduces a novel approach to building competitive advantage by applying the dynamic capability perspective. Typically, prior research has predominantly employed the resource-based view (RBV) framework in this context. Problem formulation is needed to make this research more concentrated and focused. The formulation of the problem in this study is "How can the process that can be developed to build competitive advantage through resilience capability, differentiation strategy and supply chain agility".

LITERATURE REVIEW

Dynamic Capabilities

Dynamic capabilities are defined as an organization's ability to cultivate, integrate, and reorganize both internal and external resources in response to a swiftly changing

business landscape. Initially presented by D. Teece and Pisano (1994), this concept was further developed by D. J. Teece et al. (1997) as an extension of the resource-based view (RBV) put forth by (Barney, 1991). Neo and Chen (2007) outline that dynamic capabilities are composed of three key elements: adaptive capability, absorptive capability, and innovative capability. Adaptive capability enables organizations to react quickly to changes in the environment, absorptive capability emphasizes the acquisition and application of new knowledge, and innovative capability involves the development of new products or services that set the organization apart from its competitors.

The fundamental purpose of dynamic capabilities is to help organizations sustain a competitive advantage in a perpetually changing market (Ferreira & Coelho, 2020). Achieving this entails identifying and capitalizing on new opportunities while adeptly managing and restructuring resources to maintain competitiveness (Correia et al., 2020; Kaur, 2023). Helfat and Peteraf (2009) further elaborate that dynamic capabilities include: (1) sensing and responding to opportunities and threats; (2) seizing available opportunities; and (3) sustaining competitive advantage through the enhancement, combination, protection, and reconfiguration of business assets.

In essence, dynamic capabilities represent an organization's ability to modify its strategy, structure, and business processes to remain pertinent and competitive in an ever-evolving market. They encapsulate business practices and approaches that allow firms to adjust their resources in response to emerging, evolving, fragmenting, converging, or declining markets.

Competitive Advantage

Cao et al. (2022) defines competitive advantage as the ability of a company to generate greater economic value compared to the economic value of its competitors. There are several things that make competitive advantage important according to Kotler et al. (1996); Porter (1985a); Sharma & Sharma (2020) among them are (1) forming the right positioning; (2) maintaining customer loyalty; (3) gaining new market share; (4) maximizing sales; (5) creating effective business performance to support business sustainability (W. Wang et al., 2022). Therefore, to build a competitive advantage, it can be done in a way that can be done by analyzing the market, developing strategies, optimizing resources, and developing innovations. Meanwhile, to measure competitive advantage, it can be seen from product quality, price, marketing techniques, purchasing capacity, and service quality (Ali, 2021).

To achieve competitive advantage, several strategic approaches can be adopted, including cost leadership, differentiation strategy, or focus strategy. Cost leadership involves offering products or services with an emphasis on competitive pricing. Companies must be able to achieve the lowest selling price compared to competitors in the same industry, usually by reducing production and marketing costs, engaging in mass production, or other cost-saving methods (Al-Khatib & Al-ghanem, 2022; Porter, 1985a). Meanwhile, differentiation strategy is related to the organization's innovative capacity

and its ability to deliver new products and services that competitors do not offer. The focus strategy, on the other hand, involves concentrating efforts on a specific market segment or niche to gain competitive advantage (Lee et al., 2021; Porter, 1985a).

Resilience Capability

Introduced by Coutu (2002), resilience capability or the ability of companies to face challenges and difficulties that occur in the work environment is a concept that develops along with changes in the increasingly complex and dynamic business environment. The topic of resilience capability has increasingly gained prominence and has become a critical subject in business management. Numerous studies have developed measurement tools and models to assess and enhance a company's resilience capability. Over time, resilience capability has been widely recognized as a key factor in business success and a company's ability to withstand the complexities and dynamics of the modern business environment. Therefore, organizations must continuously develop their resilience capability to address the challenges and obstacles in their work environment, ensuring business continuity in the future.

With resilience capability, companies are better able to compete and survive in a competitive market (Luqman et al., 2023; Manfield & Newey, 2018). Belhadi et al. (2022) also found that resilience capability can reduce the impact of risks that may occur on businesses. Companies can have resilience capability by developing human resources Salamzadeh et al. (2023), identifying, managing, and reducing risks that may occur in business processes (Srimarut & Mekhum, 2020). Supported by creating a culture or culture that supports adaptation, collaboration, and innovation in the work environment (Kim, 2020).

Research by Afraz et al. (2021) revealed that resilience capability, acting as a mediating factor, has a significant positive impact on the relationship between supply chain innovation and competitive advantage. This finding is further supported by Dubey et al. (2021), who also identified a positive relationship between resilience capability, particularly in terms of supply chain resilience and analytics capability, and competitive advantage. On another occasion, Fathi et al. (2021) found that strategic foresight and organizational resilience have a great influence on companies in forming competitive advantages.

H1: Resilience capability has a significant effect on competitive advantage.

Differentiation Strategy

Differentiation strategy is a strategy chosen by a company with the aim of producing a product or service that is considered unique by customers, and different from competitors (Porter, 1985b, 1985a). Differentiation strategies can extend the product life cycle and increase brand awareness or brand awareness of the product Navaia et al. (2023), as well as increase brand loyalty and business growth because it will increase the company's competitive advantage (Islami et al., 2020).

Differentiation strategies can be applied across various aspects, such as: (1) product differentiation, which involves creating unique features in a product to distinguish it from others (Hossain, Alam, et al., 2023; Hossain, Che Abdullah, et al., 2023); (2) service differentiation, achieved by offering distinct and attractive services to make the product or company stand out from competitors; (3) interest-based differentiation, focusing on employee competencies and interests to enhance competitiveness and attract customers (Andersén, 2021); (4) quality differentiation, which covers the entire process, from selecting high-quality raw materials to ethical production practices and timely delivery (Sousa & da Silveira, 2020); and (5) innovation differentiation, by developing new and unique products or services that differ from what is already available in the market (Sahi et al., 2022).

Keskin et al. (2021) found that unique capabilities within firms, particularly in the areas of information management, relationship building, and marketing, alongside competitive strategies such as differentiation and cost leadership, contribute to gaining a competitive edge and improving export performance in international markets. Likewise, research by Islami et al. (2020) indicates that employing differentiation strategies has a positive impact on competitive advantage and overall organizational performance. Additionally, Rehman et al. (2022) highlighted that differentiation strategies play a significant moderating role in the relationship between innovativeness and competitive advantage within manufacturing firms in Pakistan.

H2: Differentiation strategy has a significant effect on competitive advantage.

Resilience capability in SMEs is mainly driven by internal factors, namely resilience strategies, and surviving and adapting capacity, which in practice involves differentiation strategies, which are needed so that a business has a differentiating factor from competitors (Conz et al., 2017). Hossain, Alam, et al. (2023), found that strategy differentiation positively mediates between innovativeness, proactiveness, and export performance. This indicates that SMEs will have the resilience capability to compete by implementing a differentiation strategy. Meanwhile, Navaia et al. (2023) found that an increase in export performance and positional advantage slightly mediated between differentiation and export performance, showing that SMEs will strengthen resilience capability when effective in implementing differentiation strategies.

H3: Differentiation strategy has a significant effect on resilience capability.

Supply Chain Agility

Supply chain agility is the ability of the supply chain to change quickly, be responsive to the situation as it occurs, save costs, stay flexible, and maintain maximum productivity at all times (Park et al., 2023). As for its function for companies according to Bai et al. (2023); Stank et al. (2022) include (1) efficient logistics operations resulting in lower costs; (2) a well-developed supply chain that can respond quickly to customer

demands and preferences; (3) the company can face market changes and develop its business.

The concept of supply chain agility began in 1990, initially the main focus of the supply chain was on operational efficiency and cost reduction (Chen, 2019). The concept of Lean Manufacturing and Just-in-Time (JIT) was popularized by Toyota as an effort to eliminate waste and improve efficiency in the supply chain (Khalfallah & Lakhali, 2021). Until the early 2000s, after the crisis that hit the world at that time, whether caused by political instability or natural disasters, it triggered attention to the need for supply chains that are more agile and responsive to unexpected risks (Zhou et al., 2023).

Adobor and McMullen (2018) revealed that resilience supply chain capabilities are obtained by approaching Efficiency, system optimization, and adaptive capabilities and transformational behaviors. Where these three types of resilience complement each other and do not stand alone. Reinforced by the findings M. Wang and Wang (2023) where supply chain agility can improve relationships between supply chains and have a positive influence on sustainability, this means that if a company has an agile supply chain capacity, it will have an impact on resilience capability or the ability to survive. Then Agility, localization, and digitalization have a positive impact on supply chain resilience (Thekkoote, 2022).

H4: Supply chain agility has a significant effect on resilience capability.

Regarding supply chain agility, other findings from Um et al. (2018) show that supply chain agility is critical in supporting differentiation strategies, where high product variation and focus on customer satisfaction demand rapid adaptability. Effective and efficient supply chains are essential to support the implementation of differentiation strategies, especially in the context of sustainable supply chains (Kirchoff & Falasca, 2022). A flexible supply chain in a dual-channel context also helps the success of the product differentiation strategy between online channels and physical stores to run well, and can avoid cannibalization between channels and reduce free riding behavior (Tian et al 2022).

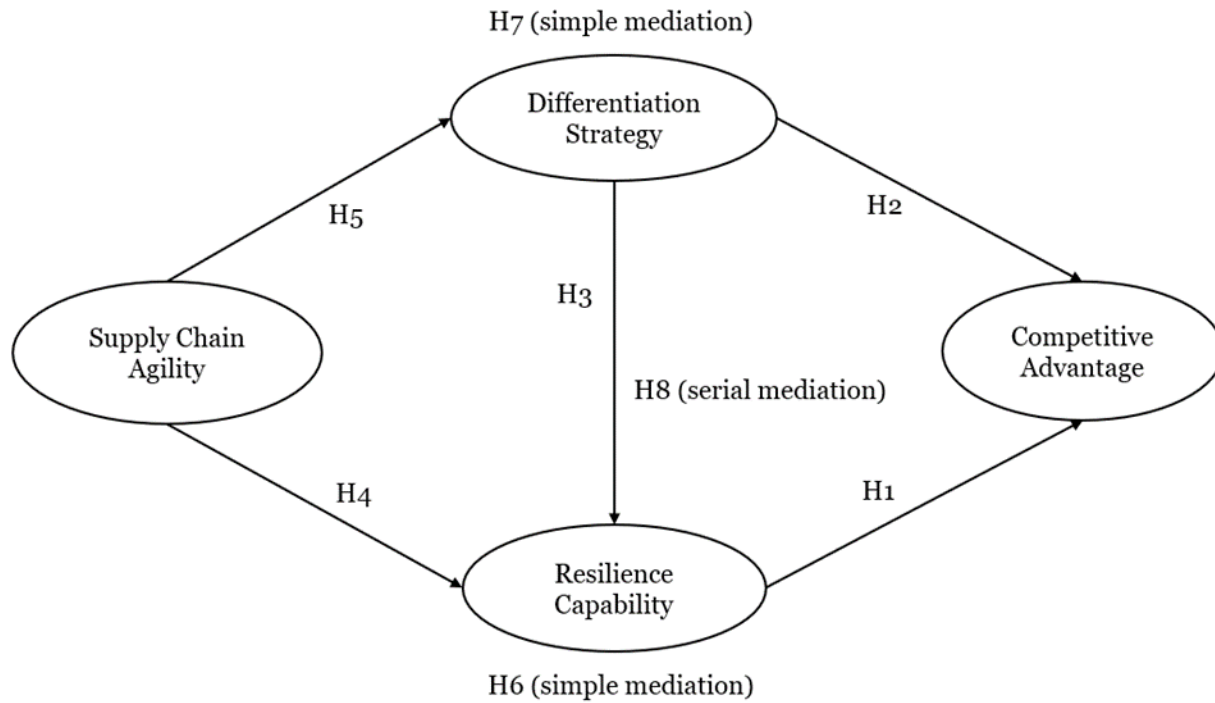
H5: Supply chain agility has a significant effect on differentiation strategy.

H6: Supply chain agility significantly influences competitive advantage through resilience capability.

H7: Supply chain agility significantly affects competitive advantage through differentiation strategy.

H8: Supply chain agility has a significant effect on competitive advantage through both differentiation strategy and resilience capability.

Figure 1. Research Model



METHODOLOGY

Sampling

The population in this study is convection SMEs in the Pekalongan area. Thus, in this study, the number of the population is unknown or infinite (Raihan, 2017). Because the population is infinite, the sample method used is purposive, which means that the researcher chooses a purposive sample or a sample that aims subjectively, because the researcher can already determine a certain target group (A. Ferdinand, 2014). In this study, the sample was taken based on certain characteristics, namely an owner or manager of a convection SME that has been operating for at least 2 years and has more than 4 employees. To be able to estimate and interpret with structural equation modeling (SEM), the ideal sample size in the maximum likelihood estimation technique is around 100-200 data (J. Hair et al., 2010).

Data Collection

This study employed a questionnaire-based data collection method. The data was obtained by distributing surveys to managers or owners of garment SMEs in Pekalongan, who had been operating for at least two years and employed a minimum of four workers. These individuals were responsible for directly completing the questionnaires. Responses were measured using an adjective bipolar interval scale, ranging from 1 to 10. The distribution of the questionnaires was carried out both in person by visiting various

markets and garment businesses in Pekalongan, and online through Google Forms, shared via social media platforms and with local garment SME associations.

The total questionnaire distributed to the target respondents was 326, 215 questionnaires were returned, and only 204 questionnaire data were feasible and met the criteria for analysis. The data adequacy test uses a soper calculator, with 4 variables, 14 variable indicators, and a probability of 0.05, this study has a minimum sample adequacy of 138 (Soper, 2024). After going through the outliers test, out of 204 questionnaire data, only 201 data can be used in this study (A. T. Ferdinand & Zuhroh, 2022).

Measurement

The measurements in this study adapted from several indicators of previous research. The competitive advantage variables were adapted from research (W. Wang et al., 2022), namely business development (CA1), meeting customer needs (CA2), opportunity exploration (CA3), company-specific advantages (CA4), brand image (CA5), and market positioning (CA6). The differentiation strategy is adapted from research Keskin et al. (2021), namely product development (DS1), special products (DS2), innovative product design (DS3), product diversification (DS4), and price variation (DS5). Resilience capability is adapted from research (Afraz et al., 2021; Fathi et al., 2021), namely adaptability (RC1), ability to respond to disturbances (RC2), business strategy planning (RC3), staff engagement (RC4), and situational awareness (RC5). Supply chain agility is adapted from research Khalfallah & Lakhali (2021); Z. Zhu & Tang (2023), namely quickly determining relationships with partners for cooperation (SCA1), quickly ending relationships with problematic partners (SCA2), optimizing operational activities (SCA3), collaborating with partners (SCA4), production effectiveness (SCA5), and inventory efficiency (SCA6). The total indicators adapted in this study are 22 indicators.

RESULTS AND DISCUSSION

Construct Validity

Validity is tested using a full model. The indicator of the variable is said to be valid if the estimate value > 0.50 , but if the result is < 0.50 , the result is invalid (Ghozali, 2017).

Table 1. Measurement of variables, indicators, validity and reliability

Variable and indicator scale item	Reference	Std. loading	Critical ratio ≥ 1.96
<i>Competitive advantage (AVE = 0.657; CRI = 0.884)</i>			
Business Development (CA1)	(W. Wang et al., 2022)	0,670	9,003
Meet customer needs (CA2)		0,761	8,346
Brand image (CA5)		0,755	8,689
Positioning market (CA6)		0,715	8,990
<i>Differentiation strategy (AVE = 0.612; CRI = 0.826)</i>			
Product development (DS1)	(Keskin et al., 2021)	0,714	8,000

Innovative product design (DS3)		0,658	8,175
Price variation (DS5)		0,711	7,601
<i>Resilience capability (AVE = 0.558; CRI = 0.790)</i>			
Adaptability (RC1)	(Afraz et al., 2021)	0,668	8,878
Interference response ability (RC2)	(Fathi et al., 2021)	0,701	8,479
Business strategy planning (RC3)		0,601	9,134
<i>Supply chain agility (AVE = 0.545; CRI = 0.827)</i>			
Quickly define relationships with partners for cooperation (SCA1)	(Zhu & Tang, 2023) (Khalfallah & Lakhali, 2021)	0,614	9,148
Optimization of operational activities (SCA3)		0,613	9,154
Collaborative with partners (SCA4)		0,703	8,524
Production effectiveness (SCA5)		0,662	8,864

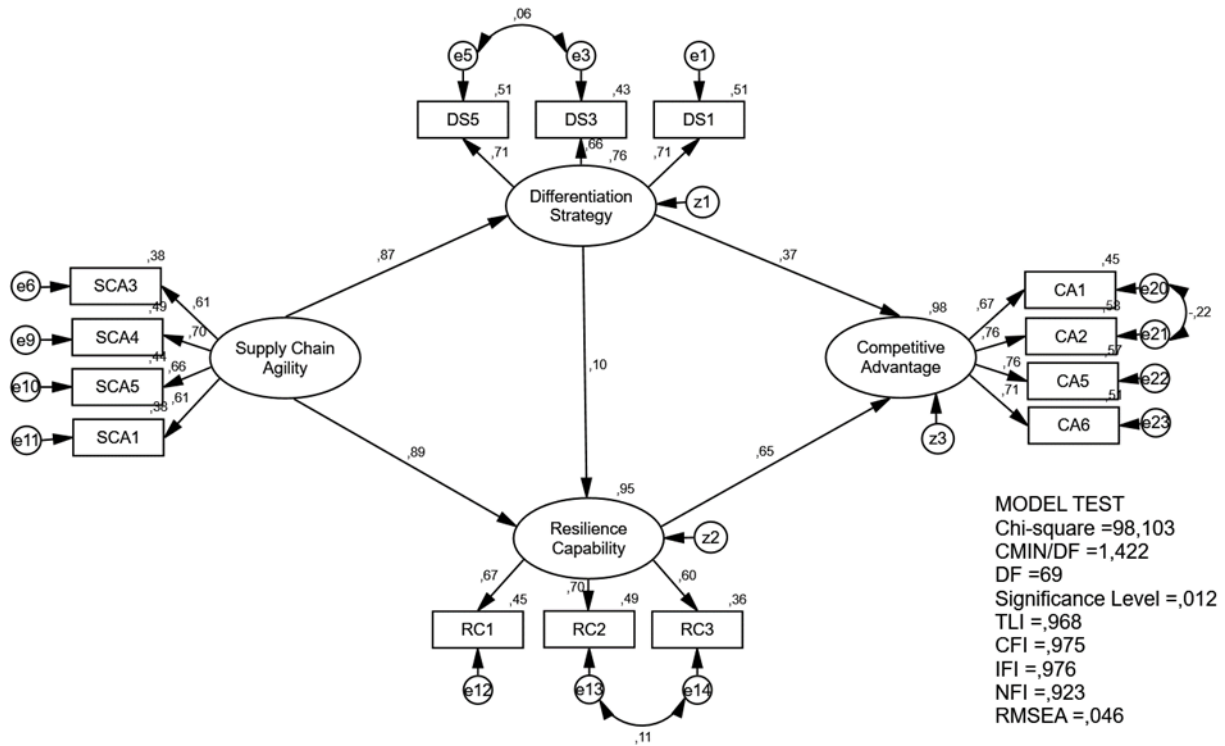
Source: Research data processing results

Based on the table above, it can be seen that out of a total of 22 indicators, only 14 indicators were used in the study because the loading factor value was > 0.50 , so these indicators were used for SEM calculations. Thus, it can be stated that all the indicators that make up the construct have sufficient validity. As for Construct Reliability (CRI) and Variance Extracted (VE), it is calculated by excel. The test results are considered reliable if they have a CRI value of > 0.70 and a VE value of > 0.50 . From the test of 201 respondents, it can be seen that the CRI and VE values of the 4 research variables have higher values than 0.70 and 0.50, respectively. This shows that all research instruments have good reliability and can be used in this study.

Structural Model Analysis

This analysis involves the entire research model after the exogenous and endogenous constructs successfully passed the previous CFA test. The next step in testing the full SEM model is to conduct a Goodness of Fit suitability test and a regression test. Model fit testing is carried out to verify that the model is suitable and meets the requirements to be accepted. Some of the indices used to test the feasibility of the research model include the chi-square, CMIN/DF, TLI, CFI, IFI, NFI, RMSEA tests (Ghozali, 2017). The model value can be considered acceptable fit if the CMIN/DF value ≤ 2.0 or ≤ 0.5 , the TLI value is ≥ 0.90 , the CFI value is close to 1 and 0.9, the NFI value > 0.90 , the RMSEA value ≤ 0.08 Ghozali (2017), and the IFI value is close to 1 J. F. Hair et al. (2019). In this study, the results of the full SEM model test and the images are as follows:

Figure 2. SEM Full Model Results



Source: Research data processing results

Referring to the figure above, it shows that the results of the SEM full model conformity evaluation obtained a chi-square value of 98.103 and a significance level of 0.012. Supported by a CMIN/DF value of 1.422, TLI of 0.968, CFI of 0.975, IFI of 0.975, NFI of 0.923 and RMSEA of 0.046, which means that it meets the cut-off value of SEM assumptions. However, the results showed that the significance of the marginal fit level, however, statistical and non-statistical measures were supported. This shows the overall fit model (A. T. Ferdinand et al., 2024). Thus, it can be said that overall the feasibility test of the model in this study is appropriate and meets the necessary criteria and the model is acceptable.

Table 2. Results of the Direct Influence Hypothesis Test

Hypothesis	Std. estimate	CR	P	Conclusion
H1 Resilience capability → Competitive advantage	,961	,536	,592	Insignificant
H2 Differentiation strategy → Competitive advantage	,381	1,698	,090	Significant
H3 Differentiation strategy → Resilience capability	,072	,352	,725	Insignificant
H4 Supply chain agility → Resilience capability	,776	3,179	,001	Significant

H5	Supply chain agility → Differentiation strategy	,946	7,475	***	Significant
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Source: Research data processing results

Based on the table above, the direct effect of the Resilience Capability (RC) variable on Competitive Advantage (CA) is 0.592. Meanwhile, the Differentiation Strategy (DS) for Resilience Capability (RC) was 0.725. This means that H1 and H3 are not supported because the P value > 0.05 (Ghozali, 2017). Then the Differentiation Strategy (DS) against Competitive Advantage (CA) is 0.090. Supply Chain Agility (SCA) to Resilience Capability (RC) is 0.001. Supply Chain Agility (SCA) against Differentiation Strategy (DS) is < 0.001. Thus, H2 is supported by a significance of ≤ 0.1 (Mann, 2010), while H4, and H5 are supported by a significance level of ≤ 0.01 (Ghozali, 2017).

Mediating Role Analysis

In this study, a simple mediation test involving the variables of intervening resilience capability and differentiation strategy was carried out, as well as a serial mediation test involving the variables of intervening differentiation strategy and resilience capability. The following is a table of the results of the mediation influence test carried out:

Table 3. Mediation Influence Test Results

Hypothesis	Direct Effect		Mediation Effect			P	Ket
	Estimation	Conclusion	Estimate	Lower	Upper		
H6 Supply chain agility → Resilience capability → Competitive Advantage			,746	,010	8,118	,046	Full Mediation
H7 Supply chain agility → Differentiation strategy → Competitive Advantage	-0,099 (C.R = - 0.067)	0,946 Insignificant	,360	-,510	1,591	,219	Rejected
H8 Supply chain agility → Differentiation strategy → Resilience capability → Competitive Advantage			,066	-,331	2,461	,394	Rejected

Source: Research data processing results

The mediation effect test results show that the simple mediation of the relationship between supply chain agility and competitive advantage via resilience capability is significant, with a P-value of 0.046, which is ≤ 0.05. In contrast, the mediation effect through differentiation strategy is not significant, indicated by a P-value of 0.219. Similarly, the serial mediation between supply chain agility and competitive advantage

shows no significant effect, with a P-value of 0.394. Based on these outcomes, hypothesis H6 is supported, while H7 and H8 are not.

Additionally, the direct effect of supply chain agility on competitive advantage, with a value of 0.946, is insignificant. Therefore, it can be inferred that the relationship between the independent variable (supply chain agility) and the dependent variable (competitive advantage) is fully mediated by resilience capability (Baron & Kenny, 1986).

Discussion

The research findings indicate that supply chain agility has an indirect effect on the competitive advantage of garment SMEs in Pekalongan through full mediation by resilience capability. As in the theory of dynamic capabilities which underlines the importance of organizational ability to participate in changes in the business environment (D. J. Teece, 2007). The results also support previous studies showing that resilience capability mediates the relationship between supply chain agility and competitive advantage (Afraz et al., 2021; X. Zhu & Wu, 2022).

Moreover, the research highlights that resilience capability, as a part of adaptive capability, plays a more crucial role than previously identified in the literature (Chen, 2019). This study offers a new perspective by showing that SMEs operating in dynamic business environments require a high level of resilience capability to achieve competitive advantage.

CONCLUSION

The results of this research indicate that supply chain agility does not directly affect the competitive advantage of convection SMEs in Pekalongan. However, when mediated by resilience capability, it has a significant effect on competitive advantage, suggesting that the relationship between supply chain agility and competitive advantage is entirely mediated. Consequently, the findings suggest that managers and owners of convection SMEs in Pekalongan can bolster their competitive advantage by focusing on enhancing their supply chain agility. This can be achieved by quickly establishing partnerships (SCA1), optimizing operational processes (SCA3), collaborating effectively with partners (SCA4), and increasing production efficiency (SCA5). Simultaneously, it is crucial to strengthen resilience capabilities, such as enhancing adaptability (RC1), improving the ability to respond to disruptions (RC2), and developing better business strategies (RC3).

Competitive advantage can also be achieved through differentiation strategies. The results of this study indicate that the differentiation strategy has a significant direct impact on the competitive advantage of convection SMEs in Pekalongan. Therefore, business owners can enhance their competitive advantage by applying differentiation strategies, such as product development (DS1), creating innovative product designs (DS3), and offering diverse pricing options (DS5). These actions have been empirically proven to have a strong influence on the competitive advantage of convection SMEs in Pekalongan.

Limitation and Suggestions

In this study, there are still several limitations that are expected to be input for future research so that it can be improved and perfected. First, the results of the goodness of fit full SEM model test still produce marginal values, namely at the significance of the level and chi-square in the SEM model is still higher than the X2 table. Second, the research construct is limited to using one question for one indicator, not using dimensions that may be able to add to the diversity of questions for each indicator. This results in the selection process of modeling indicators becoming sensitive. Therefore, future research is expected to add dimensions to each indicator, so that one indicator can consist of several questions, so that it is easier and reduces the sensitivity of indicator selection and gets an extrated variance value that is not sensitive. Third, this study has a sample coverage that is only limited to convection SMEs in the Pekalongan area. So the results do not necessarily represent to increase competitive advantage in other sectors. Therefore, further research can replicate for a wider sample coverage.

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