Gaining Supply Chain Resilience and Performance Sustainability through Supply Chain Agility in Furniture SMEs in Yogyakarta

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A R T I C L E I N F O

A B S T R A C T

The COVID-19 pandemic has disrupted many activities throughout the supply chain, from supplying unrefined materials to a product being consumed by consumers. More than five million companies have been undermined by the COVID-19 pandemic, several companies have also temporarily closed stores, cancelled orders, and suspended production. Therefore, this study aims to evaluate and examine the role of supply chain agility on supply chain resilience and supply chain performance sustainability. This study uses a quantitative method with the Smart PLS version 3.3.3 analysis tool and also involves 54 furniture SMEs in the Special Region of Yogyakarta as respondents. The results of this study find and prove that supply chain agility has a positive and significant effect on supply chain resilience and supply chain performance sustainability. The more agile furniture SMEs in managing the supply chain, the stronger the sustainability of future performance in the midst of a business environment full of uncertainty. This shows that supply chain agility owned by furniture SMEs has an important role in supply chain resilience and supply chain performance sustainability.

1. INTRODUCTION

At the beginning of 2020, the World Health Organization (WHO) declared Coronavirus Disease-2019 or COVID-19, detected since late 2019 in Wuhan (Li et al., 2021; Liu et al., 2021), as a health emergency worldwide (Sinha et al., 2020). This fairly rapid spread then managed to spread throughout the world (Chu et al., 2020) including Indonesia (Zaid, 2021) to have a major impact on the business activities in Indonesia (Pratondo & Zaid, 2021). The pandemic is exposing unexpected and unprecedented vulnerabilities in supply chains (Ivanov & Dolgui, 2021). It is estimated that more than five million companies have been undermined by the COVID-19 pandemic and 450 million people have experienced reduced income or even lost their jobs due to this outbreak (Kippenberg, 2020). The COVID-19 pandemic is an unprecedented defiance, mainly for Small and Medium Enterprises (SMEs) in Indonesia, especially in Yogyakarta Special Region (DIY). The reason the researchers chose the location in Yogyakarta is that Yogyakarta is one of the provinces with the highest COVID-19 cases in Indonesia (Erawan et al., 2021), so this has an impact on various industries and businesses in Yogyakarta. SMEs furniture sector has been sorely influenced in terms of economics and supply chain interferences during the COVID-19 pandemic (Ratnasingam et al., 2020). Considering that the furniture industry is also known as one of the major residue-producing industries (Aguilar et al., 2017). The furniture industry needs to adopt appropriate supply chain strategies, namely supply chain agility, supply chain resilience, as well as supply chain performance sustainability.

Supply chain resilience may be interpreted as the supply chain's ability to evolve a level of response, readiness, and recovery capability to administer risks and disruptions in the supply chain and revert to its original or even preferable state after the disruption (Chowdhury et al., 2019). In a volatile business environment, companies need the resilience of their supply chains to be prepared to detect a change, deal with change and respond to change, thereby providing a competitive advantage. Indeed, the issue of supply chain resilience has not been researched and investigated yet intensively but is professed as a very important topic after the spread of the COVID-19 pandemic (Choi et al., 2020; Haren & Simchi-Levi, 2020; Ivanov, 2020). The concepts of supply chain agility and supply chain resilience have emerged as key factor attributes of most global supply chains (Gligor et al., 2015; Hohenstein et al., 2015). Agility is regarded as either fundamental characteristic required for a supply chain to withstand in today's volatile market

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(Braunscheidel & Suresh, 2009). In the existing literature, the construct of agility has been a prominent concern for supply chain managers (Dubey et al., 2018). Several previous studies have also shown that there is a positive influence of supply chain agility on the sustainability of supply chain performance (Aslam et al., 2020; Naimi et al., 2020; Wieland & Wallenburg, 2013).

Supply chain performance sustainability has become an interesting topic in both qualitative and quantitative research (Acquaye et al., 2017). Sustainable supply chain research concentrates on a "triple-bottom-line" point of view, with the economy and the environment playing major actors (Hallinger, 2020) and social concerns gaining increasing attention (Nath & Agrawal, 2020; Walker et al., 2014). This study seeks to develop a conceptual framework to improve the sustainability of supply chain performance to survive during and after the COVID-19 pandemic. Given the critical issues of supply chain sustainability that include economic, environmental, and social issues, this is forcing SMEs to rethink and redesign their supply chain networks and manage their relationships with suppliers and customers (Ni & Sun, 2018). Sustainability of supply chain performance is broadly defined as interactions between organizations in the supply chain that provide environmental or social benefits to the supply chain as a whole, or one or more organizations in the supply chain (Taylor & Vachon, 2018).

Supply chain agility and sustainability are serious and crucial elements for the survival and long-term success of an industry (Rehman et al., 2020). In a dynamic business environment, the furniture industry demands supply chain agility be evaluated to support any worrisome decisions in the midst of a pandemic or post-pandemic because agility is an ability that encourages competitiveness to foster sustainability aspects. Several previous studies have also shown the influence of supply chain agility on the sustainability of supply chain performance (Nath & Agrawal, 2020; Perera et al., 2014; Rehman et al., 2020). Predicated on the explanation above, this study has a necessary purpose to examine and review "the role of supply chain agility in influencing the sustainability of supply chain performance and supply chain resilience". In this research model, the hypothesis that will be proposed in this study is that supply chain agility affects positively supply chain resilience (H1), and supply chain agility affects positively supply chain performance sustainability (H2). Furthermore, this research is expected to provide benefits not only on supply chain management theories but also practical benefits that can be used by the furniture industry as a guide in dealing with supply chain disruptions and recovery efforts after the COVID-19 pandemic.

2. METHODS

This research was conducted in a furniture SME located in the Special Region of Yogyakarta. The population in this study were all furniture SMEs in Sleman Regency, Bantul Regency, and Yogyakarta City. The sample in this study is 54 furniture SMEs. The research instrument used as a data collection tool is a questionnaire. From 54 questionnaires that have been distributed, it is found that all questionnaires have been returned and filled out completely. The data that has been collected is then analyzed with an analytical technique in the form of a structural equation model (Structural Equation Modeling-SEM) which is better known as Partial Least Square (PLS) version 3.3.3. The questionnaire used in this study consisted of three variables measured by 10 dimensions. All measure items were adopted from the literature on supply chain agility, supply chain resilience, and supply chain performance sustainability. The dimensions of supply chain agility consist of alertness, accessibility, assertiveness, speed, and flexibility which were adopted from previous research (Gligor et al., 2013). The dimensions of supply chain resilience consist of vulnerabilities and capabilities adopted from previous research (Pettit et al., 2013). Then, the sustainability dimension of supply chain performance consists of economic, environmental, and social dimensions adopted from previous research (Narimissa et al., 2020; Sopadang et al., 2017). All items are evaluated on a five-point Likert scale, from "strongly disagree (1)" to "strongly agree (5)".

3. RESULTS AND DISCUSSIONS

Results

The first step in the analysis method with PLS-SEM is to examine or test the model. The PLS-SEM consists of two models, the measurement model (representing how the measured variable represents the construct) and the structural model (showing how the construct is associated with each other construct) (Hair et al., 2019). Table 1 puts on the outputs of testing the measurement model.

Based on Table 1, shows that all items in each indicator hold a loading factor value of > 0.708. Thus, whole indicators have met the internal consistency reliability testing standards formulated by (Avkiran, 2018; Hair et al., 2019). Furthermore, the outcomes of reliability testing can also be noticed from the value of Cronbach's alpha and composite reliability, general guidelines for assessing Cronbach's alpha, and composite reliability, which is greater than 0.70 (Hair et al., 2019). Based on Table 1, it can be taken into

consideration that the value of Cronbach's alpha and composite reliability is greater than 0.70, thus all variables in this study can be said to be reliable.

Table 1. Measurement Model Test Results

Variable	Loading	α	CR	AVE
Supply Chain Agility (X)		0.849	0.892	0.625
Our SMEs can immediately detect changes, identify opportunities, and sense threats in the business environment.	0.772			
Our SMEs can access the information they need to respond to changes in the business environment.	0.734			
Compared to competitors, our SMEs are more assertive in making decisions regarding supply chain operations.	0.877			
Our SMEs can quickly respond to changes in both opportunities and threats in the business environment.	0.749			
Our SMEs can customize order specifications and speed up delivery times according to customer requests.	0.813			
(Gligor et al., 2013)				
Supply Chain Resilience (Y1)		0.728	0.880	0.786
The COVID-19 pandemic affects the production and sales of our SME products.	0.881			
Our SMEs have excess raw material, equipment and labour capacity to increase production quickly if needed.	0.893			
(Pettit et al., 2013)				
Supply Chain Performance Sustainability (Y2)		0.766	0.865	0.683
Our SME revenue has increased over the last 3 years.	0.753			
Our SMEs can utilize the waste generated from the production process to make a product that has economic value.	0.883			
Our SMEs can meet customer expectations when using our SME products.	0.838			
(Narimissa et al., 2020; Sopadang et al., 2017)				

Validity testing is done by looking at the values of convergent validity and discriminant validity. Convergent validity is noticed from the Average Variance Extracted (AVE) value provided that the AVE value must be greater than 0.5 (Avkiran, 2018; Hair et al., 2019). Based on Table 1, the AVE value generated by all variables is greater than 0.50, so that the measurement model in this study has been declared valid with convergent validity. Meanwhile, for discriminant validity testing, it is presented in Table 2.

Table 2. Discriminant Validity Test Results

	1	2	3
Supply Chain Agility	0.791		
Supply Chain Resilience	0.608	0.877	
Supply Chain Performance Sustainability	0.599	0.524	0.826

The most common criterion used to assess discriminant validity is to look at the Fornell-Lacker Criteria with the provision that the square root of the AVE must be greater or higher than the correlation of the reflective construct with all other constructs (Avkiran, 2018; Hair et al., 2019). Based on Table 2 regarding discriminant validity as seen from the Fornell-Lacker Criteria value, it can be seen that the value of the square root of AVE is greater or higher than the correlation of other constructs. Thus, it can be said that all variables in this study can be declared valid with discriminant validity.

The second step in the analysis method with PLS-SEM is to test the structural model. The structural model is tested by looking at the R-square (R^2), F-square (F^2), and path coefficient values to obtain information on how much the dependent variable is influenced by the independent variable (Hair et al., 2019). Table 3 presents the results of the R-square (R^2) test. Table 4 puts on the results of the F-square (F^2) test, yet Table 5 puts on the results of hypothesis testing.

Table 3. Test Results of R-square (R^2)

Variable	R^2
Supply Chain Resilience	0.369
Supply Chain Performance Sustainability	0.359

The value of R^2 is used to determine and measure the research model, if the resulting R^2 value of 0.75 is said to be strong, 0.50 is said to be moderate, and 0.25 is said to be weak. Referring to Table 3, it can be taken into consideration that the coefficient of determination (R^2) generated in the supply chain resilience variable is 0.369. While the value of the coefficient of determination (R^2) generated in the supply chain performance sustainability variable is 0.359. This means that the prediction accuracy of the research model on the supply chain resilience variable is 36.9% and the supply chain performance sustainability variable of 35.9% is acceptable, but the prediction accuracy level is still weak based on the standards that have been set (Hair et al., 2019). Even though it has a weak prediction, a low R2 value does not always indicate that the impact is small and can be ignored.

Table 4. Test Results of F-square (F^2)

	Supply Chain Agility	Supply Chain Resilience	Supply Chain Performance Sustainability
Supply Chain Agility		0.585	0.560
Supply Chain Resilience			
Supply Chain Performance Sustainability			

The value of F^2 is utilized to measure the importance of the independent variable in explaining the dependent variable. As for determining the magnitude of F^2 the criteria are used if the resulting values are 0.02 (small), 0.15 (medium), 0.35 (large), and less than 0.02 indicating no effect (Hair et al., 2019). Based on Table 4 shows the value of F^2 on the supply chain agility variable to supply chain resilience is 0.585 and the supply chain agility variable on supply chain performance sustainability is 0.560. That is, the influence of the independent variable on the dependent is in the criteria of a large influence.

Table 5. Hypothesis Testing Results

Variable	β	T-Value	P-Value
Supply Chain Agility → Supply Chain Resilience	0.608	3.932	0.000
Supply Chain Agility → Supply Chain Performance Sustainability	0.599	5.356	0.000

The last stage in using PLS-SEM is to test the hypothesis that connects the constructs in this study. Based on Table 5, shows that supply chain agility to supply chain resilience has a positive (β = 608) and significant (0.000) effect. Likewise, supply chain agility on the sustainability of supply chain performance has a positive (β = 599) and significant (0.000) effect. Thus, H_1 and H_2 in this study were declared proven.

Discussion

This research aims to measure and analyze supply chain agility to supply chain resilience and supply chain performance sustainability. This study has differences from previous studies, this study focuses on the dimensions of supply chain agility presented by Gligor et al., (2013), while previous studies only measuring supply chain agility in terms of flexibility, visibility, and speed (Naimi et al., 2020). Given the current COVID-19 pandemic, supply chain resilience and performance sustainability concepts are increasingly interesting to research. This study provides evidence on how the concept of agility as a dynamic capability can be integrated with the concept of resilience and sustainability of supply chain performance. For more details regarding the results of the analysis of the effect among variables, it is explained as follows:

The Effect of Supply Chain Agility on Supply Chain Resilience

Based on hypothesis testing results, the original sample value (β) is 0.608 and the T-Value is 3.932 and the P-value is 0.000 on the effect of supply chain agility on supply chain resilience. That is, there is a positive and significant influence of supply chain agility on supply chain resilience, this provides evidence that the H_1 in this study is accepted. The results of this study are also supported by previous research found that supply chain agility has a positive effect on supply chain resilience (Aslam et al., 2020; Naimi et al., 2020; Wieland & Wallenburg, 2013). The results of this study provide evidence that in the volatile business

environment caused by COVID-19, furniture SMEs need the resilience of their supply chains to be prepared to detect the change, deal with change, and respond to changes that occur. In the business environment, responding to changes in both opportunities and threats quickly can be achieved with supply chain agility. Supply chain agility is very helpful in maintaining supply chain resilience in the midst of a pandemic like today, meaning that the furniture industry can rely on supply chain agility to be able to maintain its supply chain amid the COVID-19 pandemic. Furniture SMEs that can achieve supply chain resilience can manage risks and disruptions in the supply chain and return to their original or even better state after the disruption (Chowdhury et al., 2019). Supply chain resilience can anticipate and reduce the negative effects of disruptive events while accelerating recovery to a normal state (Ruiz-Benitez et al., 2019).

The Effect of Supply Chain Agility on the Supply Chain Performance Sustainability

Based on hypothesis testing results, the original sample value (β) is 0.599 and the T-Value is 5.356 and the P-value is 0.000 on the influence of supply chain agility on the sustainability of supply chain performance. That is, there is a positive and significant influence of supply chain agility on the sustainability of supply chain performance, this provides evidence that H_2 in this study is accepted. The results of this study are also supported by previous research found that supply chain agility has a positive effect on the sustainability of the supply chain performance (Nath & Agrawal, 2020; Perera et al., 2014; Rehman et al., 2020). The results of this study found that furniture SMEs that can quickly run their operational processes will be superior to their competitors, and this can have an impact on the sustainability of supply chain performance in the future. Supply chain agility in the form of the capability to detect alterations, opportunities, and threats quickly, the faculty to access pertinent data, the ability to make decisive decisions, the Competence in implementing decisions quickly, and the aptitude to change the range of strategies and operations to the extent needed. Encourage the sustainability of supply chain performance. Supply chain agility plays a very significant role in attaining supply chain performance (Chan et al., 2016). This reflects that the more agile furniture SMEs in implementing supply chain agility indicators can encourage or increase operational activities and can further improve the performance of these SMEs. Supply chain agility is needed today where sustainability determines the competitiveness of SMEs. The sustainability of the performance of the furniture industry in the Special Region of Yogyakarta depends on the agility of its SME supply chain.

4. CONCLUSION

Predicated on the results and discussion of the research above, the conclusion in this study is that supply chain agility has a positive and significant effect on supply chain resilience. The more agile the furniture SMEs are in managing the supply chain, the higher the supply chain resilience in dealing with disruptions and challenges caused by the COVID-19 pandemic. Second, supply chain agility has a positive and significant impact on the sustainability of supply chain performance. The more agile furniture SMEs in managing the supply chain, the stronger the sustainability of future performance in the midst of a business environment full of uncertainty. This shows that supply chain agility owned by furniture SMEs has an important role in supply chain resilience and supply chain performance sustainability. Researchers also realize that this study still has limitations and shortcomings, such as the small number of samples (54 SMEs) in Sleman Regency, Bantul Regency, and Yogyakarta City so that future research is expected to use a larger sample and wider coverage. Several other variables may also need to be investigated in addition to the variables in this study to gain additional insights and new perspectives on supply chain management, especially in the furniture industry. Researchers also believe that there are still many variables and approaches that can be used in developing supply chains, especially in the furniture industry to survive in the midst of the COVID-19 crisis.

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