



The Relationships Between Supply Chain Resilience and Firm Performance: The Mediation Role of Digital Innovation

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Abstract. This study aims to provide an explanation of the relationship between supply chain resilience and firm performance as well as the mediating role of digital innovation in West Java, Indonesia's food and beverage manufacturing. The relationship between supply chain resilience and firm performance is found to be mediated by digital innovation, according to the author. The research thus adds to the author's theoretical knowledge of the relationship between digital innovation and supply chain resilience and firm performance. This conceptual paper presents a review of the literature research on firm performance, supply chain resilience, dynamic capability, digital capability, and digital innovation. Proposition followed by theoretical analysis that needs more practical testing. This conceptual study uses digital innovation as a mediating variable since it is a dynamic enterprise capability that can explain the connection between supply chain resilience and firm performance. New insights into the relationship between supply chain resilience and firm performance are provided in this conceptual model article. For this conceptual paper, more study should be done to develop the theories of supply chain resilience, digital innovation, and dynamic capability, especially those variables that have a direct or indirect impact on firm performance. This given study will empirically test this proposition in order to support the proposition. The author develops a new conceptual model to explain a hitherto unresearched relationship between supply chain resilience and firm performance on the basis of reviews of the literature in empirical research and conceptual papers. This conceptual model serves as a roadmap for additional theoretical and empirical investigation.

Keywords: Supply Chain Resilience, Dynamic Capability Theory, Digital Capability, Digital Innovation, Firm Performance.

1 Introduction

In this VUCA (Volatile, Uncertainty, Complexity, and Ambiguity) environment, everything about being a human is disrupted, including business activity, interpersonal interactions, and even private spaces [1]. This circumstance encourages skill improvement for individuals who interact with the new one. To deploy the new resources, this expertise is a requirement for digital technology. Due to technology disruption, corporate interactions have shifted from traditional face-to-face interactions to virtual interactions. The pandemic COVID-19's additional disruption has a negative impact on business performance throughout the world, including Indonesian manufacturing, particularly in West Java.

Internal and external sources of disruption can both have an impact on an organization's performance, particularly in the West Java region of Indonesia where food and beverage manufacturing is practiced. Growth in sales and profit based on BPS (Badan Pusat Statistik) data declines from an average of 7% per year before the disruption to 2% per year in 2020. According to [2] estimate that the impact of supply chain disruption on operating income, return on sales, and return on asset will be, respectively, -26.5%, -12.70%, and -16.11%, while empirical data indicates that sales will decrease by up to 21% across all branches. This indicator shows the real-world performance of the industry in an acute situation. In order to survive, businesses must lay off workers and decrease costs and production.

One of an organization's internal resources' supply chains has been severely damaged by disruption. When hit by disruption from an internal or external factor, some activities in one of the member supply chains collapsed and had an adverse effect on the performance of the company. The function of the supply chain is to manage the flow of materials and information from upstream to downstream and ensure that all those things flow smoothly. For instance, if a supply vendor's issues result in a shortage of raw materials in inventory, the effect ripples down the supply chain to the final customer. In order for the supply chain to become resilient, cooperation among its participants is required to reduce problems caused by digital disruption.

One of an organization's dynamic capabilities to handle supply chain disruptions is supply chain resilience. Supply chain resilience is a new and relatively uncharted topic of management research, but it is one that is now on the rise, according to Christopher and Peck [3]. Definition of supply chain resilience is ability supply chain adapt to any disruption and recovery quickly and resilience can be achieve if its original situation is sustained or of new stable situation is achieved [4]. According to Ponomarov and Holcomb [5] definition of supply chain resilience is the adaptive capability of the supply chain to prepare for unexpected events, respond to disruptions, and recover from them by maintaining continuity of operations at the desired level of connectedness and control over structure and function. Building resilience in the supply chain requires a flexible and redundant approach [6].

According to Ali and Gölgeci [7] empirical research on the relationship between supply chain resilience and company performance is still lacking. To present a notion as a mediator to explain the relationship between the supply chain and company performance, an exploratory model is required. According to Ali and Gölgeci [7] there are

variables as mediators such as product innovativeness, innovation magnitude, visibility, agility, integration, and supply chain re-engineering. Supply chain ambidexterity is also cited in literature research [8]. Another point that has to be addressed is how supply chain resilience is being used recently in the context of digital technology to mitigate or overcome vulnerability.

The role of supply chain resilience is very important in improving company performance because company competition has shifted from manufacturing to manufacturing to competition at the supply chain level [9]. However, the role of the supply chain alone is not sufficient in dealing with the disruption that is increasingly sweeping the industrial world, forcing the need to explore the resources owned by companies in the field of digital technology, in this case, digital capabilities. The interaction of digital capabilities and supply chain resilience will enhance a company's ability to enhance enterprise innovation [10]. Innovation by utilizing digital technology creates a digital innovation that can bridge the incomplete relationship between supply chain resilience and company performance.

The purpose of this research is to find novelty from previous studies related to supply chain resilience and company performance. This novelty is obtained from the inconsistency of research results on the influence of supply chain resilience in the form of gap research. From this research, researchers try to fill in the mediating variable as a novelty variable that bridges the relationship between supply chain resilience and company performance which is still not well exploited.

1.1 Supply Chain Resilience

Supply Chain Resilience is the capacity of a supply chain to adjust to any internal and external interruption, bounce back from disruption, and attain a stable [5] Resilience itself adapts from other disciplines, such as ecology, social science, and physics. Virtual interaction has replaced traditional interaction in every area of human existence, business, and social interaction due to digital technology. The supply chain was disrupted from upstream to downstream by the pandemic, which is still going on today. It has a significant impact on the company's profitability and sales growth, and ultimately, it will cause the company to fail.

There are various definitions of supply chain resilience presented by several researchers. Supply chain resilience is the ability of the supply chain to adapt to disruptions that occur so that it returns to its original position and even exceeds previous performance [3], [6]. While the definition of supply chain resilience is the ability of the supply chain to face uncertainty, response to disruption and recovery by maintaining sustainable operations [5].

Disruption today makes supply chain activities more vulnerable, and to resist disruption, businesses have strategies to make their supply chains more resilient [6]. By lowering vulnerability throughout the supply chain, supply chain resilience, one of the resources enterprises own and a component of the dynamic capability view [11], can lessen disruption. Disruption mitigation that occurs can increase the company's ability to maintain even more growth that occurs.

Supply chain resilient study in many countries show growth significantly according to much research literature which has been explored but still rare in South East Asian countries such as in Indonesia if compared with other countries. It is interesting to explore the relationship of resilience of supply to firm performance in manufacturing in Indonesia, especially for the food and beverage industry. According to [12], the growth of study resilience in many countries with 293 articles and only 22 papers focus on agro-food industry and the countries contributing to this research are almost all from the USA, India, China, Iran and Australia.

In addition, the indicators used in supply chain resilience research are still diverse, as stated by [13] and the results are still very diverse (inconsistency) the effect of supply chain resilience on company performance [7]. So to increase the company's ability to supply chain resilience alone is not enough. Faster and more unpredictable rates of disruption. One of the disruptions that is happening right now is the disruption of digital technology that can change social and business activities. Thus, forcing companies to adapt by developing their digital capabilities by carrying out digital transformation of their business processes.

1.2 Digital Capability

Digital capability is related to the company's ability to broadly combine digital assets and business resources and enhance digital networks to innovate products, services and processes to achieve organizational learning and customer value [14]. These digital capabilities are related to capture capability, connect capability and analytical capability where capture capability can create data visibility and create valuable data, while connect capability relates to how the visibility and valuable data can be connected to all members in the supply chain and analytical capability facilitates and information processing to provide a deep understanding of the available data [15].

Digital technology applications can strengthen the ability of Supply Chain Resilience in dealing with risks that occur so as to improve Company Performance [16]. By adapting digital technology, companies are able to coordinate in the supply chain faster, more accurately in resolving disruptions that occur in one of the supply chains [17].

One of the barriers to non-optimum Resilience on Company Performance is the lack of good IT integration between points in the supply chain [18]. On the other hand, for more optimal performance, better information sharing and data visibility is needed and this requires facilities or media that bridge coordination between members in the supply chain to get better through the application of digital technology. By digitizing supply chain business processes (Supply Chain Resilience) it can facilitate communication and coordination which in turn can improve Company Performance.

1.3 Digital Innovation

Digital Innovation is a company's ability to create products, services or solutions that use digital technology [19], [20]. How do companies offer their products and services digitally with various platforms that provide new experiences for customers and provide value for both the company and the customers themselves. Online interactions

between purchasing departments, distributors and customers can overcome disturbances that occur at the upstream level, manufacturing focal and downstream levels in the supply chain. Innovation is related to the interaction of resources between the knowledge possessed by the company, products and processes and external factors of the company and market changes

In the supply chain context, interactions are carried out at several levels, namely upstream, focal and downstream. The form is carried out through synergy and collaboration and even integration at every level. And media technology is a form of mediation that allows collaboration and integration processes to occur. This technology makes it very easy to create a space for collaboration without the need to be limited by place and time [17].

Meanwhile, on the other hand, the impact of VUCA can cause a company's loss of competitiveness due to the inability of the supply chain to cope with and detect changes, while one way to mitigate this impact is through visibility data [1]. Digital Innovation ensures that the data used is the same and valid or better known as SST (Source Single of Truth). With data originating from the same and valid data sources, it can be expected that supply chain performance will be more optimal [19], [21], [22].

1.4 Firm Performance

Competitive advantage is a strength that must be maintained and developed continuously in line with the changing demands from customers which continue to develop dynamically and the demands of increasingly fierce competition. The size of the company's competitive advantage can be seen from the company's performance so far. It can be seen how the indicators of sales growth, market share and return on investment are increasing from time to time. These indicators are used by several studies such as [23], [24].

2 Method

The method used in this research is SLR (Systematic Literature Review) for articles in various Scopus indexed journals. The search was carried out using the keywords supply chain resilience, digital technology and company performance. From the search results with the above keywords, there were 35 selected articles related to the topic of supply chain resilience.

The SLR method is one of the methods used in research that aims to find research gaps in previous studies. This is to seek novelty from research related to current supply chain resilience. This method was carried out with various considerations even though there were several similar studies with other, more sophisticated methods. While the stages in the research adopted from [13] methodology of current study explain in Fig. 1.

The Literature Review is the first stage which is carried out by looking for themes related to supply chain resilience, digital capabilities, digital innovation and company performance in various Scopus indexed journals. The articles are then collected through

a data collection stage which is then refined to the data collected based on the articles that are in accordance with supply chain resilience studies in the food and beverage industry.

The analysis is carried out on the data that has been collected as a basis for developing a framework for the relationship between supply chain resilience and company performance as well as creating gap research that can be used as a reference and empirically proven in subsequent research on the proportions built on the conceptual model of this research.

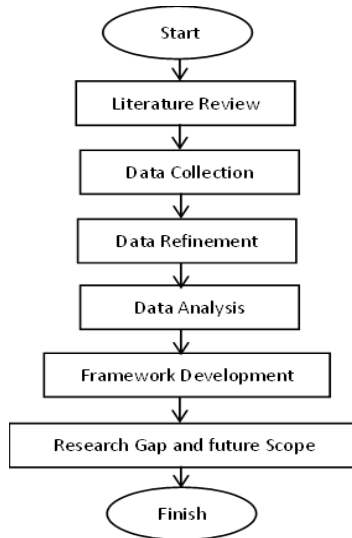


Fig. 1. Methodology of current study

3 Result and Discussion

From the results of a literature review of 35 articles related to the relationship between supply chain resilience and company performance, it turns out that there are inconsistencies in the research results. Not all studies state that supply chain resilience has a significant effect on company performance. there are several studies conducted by [25], [26]. This shows that there is still no clarity about the relationship mentioned above and there needs to be another variable that can explain the relationship between supply chain resilience and company performance.

Previous studies have illustrated how the role of resilience in company performance can be seen from different indicators as presented by [13]. However, from the indicators, it can be seen how digital technology plays a role in supply chain resilience so that it is more adaptive to changes in the external and internal environment and digital technology is one of the resources owned by companies in dealing with increasingly rapid changes.

Supply chain resilience studies have increased significantly in the last decade and research with this theme is still relatively new in current academic studies. The application of supply chain resilience research in the food and beverage industry in Indonesia is still relatively small. Meanwhile, the other side of the world is currently experiencing a shift in competition from the inter-manufacturing level to competition at the supply chain level [9]. So that reliable supply chain capabilities can increase the company's ability to increase excellence and competitiveness. Supply chain resilience studies from various journals can be seen in the following Table 1 as follow:

Table 1. Journal-wise distribution of the papers

NO	JOURNAL	Number of Articles
1	Journal of Industrial Engineering International	1
2	The International Journal of Logistics Management	4
3	British Food Journal	1
4	MIT Sloan Management Review	2
5	Management of Environmental Quality: An International Journal	1
6	Production Planning and Control	1
7	Sustainability 2020	4
8	International Journal of Physical Distribution & Logistics Management	1
9	International Conference on Industrial and System Engineering	1
10	International Journal of Production Economics	3
11	Transportation Research	1
12	Technology InnovationManagement Review	1
13	Management and Production Engineering Review	1
14	Logistics	1
15	Trends in Food Science & Technology	1
16	Management Research Review	1
17	Big Data Cogn. Comput	1
18	International Journal of Production Economics 218	1
19	Environment Systems and Decisions	1
20	International Journal of Physical	1
21	Int. J Sup. Chain. Mgt	1
22	Management Research Review	1
23	International Journal of Disaster Resilience in the Built Environment	1
24	Int. J. Supply Chain and Operations Resilience	1
25	Systems 2022	1
26	Supply Chain Management: An International Journal	1
	TOTAL	35

Articles taken from various Scopus indexed journals are collected as shown in Table 1 From the Table 1, studies on supply chain resilience mostly use journals from the international journal of Logistic Management and Sustainability. The number of samples taken from this study were 50 journals which were then selected to become 35 journals according to the topic of research discussion.

Of the 35 articles cited, the importance of supply chain resilience to firm performance stands out since it may keep a company performing well even in the face of disruptions. Due to the very dynamic nature of the contemporary business environment,

these studies, however, have not been sufficient to demonstrate the impact of supply chain resilience on corporate performance. The use of digital technology in the supply chain has not been taken into account in this research, but one of the external variables that are changing so quickly is the technological disruption that affects all spheres of social life, including the business sector.

In line with research conducted by [8] which states that there needs to be a variable mediating the effect of supply chain resilience on company performance through supply chain ambidexterity. The ambidexterity strategy is a strategy carried out by the company in optimizing internal resources in a balanced way through exploitation and exploration mechanisms. Exploitation is a form of the company's ability to explore existing resources in the face of external environmental uncertainties. While exploration leads to penetration of new markets through increased resources that can create new markets for companies through the use of digital technology in the market.

Disruption of digital technology in all aspects of social life has an impact on the study of supply chain resilience. Digital technology has a very important role for company performance as is done by [19], [15] so companies must do their best to carry out digital transformation as quickly as possible. Digital technology enables companies to improve business operations more quickly and efficiently through digital innovation as [10] which states that the interaction between supply chain resilience and digital technology will give birth to digital innovations more quickly.

Innovation is a necessity that companies must make in order to win in increasingly fierce competition. Innovation itself has now shifted to innovation that has more value for customers by utilizing digital technology [20]. So that supply chain resilience is a supply chain that has the ability to be adaptive to dynamic changes that will be able to encourage increased digital innovation in the company's business chain. so that researchers create a model concept that can strengthen the relationship of supply chain resilience to company performance. The concept of the model is described in Fig. 2.

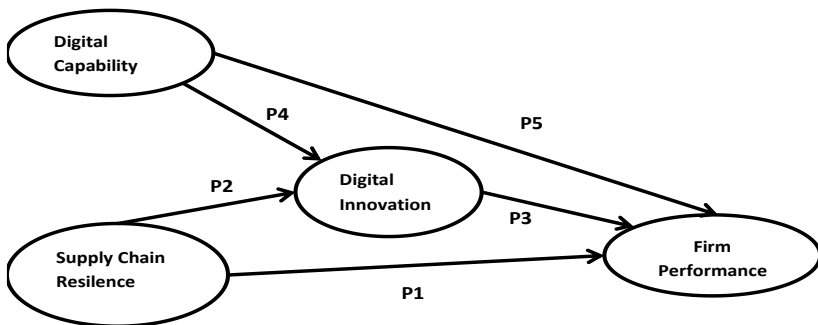


Fig. 2. Conceptual models

From Fig 2, the researcher created a conceptual model for the relationship between supply chain resilience and company performance. This model is built on the results of previous research which are still inconsistent by including a mediating variable as a novelty variable, namely Digital Innovation. Digital innovation as a mediating variable

because today's technological developments are getting faster and more dynamic. Previous studies have not fully explored the role of digital technology in the supply chain.

The current condition is in the VUCA situation where the development of external factors is very dynamic. These conditions can significantly disrupt company performance, causing many companies to go out of business due to the disruption of the Covid pandemic. Meanwhile, at this time also technological developments can lead to two different blades. On the one hand, it can improve performance capabilities, while on the other hand, it can cause the company not to move forward due to the company's inability to anticipate these technological developments.

So that now and in the future the company's ability to exploit and develop internal resources in the field of technology is very crucial. Companies that develop their digital capabilities that can survive in the midst of very fierce competition and can affect the agility of manufacturing [27]. Thus, the role of digital technology that interacts with supply chain resilience can increase the ability to carry out digital innovation in the business chain.

The conceptual model built consists of four variables consisting of supply chain resilience, digital capabilities, digital innovation and company performance. Each variable influences the variable by making 5 propositions consisting of P1, P2, P3, P4 and P5. A proposition is a form of hypothesis that has not been tested empirically. So that further research can empirically prove the propositions built in this conceptual model.

From this model, the role of digital capabilities and supply chain resilience is vital in improving company performance. However, the relationship between the variables mentioned above is not sufficient, so a mediating variable is needed that bridges digital innovation. The conceptual model is a form of proportion of these variables to be proven empirically in subsequent studies.

The limitations of this study are related to the number of samples taken from Scopus indexed journals which are still very limited which allows the research results to still have bias. So that it becomes a point for further researchers related to sample limits. Then related to the methodology carried out still uses the SLR method which is very simple and will be different if other studies use more sophisticated methods.

4 Conclusion

The supply chain resilience study is a relatively new study in the world of academic research, especially in Indonesia, especially the study of supply chain resilience in the food and beverage industry. Based on the literature review, it was found that supply chain resilience had not been sufficient to prove a significant effect on company performance. The impact of technological disruption forces companies to try as hard as possible in carrying out digital transformation in their business operations. Of course, supply chain resilience is able to adapt to increasingly dynamic environmental changes requiring other resources in driving company performance in today's digital era. Digital technology can be explored through the company's digital capabilities which will create digital innovations that will bring the company to adapt more quickly and mitigate the disruptions that occur.

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