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THE EFFECT OF BIG DATA ANALYTICAL CAPABILITIES, SUPPLY CHAIN INTEGRATION AND SUPPLY CHAIN RESILIENCE ON SUPPLY CHAIN PERFORMANCE

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ABSTRACT

This study aims to examine the effect of big data analytic capabilities, supply chain integration and supply chain resilience on supply chain performance at restaurants in East Jakarta. The sample in this study was 140 respondents using a purposive sampling technique. The data analysis model used is the Structural Equation Model (SEM). The results show that big data analytical capabilities is positively related to supply chain performance, which has a substantial influence on the supply chain performance. The study expands the understanding of supply chain integration is positively related to supply chain performance. Furthermore, supply chain resilience is positively related to supply chain performance. By increasing the ability of big data analytics, the opportunity for restaurants to maintain a more efficient supply chain becomes more likely to succeed. An increase in big data analytical skills must also be possessed by each employee so that they can be aligned with the theory or system implemented by the restaurant. The indicators in this study are adjusted for restaurants in East Jakarta.

KEYWORDS - Big Data Analytical Capabilities, Supply Chain Integration, Supply Chain Performance, Supply Chain Resilience

1. INTRODUCTION

During the Covid-19 pandemic that hit the restaurant industry, it experienced disruptions such as raw material supply, product demand, labour shortages, and business uncertainty. Several restrictions on social activities have been the main factor in the industry's decline, even though many employers are trying to compensate for the decline in income by reducing online sales. Now, after the number of Covid-19 cases has begun to decline and the government has implemented the relaxation of restrictions on community activities, the sense of optimism about the rise of the restaurant industry has again flared up. The restaurant business for dine-in, aka eating at a place, is also believed to have good prospects. Business actors can also run offline businesses, which again have great potential with an online system built to adapt to the pandemic's times and impact. (Source: Indonesian media, 2022). Intense business competition both in the DKI Jakarta City area and outside the DKI Jakarta City area makes it easy to do business in this strategic city. Therefore, restaurants in the city of DKI Jakarta must improve their business competitiveness by implementing supply chain management.

Research (Rezaei et al., 2022) stated that analytical skills as a combination of tools, techniques, and processes are understood to enable organisations to process, organise, visualise, and analyse data so that managers can make good decisions. In addition, information systems can be one of the factors that can reduce the adverse effects of disruptions in the supply chain. Supply chain resilience can be understood as the ability of a company to adapt to a complex external environment quickly; then, when a supply chain experiences a risk, the company can quickly recover and gain practical experience from it (Yao & Fabbe-Costes, 2018). According to (Wong et al., 2020), when attacked by disruptions, supply chain resilience is arguably a critical approach to enable quick recovery and ensure continuity of supply of materials and delivery of products and services, reducing the negative impact of disruptions and increasing customer satisfaction and value. Without a continuous supply of materials, a prerequisite for production and customer service, supply chain operations cannot be maintained, and demand cannot be met. Therefore, the more a company is equipped with data analysis capabilities, supply chain integration, and supply chain resilience, the more resilient its supply will be.

Research conducted by (Fernando et al., 2018) showed that data analytics capabilities could help improve supply chain function and performance. Data analytics capabilities can improve supply chain efficiency by increasing operational efficiency, reducing costs and increasing profitability. Supply chain integration is the degree to which a company intentionally interconnects with its suppliers and customers, plus operates managerial processes in a coordinated manner. The goal is to achieve an astute flow of goods and facilities, data, cash and alternatives to provide the highest value to consumers at a high speed and a small budget (Aunyawong et al., 2020).

This research will be conducted on restaurants in the city of East Jakarta because, in this area, the development of restaurants has experienced a very significant increase, so it is a city that is strong in free competition and is also included in a city where people have creative thinking in doing a business. This is interesting as a basis for research and to find out whether restaurants in the city of East Jakarta have implemented the right data analytics capabilities and supply chain integration to create supply chain resilience to improve supply chain performance.

2. LITERATURE REVIEWS

Big Data Analytical Capability

BDAC is an organisational facility with tools, techniques, and processes that enable companies to process, organise, visualise, and analyse data, resulting in insights that enable data-based operational planning, decision-making, and execution (Srinivasan & Swink, 2018). Kabil (2021) defines BDAC as a series of systematic steps taken by companies or prominent data analysts to examine large sets of data sets characterised by diversity and large size to gain new information or knowledge that enables companies to understand better-hidden patterns and relationships that can help them improve decision making. Another definition put forward (Wamba et al., 2020) states BDAC as an overall process that involves collecting, analysing, using, and interpreting data for various functional divisions to gain actionable insights, create business value, and build competitive advantage.

Supply Chain Integration

SCI is defined as strategic and operational collaboration internally and externally to manage organisational processes to maximise the value provided to customers (Gharaei & Almehdawe, 2021). According to (Aunyawong et al., 2020), SCI is the extent to which manufacturing companies intentionally interact with their suppliers and customers and operate managerial processes in a coordinated manner. The goal is to achieve the astute flow of goods and services, data, cash and alternatives to provide the highest value to consumers at high speed and on a small budget. (Sinnandavar et al., 2018) States that SCI is interaction with suppliers and customers, connecting companies with the external environment, enabling the creation of shared value through shorter processing times, improving quality, and reducing costs.

Supply Chain Resilience

SCRES can be described as the ability of a supply chain to return to its original state or move to a new or even more desirable state after experiencing a disturbance. In other words, the supply chain's ability to prepare for unforeseen events, respond to disruptions, recover from them by maintaining continuity of operations at the desired level of continuity, and monitoring its structure and performance determines SCRES, as stated by (Rezaei et al., 2022). Supply chain resilience is defined in the extant supply chain management literature (Mukucha & Chari, 2022) as the adaptive capability of a supply chain to prepare for unexpected events, respond to disruptions, and recover from them by maintaining the continuity of operations at a desired level of connectedness and control over the structure. And functions. This definition suggests that a resilient supply chain's first line of defence is against disruption. (Wieland & Durach, 2021) Proposes an interpretation of SC as a socio-ecological system. While it is true that it does not identify with ecological interpretation, it does take into account the factors involved in SCRES. It maintains the notion that after a disturbance, the SC system should not return to its previous state or stable equilibrium. In particular, it is a function of the social factors that guide the SC system towards transformation after disturbance (Walker, 2020).

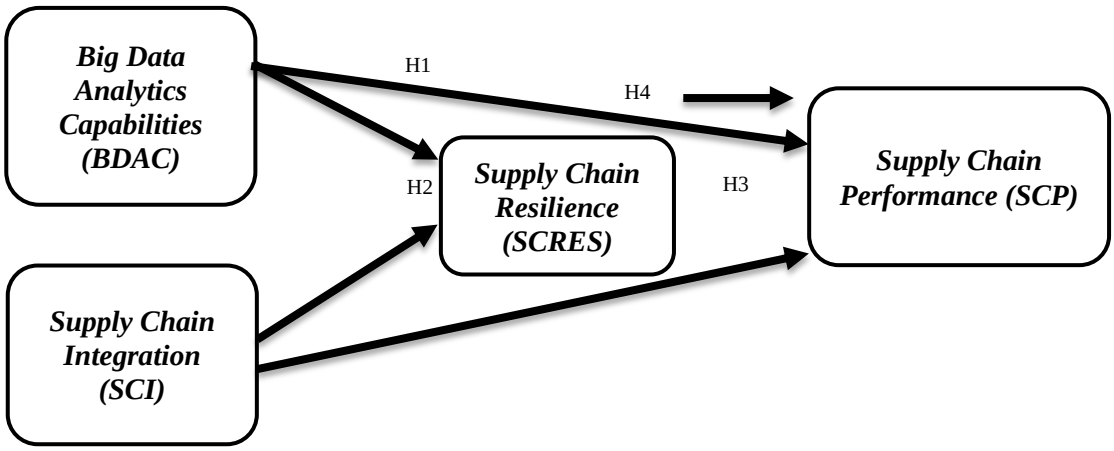
Supply Chain Performance

Supply chain performance is how they explain why some supply chains operate efficiently and better than others (Baah et al., 2022). In contrast to the opinion (Alshurideh et al., n.d.), supply chain performance is a measurement tool that determines the actual operational activities that meet industrial goals and meet customer needs by providing the required products. SCP is a complete approach to evaluating the effectiveness and efficiency of a company's supply chain management (Anand & Grover, 2015). Depending on their involvement in supply chain connections, SCPs are operational indications that improve the performance of each supply chain channel and the performance of the supply chain as a whole (Gagalyuk et al., 2013).

3. CONCEPTUAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

Applying big data analytics capabilities and supply chain integration in its operational activities can help the restaurant industry have supply chain resilience, which can be a differentiator between one restaurant industry and another. That way, it will improve supply chain performance. This research will examine the positive influence of big data analytical capabilities on supply chain performance directly or through supply chain resilience and test the positive effect of supply chain integration on supply chain performance directly or through supply chain resilience. The conceptual framework designed in this study is as follows:

Fig. 1 Conceptual Framework



Hypothesis Development

Big Data Analytical Capability and Supply Chain Resilience

(Srinivasan & Swink, 2018) Argues that organisations that can build demand and supply chain visibility are in a better position to develop and implement systems and processes that support data analytics capabilities. An organisation with the ability to analyse data has access to a large amount of information that can be used to predict future conditions. In this context, information leads to increased resilience, and organisations can rely on this information to predict future events or prepare for them. Therefore, we argue that the more a company is equipped with data analysis capabilities, the more resilient its supply chain will be (Rezaei et al., 2022). (Dennehy et al., 2021) stated in his research that there is a strong relationship between data analytics capabilities and supply chain resilience. In line with these findings, (Srinivasan & Swink, 2018) also emphasises that data analytics capabilities can affect supply chain resilience. Research conducted by Jihan & Santosa (2022) on manufacturing companies in Indonesia also shows that there is a positive and significant effect of big data analytical capabilities on supply chain resilience. Based on the findings above, the hypothesis formed is:

H1: Big data analytical capability has a positive effect on supply chain resilience

Supply Chain Integration and Supply Chain Resilience

Reconciling the relationship between companies and suppliers is also an essential form of SCI (Birasnav & Bienstock, 2019). Increasing the supply chain's resilience can enable companies to quickly understand the uncertainty of the company's internal and external environment. Companies with solid flexibility can obtain more sophisticated market information and resources than their competitors (Fayezi et al., 2017). The company's marketing relationship with its customers is the basis of supply chain integration, which can enhance supply chain resilience. Improved absorptive capacity depends on certain collaborative activities (Lawson et al., 2019), for example, cooperation and cultural fit between companies and consumers. In line with the findings (Shi et al., 2022) stated that the higher the efficiency of supply chain integration, the stronger the resilience capability of the supply chain. Based on the explanation above, the hypothesis that can be developed is:

H2: Supply chain integration has a positive effect on supply chain resilience

Supply Chain Resilience and Supply Chain Performance

(Pettit et al., 2019) Describes the evolution of resilience in supply chain management. The effect of resilience on supply chain performance depends on future business vulnerabilities resulting in increased technology costs. (Remko, 2020) suggests a path for developing more resilient supply chains in the industry to improve post-COVID-19 corporate performance. Especially in times of crisis, businesses should refrain from investing in such technologies because there is no guaranteed return. According to (Um & Han, 2021), a high resilience

supply chain can deal with supply chain risks effectively. It is evident from the recent COVID-19 situation worldwide that food and essential product supply chains have built resilience in their supply chains faster than any other supply chain thanks to collaborative efforts. Furthermore, (Ramanathan & A.S, 2021) assumes that supply chain resilience positively influences supply chain performance. In accordance with the explanation above, the hypotheses that can be compiled are:

H3: Supply chain resilience has a positive effect on supply chain performance

Big Data Analytical Capability and Supply Chain Performance

The big data revolution is in full swing and has a huge impact on SCM. The advent of big data allows consideration of complicating factors in designing supply chains, thereby enabling the advancement of robust supply chain networks (Wang et al., 2018a). Big Data in supply chain BDA capabilities and supply chain performance and emphasizes the importance of BDA technology in SCM. Based on their discussion, Big Data is used in SCM to enhance competencies and provide new capabilities. Furthermore (Bahrami et al., 2022) assumes that BDAC has a positive influence on supply chain performance. In accordance with the explanation above, the hypotheses that can be compiled are:

H4: Big data analytical capability has a positive effect on supply chain performance

Supply Chain Integration and Supply Chain Performance

(Yu et al., 2018) stated that integration in terms of the relationship between businesses and their customers is an important part of increasing collaboration. Furthermore, (Chou et al., 2018) revealed that integration, which focuses on exchanging information or communication, has a positive impact on collaboration. (Liu & Lee, 2018) shows that SCI positively influences supply chain performance. Structural capital is the overall system of fit relationships among supply chain partners. So, it is considered as integration between supply chain partners. Based on previous research, the hypotheses that can be developed are:

H5: Supply chain integration has a positive effect on supply chain performance

4. METHODS AND SAMPLES

The research design used in this study is hypothesis testing with cross-sectional data and individual analysis units. The research population is restaurant in East Jakarta, with a sample of 140 restaurant owners or/and employees in East Jakarta. Data were obtained by distributing questionnaires, while hypothesis testing was carried out using the Structural Equation Modeling (SEM) method using SPSS 22 and AMOS. The data collection technique used in this study was a questionnaire.

5. RESULTS AND DISCUSSIONS

The results of the validity test indicated that all of the research instruments were declared valid. The reliability test showed that the Crombach Alpha coefficient for supply chain management, total quality management, competitive advantage and organizational performance had values above 0.6 so that all variables in this study were declared reliable. The Goodness of Fit test shows the criteria based on various measurement models that have been carried out, it is known that the NFI and CFI values are concluded as goodness of fit models, and the rest are concluded as poor fit models. Therefore, research can be continued (Hair Jr et al., 2014). The results of hypothesis testing are shown in table 1 below:

Table 1. Hypothesis Testing

hypothesis	Coefficient	p-values	Decision
H_1: Big data analytical capability has a positive effect on supply chain resilience	0.125	0.049	Supported
H_2: Supply chain integration has a positive effect on supply chain resilience	0.040	0.037	Supported
H_3: Supply chain resilience has a positive effect on supply chain performance	0.511	0.000	Supported
H_4: Big data analytical capability has a positive effect on supply chain performance	0.635	0.000	Supported
H_5: Supply chain integration has a positive effect on supply chain performance	0.583	0.009	Supported

Big Data Analytics Capability and Supply Chain Resilience

The big data analytical capability positive and weak effect on influences the supply chain resilience variable. This was also proven in the studies conducted by other researchers (Wamba et al., 2020), who were able to establish the positive relationship that exists between big data analytical capabilities and supply chain resilience, which in turn agrees with the findings in hypothesis one of the current study. These results indicate that if managers continue to improve their big data analytics capabilities, it will increase the resilience of the supply chain carried out by the restaurant. By increasing the capability of big data analytics, the opportunity for restaurants to maintain a more efficient supply chain resilience becomes more likely to succeed. An increase in big data analytical skills must also be possessed by each employee so that they can be aligned with the theory or system implemented by the restaurant. The use of big data analytics to sustain and increase performance through enhancing supply chain resilience might be the key to success in unexpected environments and supply chain disruption circumstances.

Supply Chain Integration and Supply Chain Resilience

The supply chain integration positive and weak effect to supply chain resilience. Furthermore, the findings are congruent with those of (Liu & Lee, 2018), emphasizing that supply chain integration leads to improved supply chain resilience. In particular, (Fayezi et al., 2017) discovered a positive relationship between supply chain integration and supply chain resilience. These results indicate that if the manager increases the integration of the supply chain owned, it will increase the resilience of the supply chain carried out by the restaurant so that it can be useful for developing restaurants in the future. Improved supply chain integration can also make supply chain resilience gained by managers into learning that has positive value for the future.

Supply Chain Resilience and Supply Chain Performance

The supply chain resilience has a positive and strong effect on supply chain performance. Most of the research conducted by (Bahrami et al., 2022; Shi et al., 2022; Um & Han, 2021) on the connection between supply chain resilience and supply chain performance has established a positive relationship. Thus, this also aligns with the results obtained during the performance of this study. These results indicate that if a restaurant has good supply chain resilience, the desired supply chain performance will be achieved in accordance with the targets of each restaurant. However, in order for the desired supply chain performance to be achieved, the supply chain resilience that is applied must also be in accordance with the needs of each manager.

Big Data Analytical Capability and Supply Chain Performance

The big data analytical capability positively and strongly influences the supply chain performance. Organizations that make good use of the quality of information obtained from BDA-based systems can also provide alternative procedures, options and pathways for managing unavoidable supply chain disruptions. These conditions can help organizations continue to provide services, the result of which is customer satisfaction and continued profitability. According to (Dubey et al., 2021; Wamba et al., 2020), the study findings also showed that big data analytical capabilities is positively effect on supply chain performance. These results indicate that if the big data analytic capabilities in the restaurant run well and efficiently, it will affect supply chain performance, because with good and efficient big data analytic capabilities the resulting products will be of higher quality so as to make consumers satisfied with the product. Produced and can also attract new consumers.

Supply Chain Integration and Supply Chain Performance

The supply chain integration has a positive and strong effect on the supply chain performance. These findings also corroborated the widespread belief that supply chain integration has a positive effect on influence the supply chain performance (Aunyawong et al., 2020; Sinnandavar et al., 2018; Yu et al., 2018). These results indicate that if supply chain integration is well studied by managers, this learning will become an innovation for companies in the future to achieve the desired supply chain performance, so that the supply chain performance achieved by restaurant managers cannot be separated from chain learning. If supply chain partners will enhance the level of information sharing between supply chain partners and will contribute to the interdepartmental integration in enterprises and the integration of supply chain partners. Due to the change of environment and expansion of elevator productivity, it is highly important for the integration of the supply chain to reached maximum production performance.

6. CONCLUSSION AND FURTHER RESEARCH

Conclusions

Prior studies have mostly analyzed the relationships among supply chain resilience, big data analytical capabilities and supply chain performance (Aunyawong et al., 2020; Dennehy et al., 2021; Fernando et al., 2018). This study contributes by further helping us to understand how the effect of big data analytical

capabilities, supply chain resilience and supply chain integration on supply chain performance. Few papers have studies suppliers of manufacturing supply chains as the sampling objects. The results of this study verify the relations between research variables and combine theories and practice. Overall, the main findings of this study are presented in detail as follow big data capability can be a strategic investment in improving SC performance and supply chain resilience.

Further Research

Despite the contributions made by this study, there are a few drawbacks. Firstly, restaurant in East Jakarta need to maintain and improve their big data analytics capabilities such as improving the technology used in order to achieve the desired supply chain performance. Big data analytical skills positively affect supply chain performance, so good big data analytical skills must be carried out continuously by restaurants in East Jakarta to improve the expected supply chain performance. Second, restaurants in East Jakarta need to implement and improve supply chain integration to achieve supply chain performance by maintaining the company's marketing relationship with its customers, which is the basis of supply chain integration and can increase supply chain resilience. Supply chain integration has a positive effect on supply chain performance, so good supply chain integration will impact the improvement of supply chain performance.

Third, restaurants in East Jakarta must have supply chain resilience in order to maintain the desired level of control over structure and function in the event of a disruption. If you have strong supply chain resilience, it will improve supply chain performance. Last, it is recommended to use variables that have a greater influence on supply chain performance such as supply chain innovation, competitive advantage and supply chain agility.

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