



The impact of flexibility and responsiveness on the financial performance in Malaysia's manufacturing industry during the COVID-19 pandemic

Mohd Khairulnizam Zahari^{1*}

Norhayati Zakuan²

Muhamad Zameri Mat Saman³

Teh Zaharah Yaacob⁴

Roshazlizawati Mohd Nor⁵

^{1,2,3,4,5}Faculty of Management Universiti Teknologi Malaysia, Skudai, 81310 Johor Bahru, Malaysia.

¹Email: nizam.zahari88@gmail.com

²Email: norhayatimz@utm.my

³Email: tehzaharah@utm.my

⁴Email: roshazlizawati@utm.my

⁵Faculty of Mechanical Engineering, Universiti Teknologi Malaysia, Skudai, 81310 Johor Bahru, Malaysia.

⁵Email: zameri@utm.my

Licensed:

This work is licensed under a Creative Commons Attribution 4.0 License.

Keywords:

COVID-19

Financial performance

Flexibility

Responsiveness

Supply chain management.

JEL Classification:

L10; H12; M11.

Received: 12 December 2022

Revised: 23 February 2023

Accepted: 6 March 2023

Published: 14 March 2023

(* Corresponding Author)

Abstract

In order to combat the disruption caused by COVID-19, it is essential for the company's operations to implement flexibility and responsiveness in their work. In this study, the researchers will investigate the effect of these two variables on the financial performance of the company. The current study evaluates the data obtained from 215 manufacturing companies in Malaysia. The data is collected and analysed using PLS-SEM in order to provide an in-depth look at the issue. The results show that flexibility and responsiveness are positively related to a company's financial condition. The primary contribution of this study is to provide the management of company with a groundbreaking idea of dealing with a pandemic situation in the current business environment. A company's capacity to survive also depends on planning changes, particularly those that affect supply chain management and production operations. When making tough decisions, managers must be less rigid and more flexible. Demand management, inventory management, supply chain management, and operation management are some of the things that call for flexibility and responsiveness. The business will experience losses if they are unable to meet the demands of the COVID-19 era and maintain business operations. Of course, this will have an impact on the company's financial performance.

Funding: This research is supported by Malaysian Ministry of Education, Universiti Malaysia Perlis, Faculty of Management, Universiti Teknologi Malaysia and Research Management Centre (Grant numbers: 20H76 and 31J18.).

Competing Interests: The authors declare that they have no competing interests.

1. Introduction

The overall effectiveness of a supply chain depends on its best plan in managing its relationships with buyers and suppliers and prediction, they will be will be around in the long run (Sharma, Luthra, Joshi, & Kumar, 2022). In order to respond to the outbreak or any other disruptive occurrences, the company's its production system and supply chain must be highly resilient (Hosseini, Ivanov, & Dolgui, 2019). The organization's service levels, profitability, and process of productivity are negatively impacted when stock is limited delivery is delayed due to a pandemic (Dolgui, Ivanov, & Rozhkov, 2020; Dolgui, Ivanov, & Sokolov, 2018). Businesses must plan for pandemics as part of their resilience management processes if they have to provide a comprehensive response and ensure that their most demanding products and services remain operational (Ey Global, 2020). The global epidemic had an adverse effect on Malaysia's economy. This is demonstrated by the fact that Malaysia's gross domestic product (GDP) dropped by 3.4% in the fourth quarter of 2020, which was a larger drop than the 2.6% drop that occurred in the previous quarter. The gross domestic product of Malaysia declined by 5.6% in 2020, which was higher than the 4.3% drop that it experienced in 2019. Last time in 2009 the economy of Malaysia, fell by 1.5%, marking its lowest level since 1998 (-7.4

percent) (Department of Statistics Malaysia, 2020). As a result of the COVID-19 epidemic, production has been hampered, which will have a negative impact on Malaysia's position in the global supply chain as a hub for automotive components, which generates 3.7 billion Malaysian ringgit (RM) in export revenue. The economy is in threat of being jeopardized.

Changes in demand that are difficult to anticipate have an adverse effect on supply chains, which introduces ambiguity and uncertainty into forecasting and decision-making processes (Gunessee & Subramanian, 2020). The prices of products are rising because of this uncertainty. The prices of the expensive items have risen dramatically, while the prices of the cheap items have dropped significantly (De Paulo Farias & De Araújo, 2020). In addition, COVID-19 had an effect on the pattern of consumers' purchasing attitude for both essential and non-essential products (Mollenkopf, Ozanne, & Stolze, 2020). Companies must adequately plan for raw resources and manage their suppliers. Company's direct suppliers must not be overseas but, the vast majority of its tier 2 and tier 3 suppliers should be located in different cities. As a result, multinational suppliers have halted operations as they struggle with lockdown-related limitations in their homeland. As a result of these disruptions, short- and long-term real-time forecasts of the pandemic and its impact on the supply chain have become managerial and policy-making requirements (Nikolopoulos, Punia, Schäfers, Tsinopoulos, & Vasilakis, 2021).

Businesses are extending their supply chains in order to address the problems caused by the COVID-19 pandemic. They are doing this with more flexibility and responsiveness to their operations as well as by working collaboratively with partners whose complementary capabilities can offer a competitive advantage to the entire corporate network (Badraoui, Van der Vorst, & Boulaksil, 2020). Ramanathan, Gunasekaran, and Subramanian (2011) emphasised that adaptability, which includes both flexibility and responsiveness, is synonymous with the supply chain's capacity to adjust in new circumstances. This study aims to assess the relationship between flexibility and responsiveness in financial performance of Malaysian manufacturing companies during and after COVID-19. The research was carried out in order to fulfil this objective.

2. Literature Review

2.1. Flexibility

The COVID-19 epidemic has caused havoc to markets all around the world, and many companies have come across a variety of supply chain challenges. According to Sarkis, Cohen, Dewick, and Schröder (2020) as a result of regulations and shelter-in-place orders, organizations that rely on transoceanic shipping, air travel, and land transportation must now deal with halts in operations and delays in shipments. Furthermore, the need for supply chain integration has grown a lot because the global economy is getting bigger and now people want better customer service (Van der Vaart & Van Donk, 2008) in making supply chain integration a critical component and it is good in achieving organizational performance objectives. The ability to adapt these changes effectively with available resources is measured by flexibility (Ramanathan et al., 2011). Uncertainty in the form of market demand, supplier lead time, product quality, and information delay are all examples of factors that call for a flexible structure (Giannoccaro, Pontrandolfo, & Scozzi, 2003). Supply chains that are able to adapt to these changes, preferably more effectively than their competitors, will have a competitive advantage over their competitors (Wang et al., 2019). Flexibility in supply and demand can be increased through enhancing a company's responsiveness, which in turn boosts the company's ability to overcome supply chain difficulties. According to Erboz, Yumurtacı Hüseyinoğlu, and Szegedi (2021) flexibility can be measured according to the company's ability to respond to the periods of low manufacturing performance, demand changes, supplier and delivery performance during pandemic.

2.2. Responsiveness

Technological advancements assist the networks that make up supply chains today and they face the challenge of becoming more flexible in expanding consumer demand. This issue is being driven by competitive pressures. If a company is unable to adjust according to the changes in the market it improves its performance through its own efforts, it will find it more difficult to attain profitability (Wu, Yenyurt, Kim, & Cavusgil, 2006). The capacity of a business to respond swiftly towards unpredictable market demand that employ strategic resources to find and capitalize the market opportunities and those are characterized as responsiveness (Zhang, Zhao, Lyles, & Guo, 2015). The concept of supply chain responsiveness implies that a firm's ability of response is dependent not only on the capabilities of the company itself, but also dependent on those companies with which it collaborates in its supply chain (Ramanathan et al., 2011). Therefore, rather than relying on the efforts of a single firm, the entire supply chain must work together to perform better according to the needs of customers and the environment (Mentzer et al., 2001). In fact, more efficient production methods make it possible to reduce the amount of time which is required in providing service or product. Shorter lead times, dependable service, rapid reaction, and flexibility are all guaranteed by a supply chain that is responsive (Gorane & Kant, 2017; UEKI, 2013). Supply chains cannot compete successfully on a global scale because they can't change quickly enough to meet the changing needs of customers (Singh & Sharma, 2014). According to Singhry and Abd Rahman (2019), the company and its suppliers, customers need to collaborate in order to increase the accuracy of the forecast and they produce joint sales predictions for

replenishing during the course of a pandemic. In addition, the company is able to rely on its suppliers because they provide data regarding market forecasts and information related to planning.

2.3. Company's Financial Performance

The COVID-19 pandemic had an impact on those companies that are negatively influencing stock prices, cash flows, asset management, inventory management, operating costs that are resulting in worse performance and even some bankruptcies (Xu & Jin, 2022). According to Price (1997), the term "economic performance" refers to the financial viability of a company to which it is successful in meeting its economic goals. It is relevant, among other things, to the possibility that the economy will continue to function normally well into the foreseeable future for the sake of succeeding generations. It focuses on the economic value that the company brings to the system that benefits future generations (Alhaddi, 2015). A company's financial performance is judged by a number of other metrics, such as return on assets (ROA), return on investments (ROI), gross margin, sales volume, sales growth, market share, profitability ratio, and stock prices. (Amah & Nwuche, 2013; Borchert, 2008; Hafidzi & Qomariah, 2020; Heikal, Khaddafi, & Ummah, 2014; Masters, Anwar, Collins, Cookson, & Capewell, 2017).

2.4. Research Framework

The hypotheses of this research that presented in Figure 1 will be the basis for the research framework that is developed. Two hypotheses are drawn based on this framework. They are as follows:

- H1: Flexibility positively influences a company's financial performance during the COVID-19 pandemic.
- H2: Responsiveness positively influences a company's financial performance during the COVID-19 pandemic.

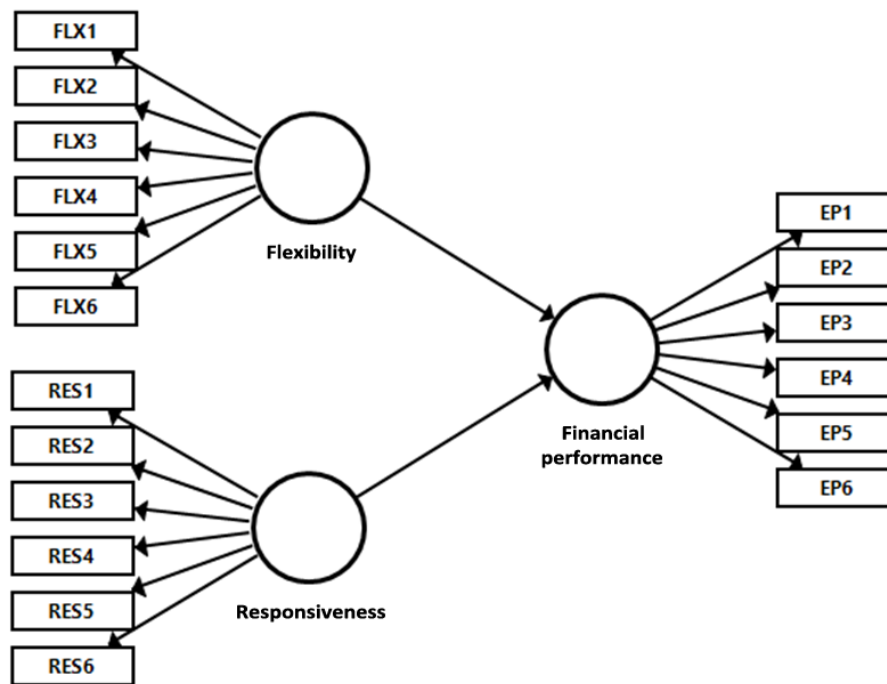


Figure 1. Proposed research framework.

3. Research Methodology

Quantitative research was conducted for this study. The number of 250 questionnaires were sent out to the managers of manufacturing companies in Malaysia, which were the respondents in this survey. Only 215 out of 250 responses have been received and screened that gives us an overall response rate of 86%. There are two different variables, each of them with their individual set of questions consisting of six items as shown in Table 1. On the other hand, the financial performance of the company serves as the dependent variable and there are also six questions concerning it. 5point Likert scale is used in this survey.

Table 1. The constructs and total of items.

Constructs	Total of items	Sources
Flexibility	6	(Erboz et al., 2021; Singhry & Abd Rahman, 2019)
Responsiveness	6	(Baah, Agyeman, et al., 2021; Singhry & Abd Rahman, 2019)
Company's financial performance	6	(Ajmal, Khan, Shad, AlKatheeri, & Jabeen, 2021; Baah, Acquah, & Ofori, 2021)

4. Results

The analysis of the research was carried out using Smart PLS 3.0, which involved a partial least squares (PLS) analysis. During this research process and model's analysis, first the model's reliability and validity were tested, and the Structural Equation Model (SEM) was applied to test the research hypotheses.

4.1. Measurement Model

In this study, PLS-SEM analysis was used for measurement model. In order to acquire the results of measurement model for this investigation, the PLS-SEM analysis was utilized. Figure 2 depicts the measurement model assessment, which includes two independent variables, named as flexibility and responsiveness, and one independent variable that includes the company's financial performance.

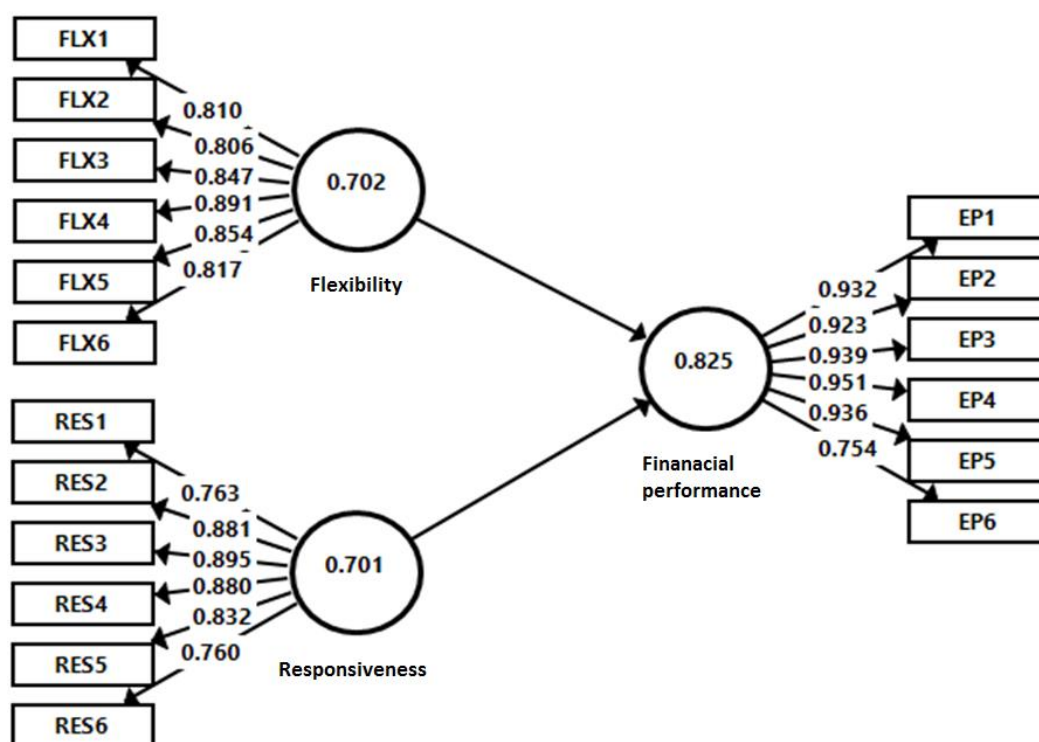


Figure 2. Internal consistency reliability.

For the purpose of determining whether or not there is internal consistency, this study makes use of composite reliability to determine the internal consistency. Ratings of composite reliability should be considered acceptable if they are greater than or equal to 0.60 or fall between 0.70 and 0.90 (Leguina, 2015). In the analysis of the composite reliability, a cut-off value of 0.70 or greater than it was applied to determine the good convergent or internal consistency. According to Hair, Black, Babin, Anderson, and Tatham (2006) the value of this statistic must be greater than 0.70 in order to determine whether the constructs are reliable. Table 2 displays the values of composite reliability as well as Cronbach's alpha for each individual construct that was investigated in this study.

Table 2. Internal consistency reliability result.

Constructs	Cronbach's alpha	Composite reliability
Flexibility	0.915	0.934
Responsiveness	0.914	0.933
Financial performance	0.956	0.966

4.2. Convergent Validity Assessment

In addition, convergent validity was investigated in this study to establish the validity of that one item which measures other similar constructs. The outer loading assessment, the composite reliability (CR), and the average variance extracted (AVE) are the three tests that can be utilized to demonstrate convergent validity analysis. According to Hair, Risher, Sarstedt, and Ringle (2019), it is required that the outer loading values must be greater than 0.708. Both AVE and CR need to have values that are higher than 0.5, and CR needs to be higher than 0.7. Table 3 provided a summary of the results regarding the outer loadings, CR, and AVE. In terms of outer loadings, every component was greater than 0.708. The outcomes show that nothing is removed from the list. Because the composite reliability (CR) is higher than 0.7, this indicates that all of the

items had a satisfactory level of reliability. All of these values obtained for each construct of AVE were within the range of 0.701 and 0.825, which indicates that all of the values are higher than AVE's minimum value.

Table 3. Convergent validity result.

Constructs	Items	Loading	Composite reliability	AVE
Flexibility	Flex1	0.81	0.934	0.702
	Flex2	0.806		
	Flex3	0.847		
	Flex4	0.891		
	Flex5	0.854		
	Flex6	0.817		
Responsiveness	Res1	0.763	0.933	0.701
	Res2	0.881		
	Res3	0.895		
	Res4	0.88		
	Res5	0.832		
	Res6	0.76		
Financial performance	EP1	0.932	0.966	0.825
	EP2	0.923		
	EP3	0.939		
	EP4	0.951		
	EP5	0.936		
	EP6	0.754		

Note: Flex (Flexibility); Res (Responsiveness); EP (Financial performance).

4.3. Discriminant Validity

A set of indicators' discriminant validity is examined to confirm the distinction across constructs (Hair et al., 2019). It determines whether there is any overlap in the correlations between the measurements and also confirms that the researched constructs are actually separate from one another. Fornell and Larcker's criteria and the heterotrait monotrait ratio (HTMT) were used in this study for the analysis which determines the discriminant validity.

The Fornell and Larcker criteria is analytical model that contrasts the correlations between latent variables and the square root of the AVE value. The value should be greater than the value of any other construct (Afthanorhan, Ghazali, & Rashid, 2021). The evaluation is based on the idea that a construct differs more from other constructs' indicators than it does from its own indicators. According to Table 4, the Fornell-Larcker's criterion had appropriate discriminant validity because each construct's correlation value was higher than that of other constructs.

Table 4. Findings of Fornell-Larcker's criterion

Constructs	Economy performance	Flexibility	Responsiveness
Economy performance	0.908		
Flexibility	0.351	0.838	
Responsiveness	0.349	0.643	0.837

The HTMT number needs to be less than 0.9 (Gold, Malhotra, & Segars, 2001). The projected result should be less than 1 because a score closer to 1 implies a lack of discriminant validity (Hair et al., 2019). The value of HTMT was below the value of 0.9 cut-off in Table 5, that is demonstrating the criteria for discriminant validity had been satisfied.

Table 5. HTMT result.

Constructs	Economy performance	Flexibility	Responsiveness
Economy performance	-	-	-
Flexibility	0.367	-	-
Responsiveness	0.37	0.711	-

4.4. Hypotheses Testing

In order to study the path coefficient, 5000 bootstrap samples were chosen for a one-tailed test with a significance level of 0.05 for structural model analysis (Hair et al., 2019). The link between the independent variable (flexibility and responsiveness) and the dependent variable (financial performance) was examined using the bootstrapping approach. One-tailed t-tests have critical values of 1.645 at the 5% significance level. The hypothesis is accepted if the t-value is greater than 1.64 with a 5% threshold of significance. At $p < 0.05$, the significance level was established (Hair et al., 2019).

Table 6. Result of significance testing.

Relationship	β	Standard deviation (STDEV)	T-value	P-value	Decision
Flexibility → Financial performance	0.215	0.1	2.155	0.014	Accepted
Responsiveness → Financial performance	0.211	0.091	2.311	0.01	Accepted

Note: One-tailed test, significant at $t > 1.65$, $p < 0.05$.

The study that was conducted to look into the direct links that were reported in the first section of the test for statistical significance. This structural model identifies two direct relationships between flexibility and financial performance, as well as responsiveness and financial performance. Table 6 lists all of the significance test results for this structural model.

The t-values in the results are greater than 1.645, thus the relationships are significant. Moreover, the p-values are significant because they are lower than 0.05. The hypothesis is accepted based on the research objectives

5. Discussion

The hypothetical results in Table 6 show that the financial performance of a company is better when its operations are flexible and responsive especially during COVID-19 pandemic. In this particular research, the financial performance of the organisation was evaluated using the metrics of both its flexibility and its responsiveness during the COVID-19 pandemic. The concept of supply chain responsiveness implies that a firm's ability to remain responsive is dependent not only on the capabilities of the company itself, but also on those of the companies with which it collaborates in its supply chain (Ramanathan et al., 2011). The term "flexibility" is used to describe a supply chain's ability which respond to both short-term shifts in demand and supply as well as other external disturbances such as COVID-19 outbreaks and longer-term strategic and structural shifts in the environment in which it operates (Dolgui et al., 2020; Whitten, Green Jr, & Zelbst, 2012). The variables contribute to the construction of a better forecasting horizon, which helps to minimise uncertainty and enables a more flexible supply chain, which is necessary for responding to unexpected shifts in demand, such as those that occurred during COVID-19 outbreaks (Dolgui et al., 2020). This argument was backed by Queiroz, Ivanov, Dolgui, and Fosso Wamba (2022) who stated that the high responsiveness of collaborative planning enables a corporation to handle the frequent changes and disruptions produced by COVID-19 and to respond rapidly to new orders. The research undertaken by Kazancoglu, Ozbiltekin-Pala, Mangla, Kazancoglu, and Jabeen (2022) demonstrates that flexibility and responsiveness are crucial for supply chain resilience and corporate sustainability.

6. Conclusion

As a result of the COVID-19 outbreak in Malaysia, business owners and executives have to act swiftly and make crucial decisions. The long-term effects of a decision like decreasing production in industry or even temporarily shutting down operations might not be obvious at first. Companies' bottom lines would be affected as a result of the government's lockdown policy or order. Businesses also need to be prepared for the unexpected emergency and they should have a scalable plan. Because of this, it is crucial that the company's operations should be flexible and responsive, especially when it comes to supply chain management. Customers' uncertain demand during the COVID-19 pandemic compelled businesses to come up with quick and effective solutions. A company's capacity to survive also depends on planning changes, particularly those that affect supply chain management and production operations. When making tough decisions, managers must be less rigid and more flexible. Demand management, inventory management, supply chain management, and operation management are some of the things that call for flexibility and responsiveness. The business will experience losses if they are unable to meet the demands of the COVID-19 pandemic and maintain business operations. Of course, this will have an impact on the business's financial performance. During this time of economic turmoil, this paper can act as a guide for business managers to help them to increase their company's profitability and reduce the strain on their cash flow. It also enables governmental policymakers to implement preferential policies to aid manufacturing enterprises that lighten their financial burdens. Both of these benefits are extremely beneficial. The limitation of this study is that it is only restricted to Malaysia. Therefore, this study is expected to be implemented in other countries for future studies. This study can also be carried out in fields other than manufacturing, such as the service industry or construction.

References

- Afthanorhan, A., Ghazali, P. L., & Rashid, N. (2021). Discriminant validity: A comparison of CBSEM and consistent PLS using fornell & larcker and HTMT approaches. *Journal of Physics: Conference Series*, 1874(1), 012085. <https://doi.org/10.1088/1742-6596/1874/1/012085>
- Ajmal, M. M., Khan, M., Shad, M. K., AlKatheeri, H., & Jabeen, F. (2021). Socio-economic and technological new normal in supply chain management: lessons from COVID-19 pandemic. *The International Journal of Logistics Management*, 33(4), 1474-1499. <https://doi.org/10.1108/ijlm-04-2021-0231>

- Alhaddi, H. (2015). Triple bottom line and sustainability: A literature review. *Business and Management Studies*, 1(2), 6-10. <https://doi.org/10.11114/bms.v1i2.752>
- Amah, E., & Nwuche, C. (2013). The influence of size on corporate culture and organizational effectiveness in the Nigerian banking industry. *International Journal of Business Administration*, 4(5), 15-23. <https://doi.org/10.5430/ijba.v4n5p15>
- Baah, C., Acquah, I. S. K., & Ofori, D. (2021). Exploring the influence of supply chain collaboration on supply chain visibility, stakeholder trust, environmental and financial performances: A partial least square approach. *Benchmarking: An International Journal*, 29(1), 172-193. <https://doi.org/10.1108/bij-10-2020-0519>
- Baah, C., Agyeman, D. O., Acquah, I. S. K., Agyabeng-Mensah, Y., Afum, E., Issau, K., . . . Faibil, D. (2021). Effect of information sharing in supply chains: understanding the roles of supply chain visibility, agility, collaboration on supply chain performance. *Benchmarking: An International Journal*, 29(2), 434-455. <https://doi.org/10.1108/bij-08-2020-0453>
- Badraoui, I., Van der Vorst, J. G., & Boulaksil, Y. (2020). Horizontal logistics collaboration: an exploratory study in Morocco's agri-food supply chains. *International Journal of Logistics Research and Applications*, 23(1), 85-102. <https://doi.org/10.1080/13675567.2019.1604646>
- Borchert, O. (2008). Resource-based theory: Creating and sustaining competitive advantage *Journal of Marketing Management*, 24(9-10), 1041-1044. <https://doi.org/10.1362/026725708x382046>
- De Paulo Farias, D., & De Araújo, F. F. (2020). Will COVID-19 affect food supply in distribution centers of Brazilian regions affected by the pandemic? *Trends in Food Science & Technology*, 103, 361-366. <https://doi.org/10.1016/j.tifs.2020.05.023>
- Department of Statistics Malaysia. (2020). *Malaysia economic performance fourth quarter 2020*. Retrieved from https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=100&bul_id=Y1MyV2tPOGNsVUtnRy9SZGdRQs84QT09&menu_id=TE5CRUZCblh4TZMODZlbnk2aWRRQT09
- Dolgui, A., Ivanov, D., & Rozhkov, M. (2020). Does the ripple effect influence the bullwhip effect? An integrated analysis of structural and operational dynamics in the supply chain. *International Journal of Production Research*, 58(5), 1285-1301. <https://doi.org/10.1080/00207543.2019.1627438>
- Dolgui, A., Ivanov, D., & Sokolov, B. (2018). Ripple effect in the supply chain: An analysis and recent literature. *International Journal of Production Research*, 56(1-2), 414-430. <https://doi.org/10.1080/00207543.2017.1387680>
- Erboz, G., Yumurtacı Hüseyinoğlu, I. Ö., & Szegedi, Z. (2021). The partial mediating role of supply chain integration between Industry 4.0 and supply chain performance. *Supply Chain Management: An International Journal*, 27(4), 538-559. <https://doi.org/10.1108/scm-09-2020-0485>
- Ey Global. (2020). *COVID-19 and pandemic planning: How companies should respond*. Retrieved from https://www.ey.com/en_my/covid-19/covid-19-and-pandemic-planning--how-companies-should-respond
- Giannoccaro, I., Pontrandolfo, P., & Scozzi, B. (2003). Uncertainty in supply chain inventory management: A fuzzy approach. *European Journal of Operational Research*, 149, 185-196.
- Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge management: An organizational capabilities perspective. *Journal of Management Information Systems*, 18(1), 185-214. <https://doi.org/10.1080/07421222.2001.11045669>
- Gorane, S., & Kant, R. (2017). Supply chain practices and organizational performance: An empirical investigation of Indian manufacturing organizations. *The International Journal of Logistics Management*, 28(1), 75-101. <https://doi.org/10.1108/ijlm-06-2015-0090>
- Gunessee, S., & Subramanian, N. (2020). Ambiguity and its coping mechanisms in supply chains lessons from the Covid-19 pandemic and natural disasters. *International Journal of Operations & Production Management*, 40(7-8), 1201-1223. <https://doi.org/10.1108/ijopm-07-2019-0530>
- Hafidzi, A. H., & Qomariah, N. (2020). Impact of corporate social responsibility on stock prices through financial performance in manufacturing companies listed on the IDX in the Covid era 19. *International Journal of Advanced Research in Engineering and Technology*, 11(11), 1510-1520.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis 6th edition*. Pearson Prentice Hall. *New Jersey, humans: Critique and reformulation*. *Journal of Abnormal Psychology*, 87, 49-74.
- Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2-24. <https://doi.org/10.1108/eb-11-2018-0203>
- Heikal, M., Khaddafi, M., & Ummah, A. (2014). Influence analysis of return on assets (ROA), return on equity (ROE), net profit margin (NPM), debt To equity ratio (DER), and current ratio (CR), against corporate profit growth In automotive In Indonesia stock exchange. *International Journal of Academic Research in Business and Social Sciences*, 4(12), 2222-6990. <https://doi.org/10.6007/ijarbss/v4-i12/1331>
- Hosseini, S., Ivanov, D., & Dolgui, A. (2019). Review of quantitative methods for supply chain resilience analysis. *Transportation Research Part E: Logistics and Transportation Review*, 125, 285-307. <https://doi.org/10.1016/j.tre.2019.03.001>
- Kazancoglu, I., Ozbiltekin-Pala, M., Mangla, S. K., Kazancoglu, Y., & Jabeen, F. (2022). Role of flexibility, agility and responsiveness for sustainable supply chain resilience during COVID-19. *Journal of Cleaner Production*, 362, 132431. <https://doi.org/10.1016/j.jclepro.2022.132431>
- Leguina, A. (2015). A primer on partial least squares structural equation modeling (PLS-SEM). *International Journal of Research & Method in Education*, 38(2), 220-221. <https://doi.org/10.1080/1743727X.2015.1005806>
- Masters, R., Anwar, E., Collins, B., Cookson, R., & Capewell, S. (2017). Return on investment of public health interventions: A systematic review. *Journal of Epidemiology and Community Health*, 71(8), 827-834. <https://doi.org/10.1136/jech-2016-208141>
- Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, N. W., Smith, C. D., & Zacharia, Z. G. (2001). Defining Supply Chain Management. *Journal of Business Logistics*, 22(2), 1-25.
- Mollenkopf, D. A., Ozanne, L. K., & Stolze, H. J. (2020). A transformative supply chain response to COVID-19. *Journal of Service Management*, 32(2), 190-202. <https://doi.org/10.1108/josm-05-2020-0143>

- Nikolopoulos, K., Punia, S., Schäfers, A., Tsinopoulos, C., & Vasilakis, C. (2021). Forecasting and planning during a pandemic: COVID-19 growth rates, supply chain disruptions, and governmental decisions. *European Journal of Operational Research*, 290(1), 99-115. <https://doi.org/10.1016/j.ejor.2020.08.001>
- Price, J. L. (1997). Handbook of organizational measurement. *International Journal of Manpower*, 18(4-1), 305-558.
- Queiroz, M. M., Ivanov, D., Dolgui, A., & Fosso Wamba, S. (2022). Impacts of epidemic outbreaks on supply chains: Mapping a research agenda amid the COVID-19 pandemic through a structured literature review. *Annals of Operations Research*, 319(1), 1159-1196. <https://doi.org/10.1007/s10479-020-03685-7>
- Ramanathan, U., Gunasekaran, A., & Subramanian, N. (2011). Supply chain collaboration performance metrics: A conceptual framework. *Benchmarking: An International Journal*, 18(6), 856-872. <https://doi.org/10.1108/14635771111180734>
- Sarkis, J., Cohen, M. J., Dewick, P., & Schröder, P. (2020). A brave new world: Lessons from the COVID-19 pandemic for transitioning to sustainable supply and production. *Resources, Conservation, and Recycling*, 159, 104894. <https://doi.org/10.1016/j.resconrec.2020.104894>
- Sharma, M., Luthra, S., Joshi, S., & Kumar, A. (2022). Developing a framework for enhancing survivability of sustainable supply chains during and post-COVID-19 pandemic. *International Journal of Logistics Research and Applications*, 25(4-5), 433-453. <https://doi.org/10.1080/13675567.2020.1810213>
- Singh, R. K., & Sharma, M. K. (2014). Selecting competitive supply chain using fuzzy AHP and extent analysis. *Journal of Industrial and Production Engineering*, 31(8), 524-538. <https://doi.org/10.1080/21681015.2014.999723>
- Singhry, H. B., & Abd Rahman, A. (2019). Enhancing supply chain performance through collaborative planning, forecasting, and replenishment. *Business Process Management Journal*, 25(4), 625-646. <https://doi.org/10.1108/bpmj-03-2017-0052>
- UEKI, Y. (2013). *Supply chain collaboration and responsiveness: A comparison between Thai automotive and electronics industries*. Chiba, Japan: Institute of Developing Economies.
- Van der Vaart, T., & Van Donk, D. P. (2008). A critical review of survey-based research in supply chain integration. *International Journal of Production Economics*, 111(1), 42-55. <https://doi.org/10.1016/j.ijpe.2006.10.011>
- Wang, W., Huang, L., Zhu, Y., Jiang, L., Sahu, A. K., Sahu, A. K., & Sahu, N. K. (2019). Decision support system toward evaluation of resilient supplier: A novel fuzzy gain-loss computational approach. *Kybernetes: The International Journal of Systems & Cybernetics*, 49(6), 1741-1765. <https://doi.org/10.1108/k-05-2019-0345>
- Whitten, G. D., Green Jr, K. W., & Zelbst, P. J. (2012). Emerald Article: Triple-A supply chain performance. *International Journal of Operations & Production Management*, 32(1), 28-48.
- Wu, F., Yenyurt, S., Kim, D., & Cavusgil, S. T. (2006). The impact of information technology on supply chain capabilities and firm performance: A resource-based view. *Industrial Marketing Management*, 35(4), 493-504. <https://doi.org/10.1016/j.indmarman.2005.05.003>
- Xu, J., & Jin, Z. (2022). Exploring the impact of the COVID-19 pandemic on firms' financial performance and cash holding: New evidence from China's agri-food sector. *Agronomy*, 12(8), 1951. <https://doi.org/10.3390/agronomy12081951>
- Zhang, M., Zhao, X., Lyles, M. A., & Guo, H. (2015). Absorptive capacity and mass customization capability. *International Journal of Operations and Production Management*, 35(9), 1275-1294. <https://doi.org/10.1108/ijopm-03-2015-0120>