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The Impact of Viable Supply Chain Management on Sustainability in Malaysian Manufacturing Companies during the COVID-19 Pandemic: The Moderating Role of Government Support

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ABSTRACT

This study examines the impact of viable Supply Chain Management (SCM) on the long-term viability of Malaysian manufacturing enterprises during the COVID-19 epidemic. It specifically studies how government support can moderate this relationship. The pandemic's unprecedented disruptions have emphasised the vital need for resilient supply chains to guarantee ongoing operations and achieve sustainability goals. This study employs a quantitative approach to investigate the influence of effective SCM on the long-term viability of companies. Survey questions were distributed to a total of 488 respondents, consisting of upper-level employees of manufacturing companies in Malaysia. The study has employed a stratified random sampling process. The study utilise data from 197 manufacturing enterprises in Malaysia, which is examined using Partial Least Squares Structural Equation Modelling (PLS-SEM). The findings suggest that organisations with robust and flexible supply networks were more capable of sustaining their operations and attaining their sustainability objectives. Contrary to expectations, the data indicate that government support did not have a moderating effect on the connection between VSCM practices and corporate sustainability. To improve sustainability and ensure operational continuity during times of crisis, the report emphasises the importance of investing in and cultivating resilient supply chain procedures for industry professionals. The findings indicate that governments should reevaluate the processes and effectiveness of government support given to companies during disruptive events. This calls for a more nuanced approach to the development and execution of policies.

Keywords: Company Sustainability, Resilience, Supply Chain Management (SCM), Viable Supply Chain Management (VSCM)

1. INTRODUCTION

The COVID-19 epidemic has greatly disrupted supply chains and resulted in a worldwide scarcity of items and components. Despite implementing various efforts to assist businesses and individuals impacted by the epidemic, governments had limited involvement in helping supply chains due to several causes (Keh & Tan, 2021). The primary factor to consider was the worldwide scope of supply chains.

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Supply networks were extensive and intricate, procuring items and components from several countries. This implied that disturbances in one geographical area could have widespread consequences across the whole supply chain, posing challenges for governments to properly address the problem (Ashraf, 2020). Second, resources were limited. Governments had limited resources that were subject to competing demands. In response to the pandemic, governments had prioritised containing the virus's spread, providing healthcare, and assisting affected individuals and companies (Dubey et al., 2023). Consequently, there might be limited direct support resources for supply chains (Chatterjee et al., 2022; Hasimi, 2020).

Following were market-based systems. In many nations, supply chains were governed by a market-based system in which companies and suppliers negotiated contracts and agreements (Keh & Tan, 2021). Governments could facilitate negotiations between parties, but they could not prescribe the terms of agreements or compel suppliers to provide products and services (Lotfi et al., 2024). Lastly, innovation in the private sector. The corporate sector has been instrumental in mitigating supply chain disruptions resulting from the pandemic. Many organisations have responded to the changing business environment by investing in technology, expanding their range of suppliers, and identifying alternate transit routes (Ganlin et al., 2021).

FMM-MIER (2021) survey conducted among Malaysian manufacturing companies revealed that the main obstacle preventing their participation in government initiatives was that 58% of the companies were not eligible for the target group or activity. Additionally, 25% of the companies did not meet the criteria despite being part of the target group or activity, while 20% cited insufficient assistance as the reason for their non-participation. The respondents expressed feedback regarding this plan, highlighting the lack of support for mid-tier, large, or multi-national companies, the absence or ambiguity of guidelines for certain initiatives, the need for simplification of procedures, and the slow processing and disbursement of funds. This study was additionally reinforced by the findings of the investigation carried out by Oikawa et al. (2021). Except for Malaysia and Myanmar, the degree of help was proportionate to satisfaction among countries in Southeast Asia. According to the findings of the survey, in Malaysia, only 35% of the respondents in manufacturing companies received government support, 46% did not receive support, and 19% anticipated obtaining assistance. This demonstrates that the system for aiding the government to manufacturers was still inadequate, as there were a great many leaks. The assistance that was offered was insufficient and did not cover all bases (Dubey et al., 2023).

2. LITERATURE REVIEW

There were several justifications why the government played a reduced role in assisting supply chains during the pandemic. First and foremost was the global nature of supply chains. Supply chains were global and complex, sourcing products and components from multiple nations. Second, resources were limited. Governments had limited resources that were subject to competing demands. In response to the pandemic, governments had prioritised containing the virus's spread, providing healthcare, and assisting affected individuals and companies. Therefore, there might be limited direct support resources for supply chains (Lotfi et al., 2024). Following were market-based systems.

In many nations, supply chains were governed by a market-based system in which companies and suppliers negotiated contracts and agreements (Keh & Tan, 2021). Governments could facilitate negotiations between parties, but they could not prescribe the terms of agreements or compel suppliers to provide products and services. Finally, the advancement of new ideas and technologies in the non-governmental sector. The corporate sector has been instrumental in mitigating supply chain disruptions resulting from the pandemic. Numerous businesses have adapted to the altering business climate by investing in technology, diversifying their suppliers, and locating alternative transportation routes (Ganlin et al., 2021). Consequently, the government's involvement in the supply chain may become insignificant.

2.1 Viable Supply Chain Management (VSCM)

Most of the companies were facing problems with demand volatility and a lack of raw materials. For some supply chains, demand and supply had fallen precipitously because of the production halt (Ivanov, 2020). Hence et al. (2020) implemented strategies to enhance the ability of supply chains to withstand and rebound from the effects of the pandemic. To avoid supply chain and market collapse during the pandemic, supply chain viability had to be considered. Viable Supply Chain Management (VSCM) is a flexible and adaptable network that adds value and can effectively respond to positive developments. It is also resilient enough to withstand negative events, recuperate from difficulties, and survive for a long time even amid global disturbances (Ivanov, 2020).

Ivanov (2020) integrated sustainability, resilience, and survivability into the observable supply chain. Enhancing the feasibility of distribution systems was crucial for preserving and enhancing the region's economic strength. Past studies have demonstrated that the capacity to swiftly modify trade shares with consumers and suppliers across international boundaries has enhanced corporate performance, even during the initial year of the COVID-19 pandemic. Bhamra et al. (2011) delineated resilience into three distinct categories: preparedness and planning, reaction and adjustment, and recuperation or modification. Ivanov and Dolgui (2021)defined the capacity to endure a disruption and restore functionality as 'resilience'. The task involved restructuring the supply chain framework to align with present circumstances due to disturbances and unexpected events (Frederico, 2021). This research focused on the adaptability and viability of supply chains in the context of the pandemic situation. The objective was to surpass the resolution of immediate disturbances generated by individual incidents and instead analyse the enduring difficulties encountered by supply networks in periods of ambiguity regarding the current and future circumstances (Zahari et al., 2023).

A study by Zahari et al. (2023) has explained five VSCM practices that influenced the company sustainability which are top management support, integration and partnership, digital technologies, information sharing, and customer focus. During the epidemic caused by COVID-19, top management provided vital support to ensure that SCM systems remained functioning. First and foremost, effective top management provides clarity and direction amid uncertainty, guiding businesses through great challenges. With top-level leadership, resources are promptly mobilised to respond to disruptions like unexpected shifts in demand, supply chain issues, and regulatory changes (Bhamra et al., 2011). The second VSCM practice involves the process of integrating and forming partnerships. Integration and partnerships are crucial for improving the sustainability of SCM for industrial organisations. Supply chain integration enables efficient coordination and communication between different stakeholders, such as vendors, manufacturers, distributors, and retailers (Chowdhury et al., 2021). This alignment facilitates enhanced demand forecasting, inventory management, and production planning, hence reducing the likelihood of stockouts and surplus inventory (Rajesh, 2021). The third VSCM practice is digital technologies. Digital technology provides production processes that are more agile and responsive. With the advent of technology such as 3D printing and robots, manufacturers are now able to produce customised goods in batches. This allows them to reduce the requirement for large inventories and minimise waste (Hohenstein, 2022). Moreover, digital twin technology allows companies to replicate and optimise production processes in a virtual setting, leading to enhanced efficiency and reduced expenses. The fourth VSCM practice is information sharing. Information sharing facilitates more accurate demand estimates and more efficient inventory management. Through the exchange of sales data, manufacturing plans, and market insights with suppliers and other partners, companies may accurately anticipate demand trends and effectively control inventory levels (Nasir et al., 2022). By implementing this approach, the probability of experiencing stock shortages or surplus inventory is avoided, resulting in optimal utilisation of financial resources and decreased storage expenses (Mollenkopf et al., 2020). The last VSCM practice is customer focus. By comprehending customer needs, preferences, and purchase behaviour, companies can

adjust their production schedules, inventory levels, and distribution systems to ensure the timely delivery of the proper things to the correct customers (Wicaksono & Ille´s, 2022). By implementing this approach, the likelihood of having excessive inventory or insufficient stock is reduced, leading to a higher rate of inventory turnover and enhanced efficiency across the entire supply chain. By actively considering consumer feedback and staying informed about trends in the market, manufacturers can identify opportunities to improve, distinguish, and personalise their products (Linton & Vakil, 2020). This enables them to develop innovative products that more effectively meet their consumers' demands, thereby boosting demand and enhancing market competitiveness (Ajmal et al., 2021).

2.2 Company Sustainability

The viability of companies amidst the outbreak hinges on the capacity of their supply chains to exhibit resilience. A robust supply chain enables organisations to efficiently address disruptions, maintain operations, and meet client requests despite barriers (Sarkar et al., 2022). Amidst the epidemic, organisations with strong and resilient supply chains were able to quickly adapt, find alternative resources, and handle risks more efficiently, thereby contributing to their long-term sustainability objectives (Frederico, 2021). The support of the government significantly strengthened these endeavours, offering essential resources and legislation to assist companies in managing the crisis and improving the resilience of their supply chains. Companies that neglected to prioritise sustainability face the possibility of being out of sync with customer preferences (Nikolopoulos et al., 2021). Companies that fail to prioritise sustainability are at risk of lagging behind in meeting customer demands. Based on a recent study done by the Institute, (2020), it was found that 79% of consumers were altering their shopping patterns to prioritise sustainability. Organisations who have implemented measures to enhance their sustainability will have a competitive advantage (Ivanov, 2023). This study will assess company sustainability based on social performance, economic performance, and environmental performance.

2.3 Government Support as Moderator

Malaysia's manufacturing sector in Malaysia bore the brunt of the impact from March 2020, the reference month. The government's decision to restrict commercial and industrial operations and permit only essential services was predicted to have some impact on the development of sales value. This was because it was assumed that these essential services would account for between 60% and 70% of manufacturing turnover. In fact, the labour force of only 50% of the employees limited the productivity of the business. Manufacturing, which exported more than 80% of the goods it produced, was an important part of Malaysia's export growth (Mohamad, 2020).

COVID-19's global spread influenced Malaysia's sales value, hence reducing exports. Consequently, the industrial sector, which depended on intermediate commodities and capital goods, experienced a decrease in its ability to maintain supply chains due to widespread implementation of lockdown orders in most nations (Dubey et al., 2023). The reduction in sales in the manufacturing industry was caused by a combination of factors including a scarcity of workers, changes in the production schedule, decreased production capacity, and limited sources (UNIDO, 2020). This issue also demonstrated that most businesses struggled with supply chain sustainability, which had impacted economic, social, and environmental performance.

Several studies Abate et al. (2020) and Nasir et al. (2022) emphasised the necessity of government support to help organisations deal with the repercussions of the pandemic. Karmaker et al. (2021) said government financial assistance in the form of incentives, tax breaks, and loans played a crucial role in guaranteeing the long-term sustainability of the industrial industry. However, government initiatives to limit business and industrial operations affected the performance of sales. The essential service was estimated to contribute around 60% to 70% of the sales value of the manufacturing sector; even a human resource capacity involved only 50%

of employees would limit the productivity of the company. Malaysia's export growth was closely linked to the manufacturing sector, where over 80% of manufactured goods were exported. The transmission of COVID-19 worldwide affected Malaysian sales value and, after that, reduced export value. Major trading partners in Malaysia slowed down export and import activities. Because most countries implemented entry restrictions and lockdown, the manufacturing sector experienced a reduction in the supply chain.

Doherty et al. (2020) reported that over 70% of participants expressed the view that government assistance during crisis was inadequate in mitigating the impact of the lockdown. The question arose over the sufficiency of government action in resolving industry-related issues. The COVID-19 pandemic and ensuing lockdowns caused significant interruptions to commercial operations, the worldwide supply chain, and international trade. Tan Sri Muhyiddin Yassin, the ex-Malaysia Prime Minister, declared that the government incurred a substantial loss of 64.6 billion Malaysian Ringgit during the initial fourteen days of the Movement Control Order (MCO) starting from March 18th, 2020, (Hasimi, 2020). Continuing the MCO would result in increased potential losses and a greater number of job losses. The current predicament of the government has been compared to a circumstance where one is caught between two equally challenging and perilous options (Nikolopoulos et al., 2021). Therefore, it can be prevented by developing an effective plan in corporate management. One approach entailed determining the VSCM practices that exert an impact on the company's sustainability. As a result, the business successfully sustained its operations and overcame the hurdles presented by the epidemic. Figure 1 illustrates the structure of this investigation.

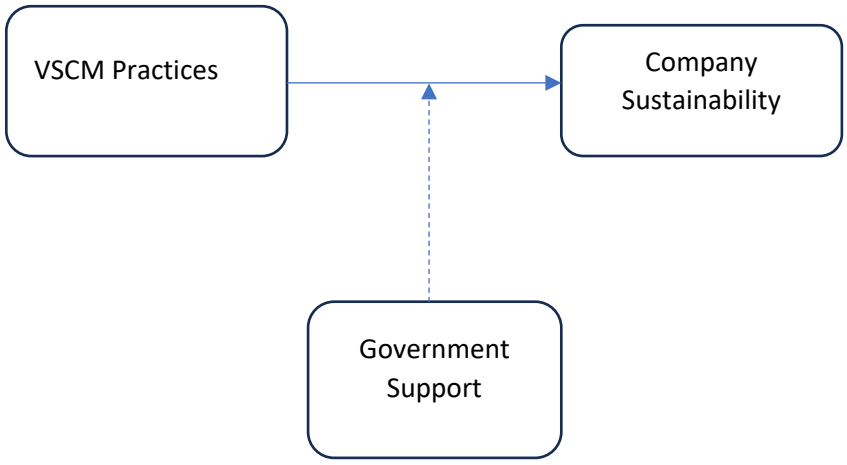

Figure 1. Research Framework

3. METHODOLOGY

The survey was given to the manufacturing businesses in Malaysia that are affiliated with the Federation of Malaysian Manufacturers (FMM). The study employed a stratified random sampling process. The questionnaire is generated after a thorough analysis of prior VSCM content. The questionnaire instrument was focused on demographic or background information of target respondent such as gender, education background, position in the organisation and the length of services in the company. The survey will utilise a five-point Likert scale to assess participants' responses. Of the original 488 surveys, 197 were returned with fully completed responses.

4. RESULTS

The bootstrapping method was employed to examine the relationship between an independent variable, dependent variable, and moderator. The numbers 1.645 are crucial for one-tailed t-tests when the significance level is set at 5 percent (Hair et al., 2019). For the hypothesis to be considered valid and accepted, the t-value of the hypothesis must be greater than 1.64 when the significance level is set at 5% (Sarstedt et al., 2019). The criterion for significance was established as a p-value that was lower than 0.05. The initial stage of the statistical significance test involved evaluating the direct relationships.

The structural model establishes a clear and uncomplicated connection between VSCM and the sustainability of the organisation. Table 1 comprehensively presents the significance test results for this structural model. The results presented above provide evidence to support the association between VSCM and firm sustainability. The fact that the t-values exceed the threshold value of 1.645 indicates a statistically significant correlation. This study recognises it as significant because the p-value is less than 0.05. According to the research goals, there is a favourable correlation between VSCM and corporate sustainability.

Table 1 Results of Significance Testing (Direct Relationship)

	β	Standard Deviation (STDEV)	*t*-Value	*p*-Value	Decision
VSCM → Sustainability	0.617	0.059	10.505	0.000	Accepted

The moderation model could be seen in Figure 2. The government role has been hypothesised to have a moderating effect on the link between VSCM and company sustainability. In smart PLS, the orthogonalising method was initially employed to generate the interaction effect between company sustainability and the moderator variable.

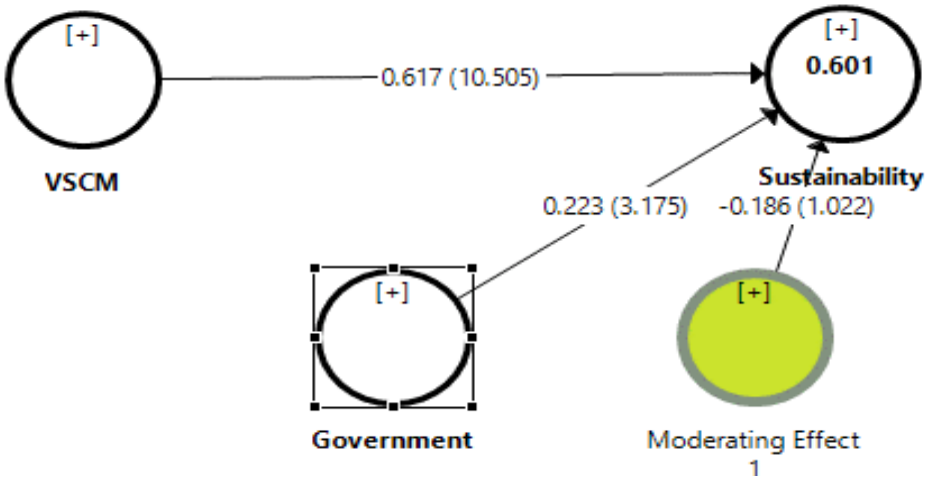

Figure 2. Moderation Model

The moderating effect in the current study was assessed by employing 5000 bootstrap samples and a significance level of 0.01 (Hair Jr et al., 2020). The results, as presented in Table 2, demonstrated that the hypothesis was rejected due to a t-value that was below the critical threshold of 2.33. According to the information presented in Table 2, the involvement of the government did not have a moderating impact on the correlation between VSCM and the sustainability of the enterprise (p = 0.154, t-value = 0.182).

Table 2 Moderating Effect Results

	β	Standard Deviation (STDEV)	*t*-Value	*p*-Value	Decision
Moderating Effect 1 → Sustainability	-0.186	-0.116	0.182	0.154	Rejected

5. DISCUSSION

The primary objective of this study was to examine how the government's support affects the relationship between VSCM practices and corporate sustainability throughout the crisis. Thus, it was hypothesised that the government's backing had an impact on the relationship between VSCM practices and the long-term viability of enterprises. Nevertheless, the outcome acquired did not substantiate the hypothesis. Consequently, it was clarified that the strong positive correlation between VSCM practices and firm sustainability does not depend on the government's support. Therefore, the findings indicated that the government's support did not significantly moderate the positive impact of VSCM practices on company sustainability.

The influence on the production sector in Malaysia is readily seen in the reference month of March 2020. The government's move to limit business and industrial operations and allow only essential services to operate is expected to affect sales performance to some extent. This was since this essential service was estimated to contribute around 60%–70% of the sales value of the manufacturing sector, and even the human power capacity involved only 50% of the employees, which limited the company's productivity. Malaysia's export growth was closely related to the manufacturing sector, where more than 80% of manufactured goods were exported. The global dissemination of COVID-19 had an impact on Malaysia's sales value, leading to a subsequent decline in exports. Linkages and supply changes between Malaysia's main trading partners slowed down export and import activities. As a result, the manufacturing sector, which included intermediate goods and capital goods, experienced a reduction in the supply chain as most countries had implemented restrictions on entry and exit (lockdown) (Mohamad, 2020).

Various steps were being taken by the government to ensure not only the immediate eradication of this virus but also the survival of the people. Three types of government interventions were implemented to enhance SCM: containment and health measures, social distancing protocols, and income assistance initiatives (ILO, 2020). Containment and health response were centred on public awareness campaigns, testing, and quarantining policies. The social separation measure was mostly about lockdown, the closure of some business sectors, schools, parks, mosques, and others, as well as travel restrictions. While income support packages focused on providing financial help to households and impacted companies in the form of direct cash transfers, debt relief, and other payments for utilities (Ashraf, 2020).

The results of this research suggest that the government's influence did not significantly affect the correlation between VSCM practices and the sustainability of companies. The purpose of this study was not to criticise government initiatives to assist the industry, but it concluded that these efforts were inadequate and unfinished. Abate et al. (2020) stated that although the government has implemented economic stimulus programmed to aid affected individuals or enterprises, the

support offered is only of a transitory nature. Malaysia had the smallest percentage of respondents who expressed satisfaction with the government's performance (Oikawa et al., 2021). In addition to infusing cash as part of an economic stimulus package, the government also experiences a decline in revenue when economic activities cannot be carried out.

If the MCO was allowed to continue, the potential for losses would increase, and the number of individuals who would have lost their jobs would increase as well. The manufacturers were also faced with various losses because of the implementation of this MCO. Factories were ordered to close during the pandemic, and various restrictions were placed on the country's import and export activities. As a result, production could not be carried out due to various problems in the supply chain, and sales in manufacturing suffered losses.

The decline in business sentiment was partly attributable to the recent increase in COVID-19 cases, which forced the reinstatement of movement restrictions to reduce infection rates. This issue resulted in the shutdown of factories that were not permitted to operate during the specific period (Zainuddin, 2021). For example, due to these restrictions, many factories were faced with a shortage of raw materials. These raw materials were needed to produce products. The manufacturers failed to achieve the target in production and ultimately failed to meet the demand from customers. Factories would have suffered such severe losses that they would have been forced to downsize operations to save costs (Seifert & Markoff, 2020). The impact of this move caused many people to lose their jobs. Therefore, it was something that could be prevented by the management of a company putting together a solid plan. One of the strategies consisted of determining which important VSCM success variables would influence the company's capacity to remain sustainable.

A study by Min, (2022) showed that during the pandemic, the government aided in the form of monetary subsidies. However, this support was insufficient given that most large businesses have substantial financial resources. This financial capability includes manpower, factory operations, funds, and so on. The government considered these large corporations to have adequate financial reserves to resist COVID-19. However, large businesses were also experiencing a serious financial crisis due to temporary business closures and employee reductions. Based on the results of this analysis, the intervention of the government during the pandemic proved to be one of the most significant bottlenecks to the company's supply chain.

6. CONCLUSION

To fortify the resilience of SCM in the face of prospective threats, it is imperative for the government to sustain financial and moral support for the manufacturing sector. The first method was to increase both transparency and coordination. To maintain the predictability that businesses had grown to expect from supply chains and the accuracy that businesses aim for, it was necessary to maintain a high degree of coordination not only among all participants in the supply chain, as well as the public and private sectors, but also across different levels of government and within governments. Without a doubt, the government should not just continue to provide financial assistance to companies; they also need to evaluate all other types of assistance provided to ensure that they are comprehensive and effective. Most manufacturing businesses struggle since the promised aid does not reach them and instead is concentrated more on Small and Medium-Sized Enterprises (SMEs). Additionally, because the aid was delivered at such a glacial pace, the business suffered huge losses while waiting for help.

Most of the government's efforts benefit the SMEs industry more than large companies that have been established for a long time. Therefore, the government needs to be more systematic and detailed in devising an effective strategy for helping manufacturers since the manufacturing sector is one of the major contributors to the national economy. Malaysia has used lockdown multiple times in situations involving lockdown. However, this lockdown was viewed as

ineffective and unserious. Consequently, the factory's production schedule was delayed because of workers inability to report to work and logistical issues. Companies suffered losses because of their inability to adhere to the production schedule. Undoubtedly, the primary aim of this lockdown was to prevent the transmission of the virus between individuals. Nevertheless, the execution of this lockdown required a more deliberate and comprehensive approach. The government also needed a more systematic and planned method for establishing Standard Operating Procedures (SOPs) in the workplace. The model developed in this study can be further evaluated according to subgroups to test what effects these groupings have on the relationship among different constructs. For example, a future study can consider company size, type of products manufactured, and company ownership as the dataset to see whether these groups would have any effect on the hypotheses tested.

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