



# Developing resilience of MNEs: From global value chain (GVC) capability and performance perspectives

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## ARTICLE INFO

### Keywords:

Global value chain (GVC)  
Resilience  
Risk performance  
Agility  
MNE performance  
Reengineering

## ABSTRACT

External shocks create various risks for enterprises. Multinational enterprises (MNEs) work to develop resilience and improve their global risk management capability. The COVID-19 pandemic has compelled MNEs to improve their global value chain (GVC) capability to enhance their global risk management and operational performance, which could eventually impact their overall performance. Developing GVC capability is a challenge for MNEs. This study aims to examine the influence of global risk management capability on MNEs' GVC capability to become more resilient to withstand such crises and further enhance their performance. Building on the resource-based view (RBV), dynamic capability view (DCV), and the existing literature, a conceptual research model was prepared. The model was then validated using the PLS-SEM technique to analyze the responses of the 323 managers at different MNEs. The study found a significant positive impact of global risk management capability on GVC capability, which eventually impacted MNE performance.

## 1. Introduction

Globalization has streamlined various business processes in different parts of the world to make a single production system with value added to each of the components of the processes (Gereffi, 2020). The globalization process makes it possible for a business unit to outsource different components from around the world, using a global supply chain management system, and to assemble them to produce a complete product that is more profitable (Kano et al., 2020). This co-dependency is conceptualized as a global value chain system (Kim & Rosendorff, 2021). A smartphone assembled in China may use graphic design elements from Singapore, silicon chips from Taiwan, and valuable metals from Latin American countries. Throughout the entire process, participating countries retain some value and are able to benefit from the finished products that are sold worldwide. Thus, development of GVC capability could benefit enterprises in different countries that

participate by becoming more resilient and eventually making more profits. GVC takes the view that upgrading is continuous, starting with upgrading processes and then product quality using higher quality materials with a better-quality management system (Humphrey & Schmitz, 2004). From a risk management perspective, GVC is associated with improved agility, supplier integration, and reengineered supply chains (Manuj & Mentzer, 2008). GVC activities of MNEs are a full range that includes designing, production, marketing, distribution, consumer support, and so on. These activities need to be divided among multiple subsidiaries and workers across diversified geographic spaces to bring a product from its very conception to its end use and even beyond that (Kano et al., 2020).

MNEs that operate in different countries experience several global risks, including environmental, economic, societal, geo-political, and technological risks (Hauser, 2003; Juttner, 2005; Dreyfus & Nair, 2022). By experiencing such external shocks, MNEs have become more resilient

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<https://doi.org/10.1016/j.jbusres.2023.114447>

Received 2 November 2022; Received in revised form 27 November 2023; Accepted 30 November 2023

Available online 8 December 2023

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and aware of the need to meet sustainable development goals (SDGs) (Van Tulder et al., 2021). MNEs must develop their capacity to resist, absorb, and successfully respond to abrupt shocks, which is also known as resilience (Ambulkar et al., 2015). Simultaneously, MNEs must develop their ability to move quickly, flexibly, and decisively to address any sudden shock, which is also associated with the concept of agility (Altay et al., 2018). They need to develop a sustained risk management culture by adopting appropriate management measures which are conceptualized as global risk management capabilities. Hence, developing resilience by improving global risk management capability and global value chain capability has become a strategic approach for MNEs to succeed in addressing any crisis. The recent COVID-19 pandemic has been a good lesson for MNEs on how to address such an apocalypse (Gereffi, 2020; Saurav et al., 2020).

The external shock of the COVID-19 pandemic caused a 37% decline in the income of 80% of MNEs by September 2020 (Saurav et al., 2020). In addition, cost increases in transportation and global procurement have further exacerbated the situation (World Trade Organization 2021). Such an untoward and unexpected crisis brought new impetus to the debate on how MNEs could develop their global value chain (GVC) capability to effectively mitigate such disruptions (Gereffi, 2020; O'Leary & Tsui, 2020). Improved global risk management ability would enable MNEs to become more agile and capable of integrating their suppliers and improving their overall supply chain management, which could eventually impact their overall global risk management performance and operating performance (Ismail et al., 2011; Hillmann & Guenther, 2021).

Previous studies have discussed the concept of a firm's resilience (Rahi, 2019; Conz & Magnani, 2020). For instance, Conz and Magnani (2020) recognized that to withstand major changes, disruptions, and crises, MNEs need to be more resilient and agile to dynamically absorb and adapt to the ever-changing, external conditions. However, those authors called for more studies on how MNEs can reconfigure their business models to mitigate economic, environmental, technological, and other related challenges. This concept requires further work on nomological assessments (Hillmann & Guenther, 2021). Also, a few qualitative studies (Liu et al., 2018) have investigated and analyzed the specific contextual factors of the various competencies of MNEs that constitute GVC capability that could largely improve their global risk management performance, their operational performance, and finally their overall performance. Additionally, previous studies have analyzed the impact of GVC capability on the supply chain management system (Aslam et al., 2018). However, more research is needed to determine how improving the GVC capability and the global risk management capability can enhance the performance of MNEs to develop organizational resilience.

Therefore, the research questions addressed in this paper are the following:

*RQ1: To what extent can the enhancement of global risk management capability improve operational and risk management performance by improving the GVC capability of MNEs?*

*RQ2: Can the enhancement of global operational and risk management performance improve the organizational resilience of MNEs to address any crisis?*

To address these RQs, this study analyzed the inputs of 323 MNE managers (collected from 23 MNEs) across Asia and the EMEA region. This study develops and validates a theoretical model using a factor-based PLS-SEM technique. To substantiate the empirical findings, this study integrates RBV (Barney, 1991) and DCV (Teece et al., 1997) because neither perspective alone can explain how global risk management capability could improve the performance of MNEs by improving intermediate contextual factors.

This research responds to the call for more quantitative studies about the impact of the risk management capabilities on the GVC capabilities

(Ambulkar et al., 2015). It contributes to research streams on the resilience of MNEs in international business studies. For instance, this contribution uncovers the impact of global risk management on the resilience capabilities of MNEs and their performance while being affected by external shocks. Moreover, this study extends the concept of DCV and proposes an integrated model by combining the concepts of RBV and DCV. GVC analyzes the phenomenon where the production activities are split into different tasks. This process can be conceptualized as a large-scale division of labor across different countries (Fernandez-Stark et al., 2011). Cross border production process liberalizes trade and investment, develops the communication process, lowers transport costs, and improves innovation of logistics (Blome et al., 2013; Gölgeci & Ponomarov, 2015). These micro processes impact the overall performance of the participating enterprises as they increase their revenue through transformational cooperation in industrialized economies.

The remainder of this paper is organized as follows. Section 2 outlines the literature background, discusses key issues, and identifies research gaps with regard to MNEs and resilience in an international business context. Section 3 introduces and discusses the theoretical underpinnings and develops six research hypotheses. Section 4 shows the methodology employed, while Section 5 presents the data analysis and the outcomes of the empirical analysis. A discussion and final remarks are presented in Section 6.

## 2. Background studies

### 2.1. Resilience of MNEs

Rapid technological progress, supplemented by intelligent manufacturing technologies and digitalization, has caused enterprises to reconfigure their business models (Culot et al., 2020). Those technological developments include decentralization of manufacturing processes, localization of production, as well as improved ease of product customization (Hannibal, 2020; Kano et al., 2020; Ghosh et al., 2021; Chaudhuri, Chatterjee, & Vrontis, 2021). Thus, MNEs need various options for business models that they could adopt to address the interference from external dynamic business environments and shocks. They must also possess risk-taking abilities, resilience, and a proactive attitude that improve their GVC capabilities to address any challenging, unpredictable, and external situation.

Abrupt environmental changes impede the growth of MNEs, which necessitates them to develop sustainable and more resilient business models to appropriately respond to such external disruptions. The development of new business models has become necessary to foster resilience in MNEs operating with GVC capability (Brandon-Jones et al., 2014; Hillmann & Guenther, 2021). It has been noted that "to be resilient, organizations need to develop appropriate management policies and actions that assess risk continuously and coordinate the efforts of their supply network" (Scholten et al., 2014, p.215). Thus, this study argues that global risk management ability could impact GVC capabilities, which eventually influence MNE performance as they develop a global risk management strategy and devise to improve their operational performance. To address major disruptions, MNEs need to be resilient and agile to promptly absorb and adapt to external dynamics by integrating valuable in-house resources with seized external opportunities, which is in terms of resource-based view (RBV) (Barney, 1991) and dynamic capability view (DCV) (Teece et al., 1997).

Organizational resiliency is deemed to be a vast and inspiring topic, and several researchers have called for more in-depth studies on its nomological explanation as well as assessment (Rahi, 2019; Hillmann & Guenther, 2021). Scholars have nurtured the term resilience in different ways. Vogus and Sutcliffe (2007) saw resilience as a process-specific issue, Linnenluecke (2017) discussed several studies that defined it as an outcome, and Ortiz-de-Mandojana and Bansal (2015) called it capability. To address external shocks, MNEs must transform their resilient business practices, such as the logic behind their business

activities, and find novel ways to create business value and to do business (Teece, 2012). They need to update their risk management abilities to be explorative (ambidextrous), so they can exploit them to ensure proper integration among their suppliers to manage the supply chain process (Wamba et al., 2019).

To cope with hostile external environments, enterprises invest in robust information and communication technology (ICT) practices. With these ICT practices, MNEs can improve their supply chain agility and adaptability, along with their risk management abilities, to update inter-enterprise and intra-enterprise performance (Chakravarty et al., 2013; Bhattacharjee et al., 2021; Chatterjee, Chaudhuri, & Vrontis, 2022). In fact, the risk management and operational performance literature have recognized the importance of MNEs' GVC capabilities, including their agility, supplier integration ability, and development of global supply-chain management capabilities (Aslam et al., 2018). However, it has been argued that by identifying valuable, rare, inimitable, and non-substitutable (VRIN) in-house capabilities and integrating those with external opportunities that have been seized, it could be easier for MNEs to ensure better performance in the dynamic business environments. This concept is founded on the theories of RBV (Barney, 1991) and DCV (Teece, 2012). There is a need for more studies on how risk-taking ability can help MNEs update their GVC capabilities to confront external threats and improve their various performance matrices (Wamba et al., 2019; Chatterjee, 2019b).

Moreover, previous studies have demonstrated that enterprises need to appropriately reconfigure their business models to include modern technologies (Culot et al., 2020; Hannibal, 2020; Kano et al., 2020). Other studies have also demonstrated that MNEs need to develop their risk management capabilities to become more resilient in the face of external shocks (Rahi, 2019; Hillmann & Guenther, 2021). For instance, Aslam et al. (2018) found that MNEs should recognize the importance of GVC capability, especially focusing on agility, supplier integration, and the improvement of supply chain management systems. There is a need for further investigation of how MNEs should improve their global risk management capabilities by enhancing their GVC capability to improve their overall performance.

## 2.2. Global value chain capability and MNEs resilience

GVC is defined as "the full range of activities that firms and workers perform to bring a specific product from its conception to its end use and beyond" (Fernandez-Stark et al., 2011, p.206). To address any crisis during an external shock, MNEs need to improve their global risk management capabilities to develop and upgrade their GVC capabilities that impact their performance matrices of employment, economy, and income. A firm's capability is associated with its accumulated skills and knowledge, which are embedded in its organizational processes and procedures. It should have different capabilities that encompass human resources, supply chain, and marketing. GVC capability is one such capabilities through which a firm can efficiently carry out all required activities by engaging different actors to bring its products from manufacturing units to the marketplace more quickly and efficiently. GVC capability can consist of a firm's agility, supplier integration, business reengineering processes, among others (Vagnoni & Khoddami, 2016; Lu et al., 2016; Shafiq et al., 2022). A firm with superior GVC capabilities can better withstand dynamic and volatile business situations. GVC capabilities can create adequate opportunities to improve the overall performance of MNEs (Chatterjee et al., 2021; Chaudhuri et al., 2022).

GVC is associated with what is known as the upgrading process. That process includes adopting better technology to improve efficiency, upgrading the products by improving their quality and functionalities with better materials or by applying a better quality management system. The process of functional upgrading then takes place, which includes developing branding and marketing abilities and eventually supplying the products directly to the end customers. There are various

phases of GVC activities from manufacturing to marketing the products, including preproduction as well as postproduction processes (Hummels et al., 2001; Bair, 2009; Kim & Rosendorff, 2021).

Due to external shocks and disruptions, there is a need to foster resilience of MNEs so that they can develop their GVC capabilities (Brandon-Jones et al., 2014; Chatterjee, 2015b). It has been observed that due to the COVID-19 pandemic, governments and agencies have tightened the rules concerning SDGs and imposed restrictions and regulations which could adversely impact the pace of progress of MNEs (Zhan & Santos-Paulino, 2021; Basile et al., 2021). This necessitates the transformation of firms' business models to address turbulent situations. Recent studies have identified how GVCs were affected during the COVID-19 pandemic and how, through new business models, it was possible to use local resources to address resource depletion (Kim & Rosendorff, 2021; Carton & Parigot, 2022). Another study investigated how African firms integrated GVC to ensure success (You et al., 2018) and how the GVC approach can help in our understanding of the impacts of MNEs on economic and social upgrading (Lee & Gereffi, 2015). However, a few studies have investigated how MNEs' GVC capabilities could help develop their business models to integrate environmental, economic, technical, and other related challenges (Conz & Magnani, 2020). In this context, none of these studies investigated how MNEs could remain consistent in their performance during external disruption and volatile market situations. Moreover, none have examined how, by improving global risk management capability, MNEs can withstand the volatile market situation and sustain their performance. The role of GVC capability in such volatile market conditions remains unexplored.

## 3. Theoretical underpinning and hypotheses development

### 3.1. Theoretical underpinning

The present study attempts to understand how the risk management abilities of MNEs could impact their GVC capabilities to develop resilience when they experience abrupt major disruptions. We also investigate how MNEs could mitigate the major disruptions through business model transformation by developing pre-production and post-production processes with the help of their in-house capabilities and by seizing the sensed opportunities from external sources. To explain why this issue demands that business processes are transformed, the present study builds on RBV (Barney, 1991) and DCV (Teece et al., 1997).

This study argues that the risk management abilities of MNEs have VRIN characteristics, corroborating the concept of RBV (Barney, 1991). In the GVC context, risk management abilities can help MNEs to become more agile and to effectively manage the integration of different suppliers in the global supply chain system for all the participating enterprises. Such abilities could improve MNEs' global supply chain reengineering efforts to address any turbulent situation, like the COVID-19 pandemic. These abilities help a firm to sense external opportunities, seize those opportunities, and then execute those opportunities with the support of in-house VRIN capabilities to improve overall performance. Hence, the GVC capability is considered a dynamic capability of the MNEs as it exhibits sensing, seizing, and reconfiguring abilities. Thus, it is argued that risk management capability and GVC capability are related to the concepts of RBV (Barney, 1991) and DCV (Teece et al., 1997).

To fulfil business needs during major external shocks, MNEs need to develop the flexibility of their risk management abilities by appropriately integrating their valuable, rare, inimitable, and non-substitutable (VRIN) capabilities with suitable seized external opportunities. These concepts corroborate RBV and DCV. The RBV elucidates that resources are the factors that enterprises own and control that they use to improve the quality of the final products and services (Pöyhönen & Blomqvist, 2006). This view suggests that not all resources can be used to achieve competitive advantage. The proponents of RBV emphasize an intra-

enterprise focus to explain how MNEs could gain competitiveness by deploying their enterprise-specific resources (Wójcik, 2015; Chiu & Chen, 2015). From this perspective, the MNEs need to exploit their in-house competencies with their VRIN abilities. By improving in-house abilities, like risk-management ability, it is possible for MNEs to address the abrupt shocks with their improved GVC capability. Therefore, it is argued that global risk management capability is one of the VRIN abilities, which supplements RBV (Barney, 1991).

To be more agile, MNEs must explore their abilities to sense the external opportunities for mobilizing external resources to develop the appropriate business model and to integrate it with their VRIN competencies to address the dynamic markets. This concept is in accordance with DCV. During and after any crisis, markets undergo rapid changes. To address such dynamic markets, MNEs need to be flexible by becoming more agile in improving their abilities to integrate suppliers and manage their supply chains. To achieve this, they must be able to sense and seize available and suitable external opportunities. They should finally be able to redesign their business operations landscape accordingly by integrating those opportunities with their existing in-house resources (Teece, 2012). This idea is in conformity with DCV since the implication of this view is concerned with MNEs building competencies to exploit new resources and revive their existing resources, thus improving their overall performance (Krzakiewicz, 2013).

It is also pertinent to mention here that bifurcated governance and decoupled value chains appear to be the destiny of GVC activities, though MNEs strive to continue to navigate the uncertain and volatile business environment that makes collaborative efforts among the GVC members more complex. In the context of GVC efforts, co-specialization remains a key area of concern for the MNEs involved. Thus, for their survival, MNEs need to enhance their GVC capability by identifying new areas of growth from external sources and orchestrating the required capability to successfully use constantly emerging changes in the external opportunities. In such a context, reconfiguring the MNEs to appropriately address those seized opportunities has become crucial for survival as well as for prosperity. Hence, for MNEs to survive, their GVC capability must have the expertise to sense external opportunities, then to seize them, and finally to integrate them with their inhouse VRIN abilities to appropriately react and respond in such a high velocity business environment. In this perspective, GVC capability of the MNEs is considered the static capability in the existing market and the dynamic capability in the ever-changing market, corroborating the concepts of both RBV (Barney, 1991) and DCV (Teece et al., 1997). Hence, from the concepts of RBV and DCV, the present study establishes a successful nexus between the risk management capabilities of MNEs and their performances by improving some intermediate contextual factors. The theoretical aspects are presented in Table 1.

### 3.2. Hypotheses development and conceptual model

In studying the literature and the concepts of RBV and DCV, we could help MNEs to identify the ways to become more resilient, to ensure business continuity, and to mitigate major risks. This can be accomplished by enterprises transforming their business model. In this context, from the knowledge of literature and DCV and RBV, we argue that, to address external shocks, MNEs need to improve their risk management abilities to foster resilience and to improve their GVC capabilities. The impact of supplier agility and integration improves GVC capability, as does reengineering the supply chain process, all of which could help the overall performance of MNEs (DeGroot and Marx, 2013; Dubey et al., 2019). Here all these antecedents will be explained, and hypotheses will be formulated to create our theoretical business model.

#### 3.2.1. Global risk management capability (RMC)

MNEs are vulnerable to the expected and unexpected risks of sudden external shocks that pose challenges for their smooth operations. Global risk management capability is explained as the capability of an MNE to

**Table 1**

Theoretical explanation (RBV, DCV, and GVC).

Particulars	Explanations
RBV (Barney, 1991)	RBV elucidates that the internal resources which possess valuable, rare, inimitable, and non-substitutable (VRIN) characteristics can help the enterprises to improve the quality of the final products or services. The proponents of RBV advocate that in the static market environment, MNEs can gain competitiveness by appropriately deploying and using the inhouse VRIN resources (Pöyhönen & Blomqvist, 2006; Wójcik, 2015).
DCV (Teece et al., 1997)	When addressing a dynamic business environment, the existing resources of the MNEs become inadequate. Therefore, MNEs need to sense external resources and to seize those resources to develop a new business model for the volatile market. After that, the MNEs should integrate the seized external resources with their existing VRIN resources to successfully react and respond to the customers' changing needs. The capability comprising sensing, seizing, and integrating abilities is called dynamic capability (Teece, 2012; Teece, 2014), which is the concept of DCV (Teece et al., 1997).
Intersection of RBV and DCV with GVC	GVC capability of the MNEs includes designing, production, supplier integration, resource management, exploration and exploitation activities, marketing, distribution, end-user support, and so on (Kano et al., 2020). Since the market fluctuates, existing competencies of the MNEs can hardly address all customer needs. As such, the GVC capability must include the ability to properly use the external opportunities by improving MNEs' sensing, seizing, and reconfiguring abilities (Teece, 2014), which are the dynamic capabilities (Teece, 2012). Thus, it can be said that GVC capability closely aligns the concepts of both RBV and DCV to address the static and dynamic market environments.
Situational context (RBV, DCV, and GVC)	For successfully executing GVC capability, MNEs should take support from other enterprises to manufacture a product as the outcome of the entire value chain process. The supporting enterprises must have abilities to use their existing valuable resources to appropriately sense and seize the external available opportunities to address the dynamic market. This co-dependency is also associated with the concept of GVC activities (Kim & Rosendorff, 2021). For example, a smartphone assembled in China may use elements of graphic design from Singapore, silicon chips from Taiwan, and precious metals from Latin American countries. Different enterprises participating in the entire value chain process with their static and dynamic abilities retain value, which can be compensated through the global sales of the final products.

sustain a strong risk management culture which enables it to manage any abrupt and untoward shock. To accomplish this, MNEs need to develop contingency plans to implement during crises. MNEs must also be able to continue the process to appropriately identify, analyze, evaluate, and treat loss exposures and to monitor financial resources and expertise to mitigate the unexpected and adverse effects of such loss. In such a scenario, the MNEs need to develop new business models that enhance their risk management abilities (Deloitte, 2021). With global value chain (GVC) capabilities, MNEs can enjoy better financial opportunities, larger product markets, arbitrage other opportunities, among others (Manuj & Mentzer, 2008).

However, coupled with these benefits, MNEs can also experience uncertainties and risks in sustaining GVC. As argued by Barry (2004), "an enterprise may have lowest overall costs in a stable world environment but may also have the highest level of risk – if any one of the multiple gating factors kink up an elongated global supply chain" (p.695). Thus, to improve performance, MNEs need to develop their overall risk management capability. Risk management capability may

also be considered a dynamic capability, since enterprises that possess it can sense and seize external opportunities that can be reconfigured and integrated with their existing VRIN resources to address any unforeseen situation. This idea supplements the concepts of DCV (Teece et al., 1997; Teece, 2014) and RBV (Barney, 1991). An enterprise with global risk management capability can identify as well as evaluate risks in assessing the consequent eventualities. Global risk management capability enables MNEs to implement suitable strategies by coordinating with their stakeholders with the objective of reducing losses (Juttner et al., 2003). These strategies can help the MNEs to increase their agility by improving their exploitative and explorative approach to ensure better supplier integration and to achieve profitability in the global supply chain ventures, which are also considered GVC capabilities (Norman & Jansson, 2004; Wamba et al., 2019; Tamilmani et al., 2021). Accordingly, the following hypotheses are developed.

*H1a: Global risk management capability (RMC) positively impacts MNE agility (MAG).*

*H1b: Global risk management capability (RMC) positively impacts MNE supplier integration (MSI).*

*H1c: Global risk management capability (RMC) positively impacts global supply chain reengineering (SCR).*

### 3.2.2. MNE agility (MAG)

According to Vagnoni and Khoddami (2016), the agility of an enterprise is its ability to adapt, renew itself, and succeed in quickly changing against a turbulent, ambiguous environment. MNEs with agility can rapidly introduce new products and services commensurate with the changing business environment. The agility of MNEs should ensure their corporate commitment towards the environment, excellent customer service and customer satisfaction, and appropriate responses and reactions to the changing demands of the markets (DeGroot & Marx, 2013; Chatterjee, 2015a). This concept is in consonance with that of DCV (Teece et al., 1997). The MNEs can be more agile if they exhibit their abilities to exploit the existing resources properly and explore how new opportunities could help them (Wamba et al., 2019; Chatterjee, Chaudhuri, Vrontis, & Thrassou, 2022).

To address any untoward situation, MNEs must be ambidextrous by being innovative, explorative, as well as exploitative, and by improving their creativity, diversity, transparency, and collaboration (Dubey et al., 2018). To ensure they have all these qualities, MNEs need to redesign their business operations by improving operational performance (Vagnoni & Khoddami, 2016). The ability of the MNEs also depends on the availability of resources (Chiang et al., 2012; Chatterjee, 2019a; Chatterjee, Rana, & Dwivedi, 2022). If the MNEs possess all the above-mentioned qualities, then they are perceived to be able to impact their performance matrices, including the global risk management performance index and global operational efficiency. The above discussions help to formulate the following hypotheses.

*H2a: MNE agility (MAG) positively impacts global risk management performance (GRP) of the MNEs.*

*H2b: MNE agility (MAG) positively impacts global operations performance (GOP) of the MNEs.*

### 3.2.3. MNE supplier integration (MSI)

Supplier integration is considered a critical managerial plan and strategy to improve the performance of the buyers (Shafiq et al., 2022). An effective business style impacts organizations' operational performance, which helps them to redesign and reconfigure their supply chain practices to be more interactive, resilient, and complementary (Dubey et al., 2019). Studies have demonstrated that to ensure better supplier integration, MNEs must use their existing capabilities to strengthen their customer-supplier relationships (Blome et al., 2013), supply chain adaptability (Aslam et al., 2018), and supply chain resilience (Altay et al., 2018). Integrating suppliers helps to mitigate supply chain

disruption even in crises, strengthening the business performance of the MNEs (Lee & Rha, 2016; Chaudhuri, Chatterjee, Vrontis, & Thrassou, 2021). MNE supplier integration is considered to improve customer services by providing the distributors with effortless access to essential information to manage, place, and complete the orders (Jean et al., 2020). Supplier integration helps to improve collaboration and visibility, to stay on top of the demand, to become more flexible, to eliminate waste, and to ensure higher profit margins (Krumwiede & Charles, 2014). Supplier integration is deemed to be vitally important when MNEs face external shocks that severely hamper business activities. In that situation, the supplier integration capability depends on MNEs possessing VRIN capabilities that are adequate to address the shocks. When the market becomes highly volatile and dynamic, MNEs need to respond by sensing and seizing the optimal external opportunities that are available and then redesign their business model to fit the situation by integrating those opportunities with the existing in-house resources. This idea is in conformity with DCV (Teece et al., 1997). By integrating the suppliers, an MNE could mitigate the risk of global supply chain disruption, thus improving its global risk management performance, its global operational activities, and its overall performance. All these discussions lead to developing the following hypotheses.

*H3a: MNE supplier integration (MSI) positively impacts global risk management performance (GRP) of the MNEs.*

*H3b: MNE supplier integration (MSI) positively impacts global operations performance (GOP) of the MNEs.*

### 3.2.4. Global supply chain reengineering (SCR)

Supply chain reengineering (SCR) mainly focuses on overcoming several aspects of uncertainty in supply chain management, which include changing customer demands and needs, improving information quality, and minimizing the inherent delays in ordering and purchasing decisions (Lu et al., 2016). In terms of improving business operations, global supply chain reengineering helps MNEs manage product manufacturing, from the suppliers to the customers (Aslam et al., 2018). According to Kristal et al. (2010), it is a strategic choice of enterprises to simultaneously develop supply chain efficiency and flexibility. This approach is taken to optimize the operations from start to finish. Global supply chain reengineering ability helps MNEs to prepare their supply abilities to promptly address customers' multifarious demands in the volatile market environment, which is supplemented by the concept of DCV (Teece et al., 1997).

The notion of supply chain reengineering holds the common view that MNEs must be able to identify the appropriate supply chain for their products (Fisher, 1997; Lee & Rha, 2016). It is argued that, to meet the pressing needs of the dynamic environment, MNEs need to embrace the supply chain which can sharply react and respond to both short-term changes and long-term demand by restructuring their supply process (Lee, 2004). This concept is in conformity with DCV. Besides, the extant literature has demonstrated that supply chain management has a profound connection with the overall performance of enterprises (Parast & Subramanian, 2021; Pant et al., 2022). Moreover, the literature has also shown that by improving risk management abilities, enterprises can improve their operational performance (Whitten et al., 2012; Aslam et al., 2018). With all these inputs, the following hypotheses are prescribed.

*H4a: Global supply chain reengineering (SCR) positively impacts global risk management performance (GRP) of the MNEs.*

*H4b: Global supply chain reengineering (SCR) positively impacts global operations performance (GOP) of the MNEs.*

### 3.2.5. Global risk management performance (GRP)

Through the interconnectedness of various risks, MNEs can tailor effective risk management strategies with careful planning. Hauser (2003) observed that in complex, ever-changing business environments,

risk-adjusted supply chain management can impact the performance of enterprises. As a synergy of business strategy and risk and performance management, assessing global risk management performance is considered an effective method for MNEs to sustain the execution of their strategy (Juttner et al., 2003; Dreyfus & Nair, 2022). GRP is concerned with the ability of the MNEs to avoid the pitfalls which could overwhelm and eventually put them out of business. There are some key risk management matrices for tracking the risks, which include factors like the number of risks identified in different areas of the MNEs, the number of risks occurred, percentage of risks which could be successfully addressed, and cost involved in monitoring such risk management performance. Assessing their global risk management performance helps the MNEs to sustain their strategy not only when rapidly addressing abrupt and unexpected external shocks but also when facing any anticipated apocalyptic situation (Ali et al., 2021). GRP can be assessed by comparing the number of risks which had been identified with the number of risks that occurred, and finally, with the number of risks which were able to be mitigated (Juttner, 2005). MNEs can improve their global risk management capabilities by assessing the dynamism of the market environment by sensing and seizing the opportunities for understanding the nature of the risks. This supports the concept of DCV (Teece et al., 1997). Thus, risk management performance of MNEs is perceived to impact on their overall performance. Hence, it is hypothesized as follows.

*H5: Global risk management performance (GRP) positively impacts the MNE performance (MPE).*

**3.2.6. Global operations performance (GOP) and MNE performance (MPE)**

Eckstein et al. (2015) argued that GVC capabilities could better synchronize supply and demand to impact business activities. By developing GVC capabilities, MNEs could minimize the time it takes to replace materials or perform services. They could also ensure improved throughput and quickly adjust the production process, which could help them to customize their products and services according to changing customer needs in the dynamic market (Lee, 2004; Tattara, 2018). This idea corroborates DCV (Teece et al., 1997). In consonance with this logic, there is a rich body of literature which has ascertained a positive

nexus between operational performance of MNEs and their overall performance when all other performance matrices are improved (Gligor et al., 2015; Dubey et al., 2018). Firm performance is conceptualized as an economic aspect of the firms' capabilities to effectively use material and human resources to achieve the firm's goals. Performance matrices include market share, revenue, profitability, value-added productivity, as well as cash flow (Dubey et al., 2018). In the context of GVC with focus on operational management of MNEs, it is notable that a value chain is considered an integral part of strategic planning for continuing uninterrupted successful business. Since a value chain is concerned with a full life cycle of a product or service, its success is closely related to the operational performance of the relevant MNEs (Tattara, 2018). GVC helps to enhance overall business efficiency through better performance so that the business can deliver value while incurring the least possible costs. The end goal of GVC activities of MNEs is to create a competitive advantage by increasing the productivity through better operational performance and keeping the cost of products or services at a reasonable level. All these arguments help formulate the following hypothesis.

*H6: Global operations performance (GOP) positively impacts the MNE performance (MPE).*

Here, control variables such as size and type of MNEs were considered in this study.

With all these inputs, a theoretical model is proposed, which is provided in Fig. 1.

**4. Research methodology**

To test the research hypotheses, a survey was conducted to collect data from respondents who have ample knowledge in the domain of this study. This survey method is perceived to be suitable for studies which aim to test the hypotheses and develop measurement scales (Lee & Shim, 2007). After the respondents completed this survey by answering a structured set of questions, their inputs were analyzed. The inputs have been quantified statistically.

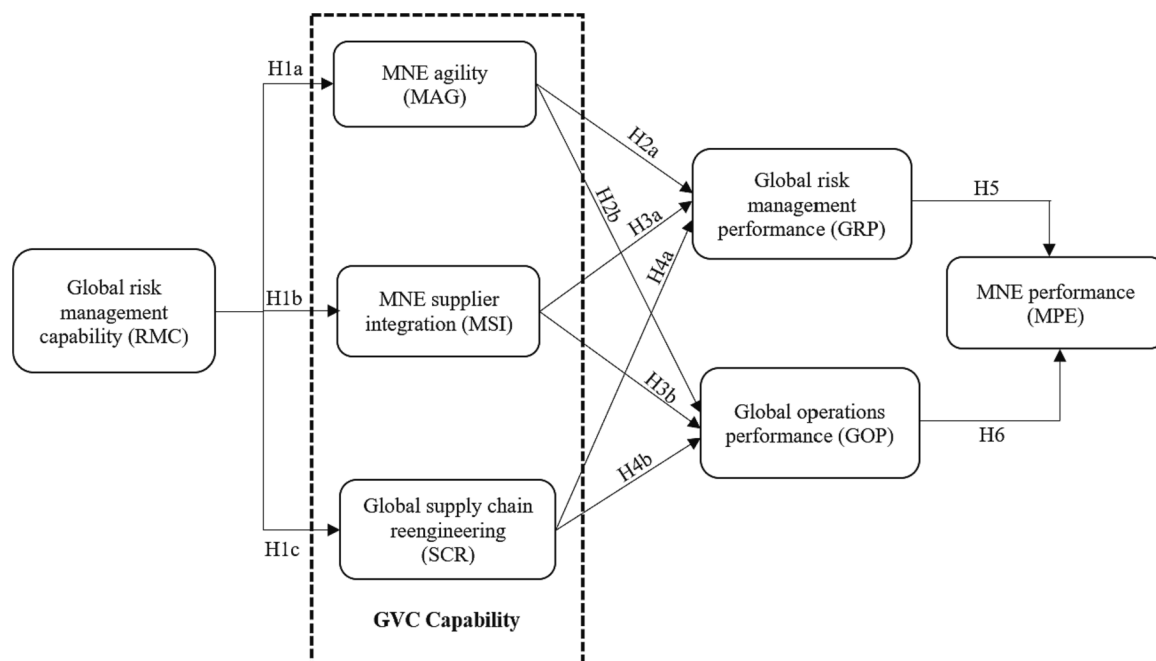


Fig. 1. Conceptual model (adopted from RBV and DCV).

#### 4.1. Preparation of research instruments

The set of questions was prepared by adopting relevant measures from the knowledge of extant literature. The dimensions were assessed on a 5-point Likert scale that had anchors at Strongly Disagree (SD) as 1 and Strongly Agree (SA) as 5. The survey questionnaire was initially pre-tested by nine experts, followed by personal discussions on the proposed survey questions. This was done to ensure that the questions were understandable and unambiguous so that potential respondents would not be constrained to respond and that there were no leading questions (Dillman, 2007). It should be mentioned that out of these nine experts, six were business professionals who had more than 12 years of experience in risk management, and the remaining three experts were academicians who had PhDs in the domain of this study. Also, the items corresponding to the variables RMC, MAG, MSI, SCR, GRP, GOP, and MPE were duly reviewed to assess their clarity, comprehensiveness, and appropriateness, and to detect any omissions or misunderstandings. In this way, the items' face validity was tested to assess if the items represented the constructs which needed to be measured or rather whether the items "look like they measure what they should".

After the pre-test stage, a pilot test was conducted by analyzing responses of 30 respondents, who were selected through the convenience sampling technique (Garg, 2019) because they had knowledge about global risk management abilities to address external abrupt shocks through development of GVC capabilities. These 30 respondents for the pilot test were not included in the main survey, although the selection criteria were the same. The pilot test results also helped to simplify the questions by enhancing their readabilities and understandabilities. In this way, 33 questions in the form of statements were carefully prepared. The details of the instruments along with their sources are provided in Appendix A.

#### 4.2. Strategy for collecting data

In order to target the respondents, the purposive sampling technique, also known as subjective sampling or judgmental sampling, was preferred (Apostolopoulos & Liargovas, 2016). The first criterion was geography: we purposefully aimed to analyze MNEs in the European, Middle East, and Africa (EMEA), and Asia regions because we aimed at a better understanding of how MNEs in these regions develop their resilience and improve their global risk management capability during a crisis. Accordingly, we first randomly listed 50 MNEs satisfying the geographical choice. It was found that the combined annual revenue of different subsidiaries of MNEs was more than USD10 billion and they have been operating for more than 25 years. The respondents were selected according to the researchers' judgments that they met the right criteria. Thereafter, using the convenience sampling technique (Garg, 2019), the researchers built the sample from MNEs of the EMEA and Asia regions. This entire process was conducted from March to September 2021. After a prolonged discussion, only 23 MNEs agreed to participate in this survey. The top executives of these MNEs were requested to send the survey links or response sheets to their respective subsidiaries. In total, there were 791 subsidiaries of these MNEs in different geographic locations to which the questionnaire was sent with a request to return the completed response sheets within two months from receiving them. Within the scheduled time, 334 subsidiaries responded to a response rate of 42.3%. The response sheets were then examined to see if they were properly filled in and 11 were incomplete, and they were not considered for analysis.

Next, non-response bias was tested for by conducting independent t-tests and chi-square tests on the inputs of the first and the last 100 responses (Armstrong & Overton, 1977). No mentionable difference in results was observed in these two cases. Hence, non-response bias was not a major problem in this study. Thus, we collected data from 323 respondents who played different roles in the domain of global value chain activities of MNEs. These respondents were from the ranks of

senior, mid-level, and junior managers. In the questionnaire, we asked them to respond as representatives of their subsidiaries. Thus, the analysis of the study was conducted at the enterprise level. The observational unit was the manager representative of each of the subsidiaries of MNEs. The information about these 23 MNEs is provided in Table 2 and the demographic information of 323 managers of different subsidiaries is provided in Table 3.

### 5. Analysis of data and results

To test the hypotheses and validate the proposed theoretical model, the partial least squares (PLS) structural equation modelling (SEM) technique was used. This technique can easily and more simply analyze a complex model with no sample restriction (Williams et al., 2010; Willaby et al., 2015; Kock, 2020). To analyze data with the PLS-SEM technique, it is not necessary that the data should be normally distributed, which is the indispensable condition for analyzing data when using the covariance-based structural equation modelling technique (Kock & Hadaya, 2018). This approach also helps to analyze an exploratory study like this (Peng & Lai, 2012). The respondents' inputs to the survey were analyzed by this process after they were quantified on the 5-point Likert scale.

#### 5.1. Measurement properties and discriminant validity test

To assess convergent validity, the loading factor (LF) of each item was estimated. Then, to verify the validity, reliability, and internal consistency of the constructs, we determined the average variance extracted (AVE), composite reliability (CR), and Cronbach's alpha ( $\alpha$ ). The results show that the estimated values are all within the specified range. The convergent validity of all the items corresponding to the constructs was found to be greater than the permissible lowest value of 0.7 (Chin, 2010), which demonstrates that there is a positive correlation between measures of the related constructs. Also, for verifying the multicollinearity defects, variance inflation factors (VIFs) have been estimated. Table 4 provides the results.

Also, it appears that the square roots of all the AVEs are greater than the corresponding bifactor correlation coefficients. This satisfies the Fornell and Larcker criteria (1981) and confirms discriminant validity of the constructs. The results are provided in Table 5.

Also, for supplementing Fornell and Larcker criteria (1981) to verify discriminant validity of the constructs, Heterotrait Monotrait (HTMT) test has been performed. The results highlight that all the HTMT values are less than 0.85 (Henseler et al., 2015). This also confirms discriminant validity of the constructs. Table 6 provides the results.

#### 5.2. Common method bias

Since the study results are based on survey data, it is possible that CMB may cause some constraints. To minimize the risk of CMB, some initial procedural measures were taken. While preparing the survey, the instruments were edited to make them simpler for prospective respondents to answer in an unbiased way. Also, during the survey, the

**Table 2**  
Details of MNEs (N = 23).

Particulars	Category	Frequency (n)	Percentage (%)
MNE HQ	Asia	14	60.9
	EMEA	9	39.1
MNE Type	Services	7	30.4
	Manufacturing	4	17.4
	Conglomerate	12	52.2
MNE age	Older firms ( $\geq 25$ years of establishment)	23	100

**Table 3**  
Demographic statistics (N = 323).

Particulars	Category	Number (Asia) (184)	Number (EMEA) (139)
Gender	Male	123	95
	Female	61	44
Employee Hierarchy	Senior manager	28	27
	Mid-level manager	62	71
	Junior manager	94	41

**Table 4**  
Measurement properties.

Constructs/Items	LF	AVE	CR	$\alpha$	rho_A	VIF
RMC		0.763	0.928	0.896	0.900	
RMC1	0.851					2.408
RMC2	0.908					3.284
RMC3	0.888					2.632
RMC4	0.846					2.110
MAG		0.506	0.823	0.749	0.776	
MAG1	0.708					1.380
MAG2	0.751					1.712
MAG3	0.700					2.051
MAG4	0.715					2.020
MAG5	0.700					1.155
MSI		0.503	0.828	0.754	0.764	
MSI1	0.702					1.287
MSI2	0.752					1.349
MSI3	0.732					1.948
MSI4	0.756					2.076
MSI5	0.755					1.190
SCR		0.501	0.818	0.718	0.724	
SCR1	0.741					1.152
SCR2	0.777					1.225
SCR3	0.778					1.868
SCR4	0.807					2.132
SCR5	0.718					1.478
GRP		0.538	0.850	0.775	0.800	
GRP1	0.711					1.228
GRP2	0.743					1.600
GRP3	0.841					2.422
GRP4	0.850					2.406
GRP5	0.772					1.605
GOP		0.649	0.879	0.812	0.825	
GOP1	0.732					1.233
GOP2	0.814					1.811
GOP3	0.893					2.857
GOP4	0.858					2.419
GOP5	0.711					2.121
NPE		0.692	0.899	0.850	0.865	
MPE1	0.718					1.510
MPE2	0.863					2.161
MPE3	0.872					2.411
MPE4	0.865					2.306

respondents were assured that their identity would not be disclosed. Even after that, for verifying the severity of CMB, Harman’s single factor test (SFT) was conducted, and the results indicated that the first factor

**Table 5**  
Discriminant validity test (Fornell and Larcker criteria).

	GOP	GRP	MAG	MPE	MSI	RMC	SCR	AVE
GOP	0.805							0.649
GRP	0.23	0.733						0.538
MAG	0.265	0.461	0.695					0.506
MPE	0.503	0.24	0.237	0.832				0.692
MSI	0.094	0.435	0.53	0.1	0.702			0.503
RMC	0.224	0.503	0.404	0.248	0.46	0.874		0.763
SCR	0.5	0.51	0.58	0.454	0.365	0.329	0.691	0.501

was 21.66% of the variance. This value is far less than 50%, which is the recommended cut-off value, according to Podsakoff et al. (2003). To reconfirm Harman’s SFT, the marker correlation test (Lindell & Whitney, 2001) was also conducted. Here, MNE commitment was considered as a marker variable (Richardson et al., 2009; Simmering et al., 2015). In this test, the results did not reflect any evidence of CMB. Hence, CMB was not a measure of concern of this study.

5.3. Hypotheses testing (SEM)

To test the hypotheses by SEM, the bootstrap procedure was used on 5000 resamples. With consideration of separation distance 7, cross-validated redundancy was assessed by estimating the Q<sup>2</sup> value, which emerged as 0.032 (positive). Hence, the model has predictive relevance (Mishra et al., 2018). To ascertain that the model is in order, standard root mean square residual (SRMR) was used as a standard index. The values of SRMR came out to be 0.061 for PLS and 0.032 for PLSc. As both are less than the threshold value of 0.08 (Hu & Bentler, 1999), the model is considered to be in order. This process helps to estimate the path coefficients of different linkages, p-values, and coefficients of determination. Table 7 provides the results.

Also, to verify the model fit, some essential parameters have also been assessed. The results shown in Table 8 reconfirm that the model is in order.

It is pertinent to mention here that as the respondents (323) were from 23 MNEs, the effects of the multilevel PLS needed to be conducted. A multilevel analysis using SEM through PLS is characterized by data being collected at the individual level (here, 323 respondents) from a group (here, 23 MNEs) where the group might impact on the data analysis results (Kock, 2020). Here, the unit of analysis is the individuals. But the individuals came from different MNEs. In this study, the final sample consists of 323 subsidiaries (level 1) nested with 23 MNEs (level 2). This appears to be a complex nested multilevel dataset. Hence the situation creates an endogeneity issue where a pervasive variable influences the endogenous variables indirectly through several of its predictors. This hidden variable is MNE type, which is influencing the predictors MAG, MSI, SCR, GRP, and GOP. Hence, variation from MNE type (level 2) flows indirectly and eventually to MPE.

To reconcile this issue, an instrumental variable needs to be considered to account for the variation due to effects of different MNE types leading to MPE through several mediating variables. There is need to control the instrumental variable that includes the effects of variation of MNE type (level 2) eventually impacting MPE. It is implemented by

**Table 6**  
Heterotrait Monotrait (HTMT) test.

	GOP	GRP	MAG	MPE	MSI	RMC	SCR
GOP							
GRP	0.291						
MAG	0.356	0.490					
MPE	0.601	0.294	0.302				
MSI	0.141	0.518	0.585	0.151			
RMC	0.263	0.603	0.426	0.280	0.483		
SCR	0.660	0.664	0.723	0.570	0.466	0.397	

**Table 7**  
Structural equation modelling (SEM).

Linkages	Hypotheses	Path coefficients	p-values	Remarks
RMC → MAG	H1a	0.46	p < 0.001 (***)	Supported
RMC → MSI	H1b	0.32	p < 0.01 (***)	Supported
RMC → SCR	H1c	0.32	p < 0.01 (***)	Supported
MAG → GRP	H2a	0.12	p < 0.05(*)	Supported
MAG → GOP	H2b	0.22	p < 0.001 (***)	Supported
MSI → GRP	H3a	0.02	p > 0.05(ns)	Not Supported
MSI → GOP	H3b	0.18	p < 0.05(*)	Supported
SCR → GRP	H4a	0.53	p < 0.001 (***)	Supported
SCR → GOP	H4b	0.40	p < 0.01 (***)	Supported
GRP → MPE	H5	0.47	p < 0.001 (***)	Supported
GOP → MPE	H6	0.14	p < 0.01(***)	Supported

**Table 8**  
Model fit.

	Saturated Model	Estimated Model
SRMR	0.115	0.137
d_ULS	6.984	9.936
d_G	2.615	2.826
Chi-Square	3630.691	3778.18
NFI	0.503	0.482

adding this instrumental variable into the proposed model (Kock, 2020). In this manner, the multilevel PLS computation has been performed (Geiser et al., 2013). Further, it is to mention here that the other necessary parameters have duly been computed and provided in Table 9.

With all these inputs, the model after validation is provided in Fig. 2.

## 6. Discussion and findings

The present study has discussed how external shocks could continuously threaten the vulnerabilities of MNEs and compel them to face several types of known and unknown risks. This study has demonstrated that, in such a crisis, the transition towards a more sustainable, effective, and resilient business model is a strategic necessity for MNEs. Such a scenario causes MNEs to address the challenges brought about by external shocks and has rekindled the debate regarding the deployment of a resilient attitude from MNEs to appropriately respond to external disruptions. It is pertinent to mention here that the survey was

**Table 9**  
Computation of different statistical parameters.

Relationships	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values
GOP → MPE	0.136	0.135	0.049	2.761	0.006
GRP → MPE	0.469	0.469	0.056	8.355	0
MAG → GOP	0.217	0.218	0.051	4.256	0
MAG → GRP	0.121	0.124	0.045	2.115	0.035
MSI → GOP	0.182	0.186	0.043	1.917	0.05
MSI → GRP	0.027	0.023	0.056	0.485	0.628
RMC → MAG	0.463	0.467	0.046	10.128	0
RMC → MSI	0.322	0.330	0.061	5.317	0
RMC → SCR	0.323	0.329	0.057	5.7	0
SCR → GOP	0.405	0.412	0.052	7.715	0
SCR → GRP	0.532	0.537	0.062	8.54	0

conducted in 2021 during the menacing effects and waves of the COVID-19 pandemic. Therefore, the MNEs were mindful about further developing their risk management capability, so that, in the future, they could easily address such abrupt turbulent situations. In such a context, the present study has considered risk management capability as a vital predictor of global value chain capability.

It has been argued in this study that by addressing and mitigating the major disruptions, MNEs can develop resilience by improving their risk management capabilities. The study has demonstrated that by developing risk management capabilities, MNEs are expected to improve their global value chain (GVC) capabilities by updating their agility, supplier integration, as well as supply chain reengineering. This idea has received support from a study by Liu et al. (2018) that investigated how risk management culture of enterprises could improve performance by developing their risk management abilities. To withstand crises and disruptions, MNEs need to be more resilient to adapt to the ever-changing external environments (Conz & Magnani, 2020), and this can be achieved by developing their risk management capabilities to improve GVC abilities. Liu et al. (2018) demonstrated that risk management could impact agility, integration, and supply chain reengineering. This present study has demonstrated that global risk management capability has a significant impact on the performance of MNEs by improving some intermediate contextual factors like different capabilities of MNEs along with their global risk management performance and global operational performance.

It is relevant to mention here that all the hypotheses formulated in this study have been duly supported after PLS-SEM statistical validation, except the relationship between MNE supplier integration (MSI) and global risk management performance (GRP), as it is observed that the impact of MSI on GRP (H3a) is insignificant, because its path coefficient is too low at 0.02, with level of non-significance  $p > 0.05$  (ns). This is presumably because MNE supplier integration does not only depend on the abilities of the MNEs but also on the external suppliers' capabilities, who might lack strong integration capabilities. In this context, the study can highlight that GVC capabilities include improvement of supply chain reengineering, which is considered an important aspect of supply chain management, where principal ingredients are supply chain risk management (Ivanov et al., 2014), procurement (Pereira et al., 2014), innovativeness (Gölgeci & Ponomarov, 2015), among others. Analysis indicated that the control variables of size and type had no significant impact on the performance of MNEs because they did not impact the coefficient of determination ( $R^2$  value) (Hossain et al., 2020).

The profitability and economic stability of the MNEs are considerably threatened by their incapability of managing uncertainties and risks they could encounter. The present study has been able to establish that to address any disruptive situation, MNEs' risk management abilities could eventually improve their performance by developing some intermediate contextual factors, including different performance matrices. Different studies have nurtured how MNEs' risk management capabilities could impact their performance (Rahi, 2019; Hillmann & Guenther, 2021). The present study has contributed to international business studies, in the context of MNEs' resilience by underlining that the risk management capabilities could improve MNEs' agility, supplier integration, and global supply chain reengineering, which comprise GVC capability. It has also examined how such capabilities could simultaneously improve global risk management and operational performance of the MNEs and eventually impact their overall performance.

Several endogenous factors, like MAG, MSI, and SCR have been successfully explained by RMC, since the concerned  $R^2$  values are 0.21, 0.36, and 0.14, respectively. Moreover, the other endogenous variables, GRP and GOP, have duly been explained simultaneously by MAG, MSI, and SCR, since the relevant  $R^2$  values are 0.26 and 0.31. The study can state that by developing GVC capabilities that are impacted by MNEs' risk management abilities, it is possible to improve the different performance matrices of the MNEs, as GRP and GOP could simultaneously explain MPE to the tune of 70%, which is the explanative power of the

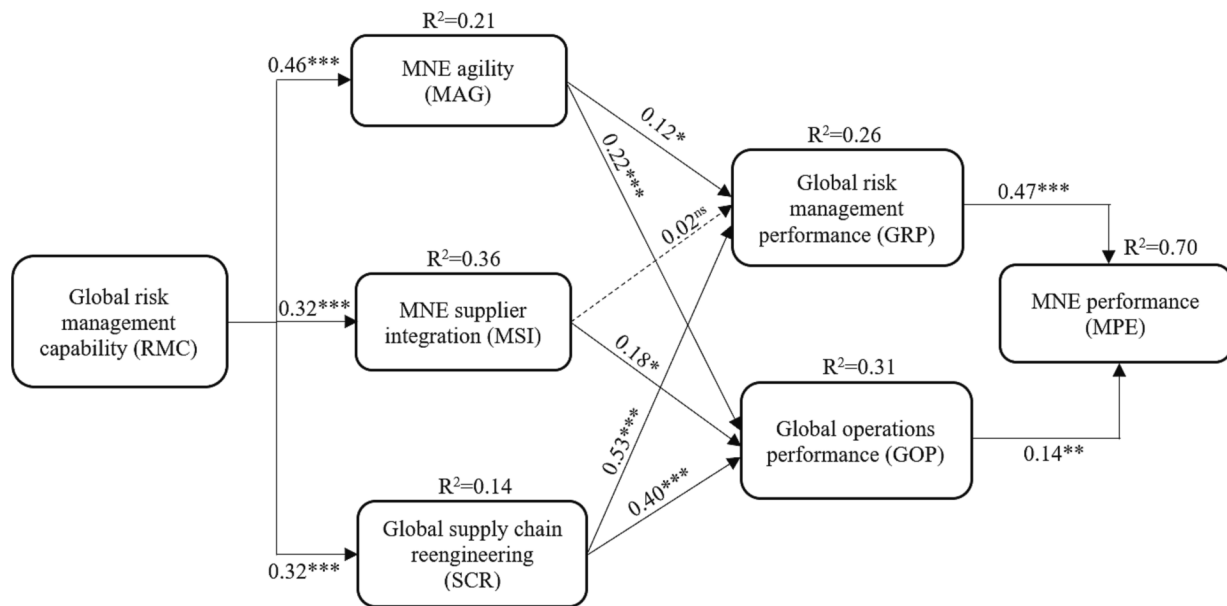


Fig. 2. Model after validation.

model.

### 6.1. Theoretical contributions

This study has provided several theoretical contributions which could enrich the extant body of literature. First, supply chain reengineering has been identified as one of the important factors in the contemporary supply chain management system. But the theoretical foundation to conceptualize supply chain reengineering is found to be fragmented and lacking methodical and systematic integration (Ivanov et al., 2014). This research underlines the impact of the supply chain reengineering on the performance of MNEs. Second, from extant literature on supply chain management, it has been observed that MNE agility and supplier integration, constituting GVC abilities, are mostly qualitative (Liu et al., 2018) in nature, and quantitative in-depth investigations by a survey to understand the impacts of risk management capabilities on the GVC abilities are scant (Ambulkar et al., 2015). In this context, to narrow the gap between practice and theory, we claim that the present study has used a rigorous quantitative research technique that synergizes the risk management abilities of MNEs and MNE performance through some intermediate contextual factors. We argue that the present study has been able to develop such a strong theoretical model with high explanative power. This is construed to be another theoretical contribution of the present study. Third, by investigating and analyzing how in such a global apocalyptic situation, the global risk management capability of MNEs could impact the performance of the MNEs by the help of some mediating contextual factors of GVC capability comprising improvement of MNEs' agility, better supplier integration, as well as developing effective global supply chain management system. This has been able to address the gap to the extant literature. This is a unique study which has demonstrated how the improvement of global risk management capability can support the MNEs to withstand any external shocks as well as remain consistent in volatile marketplace conditions.

The present study has used RBV (Barney, 1991) by extending its applications to elucidate that not all resources possessed by MNEs have such potential for enhancing competitive advantage, but such resources possessing VRIN capabilities provide competitiveness to the MNEs. From that perspective, the present study has argued that GVC capabilities possess VRIN characteristics to help the MNEs to perform better than their counterparts functioning in identical markets. The DCV concept

has also been extended (Teece et al., 1997), as we argue that, to address any external shock, MNEs need to develop their risk management capabilities, which are considered dynamic capabilities, since these abilities can handle major disruptions by transforming a resilient business model in the dynamic market with its sensing, seizing, and reconfiguring capabilities. This has added value to the body of extant literature.

Moreover, a study by Liu et al. (2018) empirically examined a model that could describe the relationship between supply chain resilience and firm performance using survey data in the context of the Taiwanese shipping industry. The concept of this study has been extended in the present study to investigate how the MNEs could change their business model to mitigate major disruptions by developing their resilience with the help of improved GVC capabilities. This has added value to the extant international business literature.

### 6.2. Managerial implications

The present study has provided several managerial implications. From our results, we can recommend that MNEs must develop their risk management capabilities to impact their GVC abilities, comprised of agility, supplier integration, and supply chain reengineering, in order to address external shocks. This implies that in case of any unforeseen external threat, MNEs need to improve their resilience.

The leadership of MNEs must focus on improving their risk management abilities. To accomplish this, the managers must ensure that employees in different positions are well trained to withstand disruptions, since poor knowledge of risk mitigation and inadequate risk awareness can constrain them from responding to rapid changes. Such training can also enhance employees' capabilities to develop a strategy to reduce risk. By enhancing their risk management abilities, it will be possible for the MNE leadership to allocate more resources in advance to address the risks that are caused by abrupt external shocks. The MNE leadership must sponsor different programs to equip the employees to be agile so they can face such challenges from the dynamic external business environment.

The present study has demonstrated that supplier integration can improve the performance matrices of the MNEs. This implies that the leadership must focus on integrating suppliers, which could include implementing intra- and inter-organizational sharing of information, as well as on integrating different operational functions of the MNEs.

The present study has highlighted that supply chain reengineering

capabilities play a critical role in improving the performance of the MNEs. This implies that leadership should emphasize improving their skill sets and understanding the modern supply chain structure. If the MNEs can invest adequate resources to effectively improve their agility, proper supplier integration, and supply chain reengineering capabilities, it will then be possible for them to sustain their performance during external shocks.

### 6.3. Limitations and future scope

Although this study has made several theoretical contributions and managerial implications, it is still not free from all limitations. First, the results depend on cross-sectional data, which can have defects of causality between the relationships of the constructs, particularly endogeneity defects. To eliminate these errors, future researchers may conduct longitudinal studies. Second, the results of this study depend on the input from 323 respondents, but they do not represent the entire population. Hence, the results lack generalizability. It is suggested that future researchers should consider more respondents to project a more generalizable result. Third, this study has used DCV (Teece et al., 1997), which other scientists say is insensitive to context (Ling-Yee, 2007). DCV cannot precisely identify the conditions under which risk management abilities of the MNEs may ensure best performance (Dubey et al., 2019). Future researchers could explore to identify the best business approach for MNEs to take to mitigate major disruptions by appropriately

improving GVC capabilities. Fourth, the explanative power of the proposed theoretical model is 70%. It is suggested that future researchers should consider including other constructs and boundary conditions to examine if the explanative power of the proposed theoretical model could be improved.

### CRedit authorship contribution statement

**Sheshadri Chatterjee:** Writing - original draft, Writing – review & editing, Data collection, Data analysis. **Ranjan Chaudhuri:** Writing – original draft, Writing – review & editing, Development of the model and propositions. **Demetris Vrontis:** Writing – original draft, Validation, Formal analysis. **Léo-Paul Dana:** Writing – original draft, Supervision. **Diala Kabbara:** Conceptualization, Theoretical framework, Writing – original draft, Writing – review & editing..

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data availability

Data will be made available on request.

## Appendix A. Summary of the instruments with sources

Items	Source	Statements	Response [SD][D][N][A] [SA]
RMCI	Juttner et al., 2003	I believe that sudden external shocks are constantly threatening the vulnerability of the MNEs.	[1][2][3][4][5]
RMC2	Manuj & Mentzer, 2008	I think that MNEs have better financial resources to withstand any risks.	[1][2][3][4][5]
RMC3	Juttner et al., 2003; Barry, 2004	I believe that the global value chain of MNEs could break due to unforeseen uncertainties and risks.	[1][2][3][4][5]
RMC4	Norman & Jansson, 2004; Wamba et al., 2019	MNEs with better global risk management capability can address the risks in a better way.	[1][2][3][4][5]
MAG1	Vagnoni & Khoddami, 2016	I believe that the agility of an enterprise is its ability to adapt and renew itself.	[1][2][3][4][5]
MAG2	Chiang et al., 2012	Agile capability helps MNEs to quickly adapt changes against a turbulent or ambiguous environment.	[1][2][3][4][5]
MAG3	DeGroot & Marx, 2013	The agile capability of the MNEs should ensure corporate commitment towards the environment, excellent customer service and customer satisfaction.	[1][2][3][4][5]
MAG4	Teece et al., 1997	I believe that the agile capability of the organization is a dynamic capability.	[1][2][3][4][5]
MAG5	Dubey et al., 2018	MNEs must be innovative to become more agile.	[1][2][3][4][5]
MSI1	Shafiq et al., 2022	I believe that the supplier integration capability is a critical managerial plan.	[1][2][3][4][5]
MSI2	Shafiq et al., 2022	I think that appropriate supplier integration helps to improve the performance of the buyers.	[1][2][3][4][5]
MSI3	Blome et al., 2013	A better customer–supplier relationship ensures improvement of supplier integration capability for the MNEs.	[1][2][3][4][5]
MSI4	Lee & Rha, 2016	I believe that the integration of suppliers helps to mitigate supply chain disruption even in crisis.	[1][2][3][4][5]
MSI5	Krumwiede & Charles, 2014	Better supplier integration ensures a lower amount of waste in the process.	[1][2][3][4][5]
SCR1	Lu et al., 2016	Supply chain reengineering ensures that the customer demands are met with their changing needs.	[1][2][3][4][5]
SCR2	Aslam et al., 2018	Global supply chain reengineering helps in improving information flow and its quality.	[1][2][3][4][5]
SCR3	Lu et al., 2016	A better supply chain reengineering capability minimizes the inherent delays in making ordering and purchasing decisions.	[1][2][3][4][5]
SCR4	Kristal et al.2010	I believe that it is a strategic choice of MNEs to simultaneously develop supply chain efficiency and flexibility.	[1][2][3][4][5]
SCR5	Lee & Rha, 2016	Having a global supply chain reengineering approach is important to optimize the operations from start to finish.	[1][2][3][4][5]
GRP1	Juttner et al., 2003	I believe that through the interconnectedness of various risks, MNEs can tailor effective risk management strategies.	[1][2][3][4][5]
GRP2	Hauser, 2003	I think that proper planning is necessary to effectively improve global risk management performance.	[1][2][3][4][5]
GRP3	Juttner et al., 2003; Dreyfus & Nair, 2022	I believe that there is a good synergy between business strategy and performance management for the MNEs.	[1][2][3][4][5]
GRP4	Ali et al., 2021	Better global risk management performance helps the MNEs to sustain their business activities in crisis.	[1][2][3][4][5]
GRP5	Juttner, 2005	Risk management performance can be assessed by comparing the number of risks which have been identified with the number of risks that occur.	[1][2][3][4][5]
GOP1	Tattara, 2018	I believe that the global value chain system helps to enhance the logistics performance of MNEs.	[1][2][3][4][5]
GOP2	Lee, 2004	Global operation performance helps to synchronize supply and demand of the customers.	[1][2][3][4][5]
GOP3	Gligor et al., 2015	Having a better global operations strategy ensures superior global operations performance.	[1][2][3][4][5]
GOP4	Dubey et al., 2018	I believe that with better global operations performance, MNEs can customize their products and services according to the changing needs of the customers.	[1][2][3][4][5]
GOP5	Teece et al., 1997	I believe that enhancement of dynamic capabilities of MNEs can improve their global operations performance.	[1][2][3][4][5]
NPE1	Eckstein et al., 2015	Faster adoption of modern technologies can ensure better performance of the MNEs.	[1][2][3][4][5]
NPE2	Tattara, 2018	I believe that as the global supply chain capability improves, the profitability of MNEs will increase.	[1][2][3][4][5]
NPE3	Gligor et al., 2015	I believe that there is a nexus between operational performance of MNEs and their overall performance.	[1][2][3][4][5]
NPE4	Dubey et al., 2018	Improvement of value-added productivity can ensure better overall performance of the MNEs.	[1][2][3][4][5]

Note: SD = Strongly Disagree; D = Disagree; N = Neither disagree nor agree; A = Agree; SA = Strongly Agree.

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