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Rethinking Boundary and Location Decisions: Lessons from Covid-19 Pandemic

Jonas Strømfeldt Eduardsen

Introduction

On March 11 2020, the World Health Organization (WHO) announced that the coronavirus – also known as Covid-19 or SARS-CoV-2 – was now considered a pandemic. Just three months prior to this announcement, Chinese authorities first alerted the WHO of pneumonia cases with an unknown cause in Wuhan City. Thus, in just 71 days, a new infectious disease had turned into an epidemic occurring worldwide and affecting numerous people across the world. What started as a small outbreak in China scaled rapidly to disperse over many geographic regions, with the epicenter of the outbreak changing from China to Europe to Latin America.

The coronavirus has not only caused severe human suffering across the globe, it has also snowballed and brought about devastating effects on businesses and economies across the world, including many multinational corporations (MNCs). Global value chain (GVC) vulnerabilities have been put under a spotlight with concerns related to global value chain vulnerabilities coming to the fore (Strange, 2020). The current pandemic is unlikely to be a one-off event, but should instead act as a reminder that global systemic risks, which are often caused by improbable events with unknown causes and consequences, pose significant threats to both countries and organizations (Centeno, Nag, Patterson, Shaver, & Windawi, 2014; Goldin & Mariathasan, 2016; van der Vegt, Essens, Wahlstrom, & George, 2015). It is therefore imperative that we learn more about how these emerging risks affect international business (IB) activities and how MNCs can confront and manage such low-probability, high-impact risks. Doing so can help MNCs avoid or cope better with similar situations in the future and thereby reduce the likelihood and severity of value chain disruptions (Blackhurst, Dunn, & Craighead, 2011; P. Sharma, Leung, Kingshott, Davcik, & Cardinali, 2020).

The purpose of this chapter is therefore to reflect upon the impact of the pandemic on IB and draw lessons from this experience in terms of how to avoid or manage a similar event in the future. While the purpose of this chapter is not to present a comprehensive review of

existing literature, it aims to draw upon the growing literature on GVCs and supply chain risk management to offer suggestions that might help MNCs develop better preparedness for future disruptions, defined as foreseeable or unforeseeable events, which affect the operations and stability of MNCs and GVCs. In particular, the chapter focuses on how MNCs should adjust their strategies with regard to the boundary and location decisions of value chain activities in order to increase GVC resilience.

The structure of the commentary is as follows. First, the impact of Covid-19 on MNCs and GVCs is considered and highlighted. Second, the dilemma that MNCs face in balancing efficiency and risk in relation to GVC configurations is discussed. Third, GVC resilience is introduced before discussing how MNCs might redesign their GVC configurations, in relation to their boundary and location decisions, in order to create an organization that has the capabilities to quickly adapt, evolve, and avoid adverse effects to the organization in the face of unfavorable critical events such as Covid-19.

Impact of Coronavirus on Multinationals and Global Value Chains

The coronavirus is first and foremost a human tragedy, which has caused severe human suffering across the globe. However, it has also severely affected many MNCs, particularly those relying on highly complex and globally connected value chains. In response to the spread of Covid-19, governments around the world have been forced to implement policies to contain the disease and fight the pandemic. The policies taken to control the spread, including lockdown measures, export restrictions, limitations on travel and border closures, have created a shock to both aggregate demand and supply (Baldwin & Tomiura, 2020). The lockdown measures have forced many businesses to shut down, preventing them from producing goods and services. This, in turn, has resulted in decreased supply and created a negative supply shock. In addition, the pandemic has forced major economies, such as the US and China, to slow down causing a macroeconomic drop in aggregate demand, while consumers are postponing investments by adopting a precautionary wait-and-see approach (Baldwin & Tomiura, 2020). Consequently, the World Trade Organization (WTO) has announced that it expects global trade to decrease by 13% to 32% in 2020 with nearly all regions suffering double-digit declines in trade volumes, as the pandemic continues to spread across the world and disrupt economic activity (World Trade Organization, 2020). Thus, the pandemic has snowballed and brought about devastating effects on businesses across the

world, including many MNCs (Caligiuri, De Cieri, Minbaeva, Verbeke, & Zimmermann, 2020).

The nature and characteristics of MNCs has changed dramatically over the past four decades. As explained by Liesch and Welch (2019, p. 44), the MNC of today "has evolved from the highly internalized form of the post-WWII period to the focal firm of today orchestrating its constellation of suppliers". Today, MNCs are increasingly fragmenting their value chains by outsourcing value chain activities to contract manufacturers and specialist suppliers and locating these activities where it is most efficient. This has been made possible by recent changes in the net benefits of internalization, which has made MNCs rethink their boundary and location strategies (Buckley & Strange, 2015). Previously, MNCs often internalized business activities because of market imperfections, which caused internalization benefits to exceed its costs. However, over the past four decades, the market imperfections of the past have been significantly reduced due to the gradual liberalization and deregulation of international trade and investment, the rapid development and penetration of information and communication technologies, and the growth of contract manufacturers and specialist suppliers. These changes have led to a situation where the internalization costs exceed the benefits, changing MNEs from highly internalized and vertically integrated organizations to orchestrators of global value chains, defined as "the full range of activities that firms and workers perform to bring a product from its conception to end use and beyond" (Gereffi & Fernandez-Stark, 2011, p. 4). MNCs are, therefore, becoming much more like differentiated networks, creating an era of network competition, where the winners are those organizations that are superior in structuring, coordinating, and managing relationships with their value chain partners (Christopher & Towill, 2000).

There are several reasons for MNCs to increasingly rely on GVCs, including cost advantages, diversification benefits, and the ability of MNCs to focus on their core competencies. However, relying on GVCs also comes at a cost, including an increase in complexity and exposure points, which magnifies the vulnerabilities in MNCs (Stecke & Kumar, 2009). Covid-19 is a great example of how the reliance on highly complex and globally connected value chains is superior in normal times, but vulnerable to disruptions. It has posed an unprecedented challenge to GVCs, by striking several GVC hub regions, which has led to severe implication for many value chains. Some of the most severely affected countries include China, Korea, Italy, Japan, US, and Germany, which together account for more than half of world supply and demand, world manufacturing, and world manufacturing

exports (Baldwin & Tomiura, 2020). In addition, these countries are central actors in GVCs, with each of them being an important supplier of industrial inputs to each other and to other countries. A supply shock in any of these nations is therefore likely to cause disruptions of GVCs and create supply shocks in many other countries, including those that are less affected by the pandemic (Baldwin & Tomiura, 2020).

There are several examples of how Covid-19 has affected MNCs by disrupting the GVCs that they rely upon. For example, following the initial outbreak of the virus in China, Apple has reported in their Q2 FY2020 10-Q filings how it experienced disruptions to its manufacturing, supply chain, and logistics services provided by outsourcing partners, which resulted in temporary iPhone supply shortage contracting sales worldwide. One reason for this disruption was due to certain components being sourced from single or limited suppliers. This is particularly true in relation to new products that utilize custom components available from only one source. This has given rise to speculations that Apple may be forced to postpone the launch of their new iPhone 12, which would mark the first time in more than a decade, where Apple has gone a full calendar year without introducing a new flagship smartphone. Another example of a sector, which has been hit hard by the Covid-19 pandemic due to its high reliance on complex and globally connected value chains, is the automobile industry. Wuhan, which is considered the breeding ground for Covid-19, is the home to the manufacturing plants of several car manufacturers, including General Motors, Honda, Nissan, Peugeot Group, and Renault. Because of Covid-19, many of the car plants had to close down, which not only affected China's domestic car production, but also had severe impact on global car manufacturing, as almost all major global car manufacturer rely on parts produced in China (He & Huang, 2020). This supply shortage has forced car manufacturers such as Kia and Hyundai to stop several assembly lines in Korea and Nissan to suspend their production in Japan (Dolan, 2020; Lee & Hyunjoo, 2020). In addition, several other car manufacturers have since announced that the continued spread of Covid-19 forced them to close plants in both the U.S. and Europe (Tajitsu, 2020). However, Apple and car manufacturers such as Kia, Volkswagen, Nissan and Honda, are not the only large MNCs suffering disruption to their operations and GVCs. In fact, 94 percent of the Fortune 1000 companies have experienced value chain disruptions due to Covid-19, with three-fourths having experienced negative or strongly negative impacts on their business (Sherman, 2020). Consequently, the current pandemic has dramatically affected GVCs highlighting the vulnerabilities of the

modern MNC and its heavy reliance on globally dispersed, efficiency driven and fragile GVCs.

Balancing Efficiency and Risk Management in Global Strategy

More than three decades ago, Ghoshal (1987) noted that one of the main strategic objectives of MNCs is to achieve efficiency in its activities, while managing the risks that it assumes in carrying out those activities. MNCs should aim to achieve efficiency in its activities to enhance efficiency rents from the use of their resources. This involves maximizing the ratio of the value of its inputs to the costs of all its inputs, while also enhancing the efficacy of internal processes via economies of scale and/or more efficient production processes. However, while achieving efficiency in operations is important, it must also effectively manage the risks that it assumes in carrying out its operations by identifying risks and alleviating the level of vulnerability of the firm (van der Vegt et al., 2015). However, Ghoshal (1987) notes that this is difficult to achieve, as these two objectives are often mutually contradictory and difficult to prioritize. For example, pursuing a strategy that seeks to maximize the efficiency of the MNC's operations by carefully separating and locating value chain activities where the activity can be carried out at the lowest costs is likely to increase risk by multiplying the MNCs' exposure points where it is exposed to disruptions (Stecke & Kumar, 2009). In contrast, an excessive focus on reducing the exposure to disruption points will likely cause the efficiency to decrease. Thus, there is an apparent trade-off between efficiency and risk and MNCs must focus on finding the right balance between the two when designing and structuring their GVCs.

Built for efficiency, today's GVCs are often unnecessarily fragile and cannot easily cope with the consequences of low-probability, high-impact events like a global pandemic (Stecke & Kumar, 2009). The boundary and location decisions in MNCs are typically driven by efficiency considerations aiming to maximize efficiency rents and profits (Liesch & Welch, 2019). Consequently, many MNCs have organized their GVCs and logistics to make themselves leaner and more efficient, e.g. by reducing inventory levels. In addition, MNCs are also prone to restrict themselves to work with few, larger and more specialized suppliers that operate in few strategic locations around the world (Hernández & Pedersen, 2017). While this can help MNCs reduce costs and overcome domestic complexity factors such as political, socio-economic, technological, and macro-economic factors, it has also increased risk and left little room for unexpected disruptions (Goldin & Mariathasan, 2016; Ivanov,

Sokolov, & Dolgui, 2014). One problem with lean and efficient value chains is that they are designed to have less buffer capacity for disturbances, thereby making them more fragile in the face of unexpected critical events creating disruptions. Consequently, even small, localized events, such as fires, earthquakes, or strikes, can have magnified implications in an international scale, as also highlighted by previous events such as the Fukushima earthquake and tsunami or the Chao Phraya river floods in Thailand, which also caused GVC disruptions and resulted in significant losses for companies relying these (Goldin & Mariathasan, 2016). Thus, while globalization and digitalization have made GVCs more efficient, they have simultaneously left MNCs and the GVCs they rely upon unnecessarily vulnerable to even minor disturbances.

Resilience and Global Value Chains

Covid-19 reminds MNCs that it is too simplistic to base boundary and location decisions solely on efficiency and the desire to optimize their operations and minimize costs. While some predict that, the pandemic will cause MNCs to re-shore some of their value chain activities and returning the companies to highly internalized and vertically integrated organizations; a more realistic prediction is that MNCs will rethink their boundary and location strategies by balancing efficiency considerations with the need to effectively management all types of risk. Consequently, once the pandemic is over, MNCs should move away from managing and configuring their GVCs as in the past, with a one-sided focus on efficiency and cost-reduction. However, if done correctly, global value networks can enable MNCs to respond more effectively to external shock, such as a pandemic (Pedersen, Ritter, & Di Benedetto, 2020). Thus, MNCs will increasingly need to reassess and redesign their GVC configurations in order to be better positioned to respond and recover if something similar will happen in the future.

MNCs must learn from the current pandemic and be better prepared for future unexpected critical events such as terrorism, natural disasters, and cyber-attacks, which may have severe consequences for organizations. The main challenge in developing a better preparedness is that traditional risk assessment cannot deal with such unforeseeable events (Gunasekaran, Subramanian, & Rahman, 2015). The traditional way of coping with adverse effects is for MNCs to develop approaches and systems to identify risks, using historical data to analyze the past and predict future adverse events (van der Vegt et al., 2015). While such

an approach will most likely help MNCs identify and prepare for certain adverse events, it falls short in terms of identifying risks where the lack of a priori evidence would render them predictable to any degree. In fact, the very organizational structures and processes used to control other risks may desensitize MNCs to unpredictable and unknowable risks, because of the heavy reliance on risk identification (Centeno et al., 2014). Thus, MNCs should adopt new management models that take into account the increasing diversity and complexity of risks.

It has been suggested that in a context where anticipating the future is difficult, organizational focus should shift from identifying and mitigating risk towards increasing resilience. The idea is that if an organization cannot predict or foresee the future, it must instead focus on developing its capacity to more quickly respond, adapt, and learn from consequential rare events and disturbances. As such, resilience becomes an important organizational capability during disruptions such as the Covid-19 pandemic (Sharma, Rangarajan, & Paesbrugghe, 2020). Broadly speaking, resilience, which originates from the latin word *resilire* (which means to leap or jump back) refers to a characteristic of a system (e.g. economies, societies, organizations) and its ability to maintain functionality, recover, and learn from severe disruptions or unfavorable critical events, which may be either known or unknown (Ponomarov & Holcomb, 2009). In the context of GVCs, resilience refers to an "adaptive capability of the supply chain to prepare for unexpected events, respond to disruptions, and recover from them by maintaining continuity of operations at the desired level of connectedness and control over structure and function" (Ponomarov & Holcomb, 2009, p. 131). The ultimate goal of organizational resilience is to create an organization that are in possession of the necessary absorptive, adaptive, and restorative capacities to quickly and efficiently respond to and recover from unpredictable and disruptive events. (Hamel & Välikangas, 2003). Resilience offers an alternative or a supplement to traditional probabilistic risk assessment approaches, which are limited in their ability to analyze complex systems characterized by large uncertainties (Aven, 2019). Rather than trying to foresee the type of events, hazards and threats that can occur and their probabilities, as in traditional risk assessment, resilience reduces consequences of anticipated and unanticipated events by improving organizations' ability to maintain functionality and recover in the face of disruptions (van der Vegt et al., 2015). Thus, resilience can be seen as a distinctive organizational capability and is an important element in preparing organizations – especially

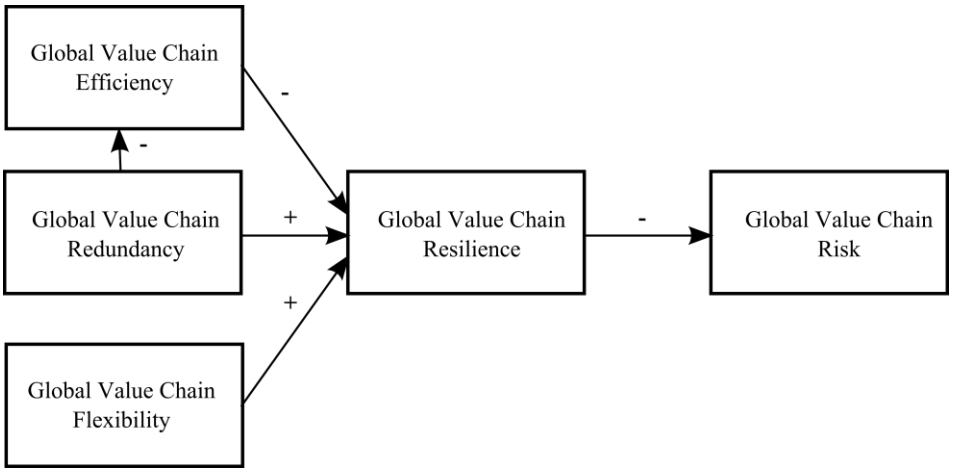
those with international business activities – to cope with low-probability, high-impact risks (Smith & Fischbacher, 2009).

Creating Resilient MNCs and Global Value Chains to Deal with Disruptions

Covid-19 reminds MNCs that are dependent on GVCs in bringing products from conception to end use and beyond that it is necessary to invest in creating resilient value chains to reduce the likelihood and severity of future disruptions while maintaining effective GVCs. To become more resilient, MNCs must consider engraining resilience in the design and structure of GVCs and increasing responsiveness capabilities through redundancy and flexibility (Carvalho, Barroso, MacHado, Azevedo, & Cruz-Machado, 2012). Flexibility and redundancy are resilience enhancers, defined as attributes that increase a firm's ability to quickly and effectively respond to and recover from disruptions. These GVC characteristics both provide MNCs with options that can allow them to offset the losses in a part of a GVC by gains from available alternatives (Stecke & Kumar, 2009). Redundancy refers to "an additional capacity that can be used to replace the loss of capacity caused by a disturbance" (Carvalho et al., 2012, p. 331), with the most common form being keeping some resources in reserve to be used in case of disruption (Sheffi & Rice, 2005). Redundancy duplicates capacity, for example by having multiple suppliers, safety stock, overcapacity, and backup suppliers, thus, allowing MNCs to use this operational slack during disruptions and thereby lowering the likelihood of negative impact of GVC disruptions. However, redundancy also comes at a costs, as it may introduce inefficiency and increased transaction costs because of capacity duplication, which in situations with no disruptions cause an underutilization of resources and creates inefficiencies (Adobor & McMullen, 2018). Thus, the incremental costs of redundancy (e.g. safety stock, additional suppliers or backup sites) can ultimately be considered an insurance premium (Sheffi & Rice, 2005). In contrast, flexibility entails restructuring previously existing capacity and allows companies to adapt faster to significant changes in GVCs (Gunasekaran et al., 2015). This can be achieved by having flexible transportation systems, production facilities, supply base, capacity and labor arrangements (Kamalahmadi & Parast, 2016). Sheffi and Rice (2005) argues that investing in flexibility is the most important step in increasing resilience, given that investing in redundancy increases costs. Similarly, Christopher and Holweg (2011) suggest that building flexible options into the design of GVCs is the key in responding to disruptions. Taken together, this suggests that MNCs can increase GVC resilience by refocusing on increasing redundancy and/or flexibility, rather than maximizing efficiency and profits. This is summarized in figure 1

below, suggesting that MNCs should prepare themselves and increase GVC resilience by finding the right balance between GVC efficiency, redundancy, and flexibility to minimize their vulnerability.

Figure X. 1. Antecedents and consequences of global value chain resilience



Source: The author

In the literature, initial efforts have been made to identify strategies and design principles, which can guide MNCs in their efforts to create more resilient value chains and prepare for future foreseeable or unforeseeable events, which can directly affect the operation and stability of GVCs. For example, Tang (2006) proposes nine different strategies to mitigate vulnerabilities in supply chains, including: (1) postponement, (2) strategic stock, (3) flexible supply base, (4) make-and-buy trade-off, (5) economic supply incentives, (6) flexible transportation, (7) revenue management, (8) dynamic assortment planning, and (9) silent product rollover. Christopher and Peck (2004) proposed a number of design principles, for designing more resilient supply chains, including: (1) selecting strategies that keep several options open, (2) re-examining the efficiency vs redundancy trade-off, (3) developing collaborative working, (4) developing visibility, and (5) improving velocity and acceleration. Finally, Blackhurst et al. (2011) conclude that companies can increase their ability to quickly and efficiently recover from a disruptive event by combining both tangible (i.e. physical capital resources) and intangible resources (i.e. human capital) and organizational and inter-organizational capital resources. Taken together, these studies suggests that GVC resilience can be generated through many different types of investment, which ultimately enhances GVC resilience, by increasing redundancy and flexibility in the value chain.

Despite wide recognition that resilience is a key capability for MNCs in mitigating increasing value chain risk, we currently have limited knowledge about what characterizes resilient MNCs and GVCs, with emerging findings being fragmented across the literature (Blackhurst et al., 2011; Kamalahmadi & Parast, 2016). Thus, there are many opportunities for IB scholars to contribute to existing knowledge by exploring resilience as a means to cope with the increased length and complexity of GVCs. In particular, Covid-19 can be used as a natural experiment to either subject hypotheses to empirical testing regarding the antecedents and consequences of GVC resilience for MNCs or to theorize from carefully selected case studies. For example, IB scholars are encouraged to identify cases that vary from each other as much as possible in their ability to anticipate, withstand, respond to, and recover from the GVC disruptions caused by Covid-19 in order to explore why some MNCs are better able to reduce the severity and duration of disruptions to their GVCs. Doing so will help us understand why some MNCs perform better than others under conditions of severe disruptions. Furthermore, such studies may be undertaken at different levels of aggregation and analysis, including individual-, organizational, industry, and national levels.

Conclusion

The nature and characteristics of MNCs have changed dramatically over the past four decades with MNCs increasingly acting as orchestrators of GVCs. Global supply chains and MNCs' heavy focus on increased efficiency and cost reduction bring increased risks of disruption. This paper points to possible vulnerabilities of the modern MNE and the global factory as an organizational form, particularly the one-sided focus of the global factory on efficiency maximization.

The basic proposition of this paper is that most boundary and location decisions in modern MNCs are primarily made with efficiency considerations in order to maximize efficiency rents. This is done by separating various business functions and activities and locating each function or activity in locations where it can be carried out in the most efficient way. The main lesson to be learned from Covid-19 is that some MNCs have focused too heavily on efficiency in making boundary and location decision, which has caused them and their GVCs to be vulnerable to unpredictable disruptions. Supposedly, this may have far reaching implications for MNCs and the development of IB thinking.

Resilience can be an important strategic weapon in anticipating unforeseen disruptive events, withstanding and responding to disruptions, and recovering from disruptions. Thus,

MNCs are encouraged to balance efficiency considerations against risk and resilience concerns, as MNCs that invest in resilient GVCs will be best prepared to respond to and recover from unexpected critical events, such as epidemic outbreaks, natural disasters, trade wars, and strikes. To do so, MNCs must reconfigure their GVCs and rethink their management in order to find the right balance between efficiency and resilience. An excessive focus on efficiency results in GVCs that are efficient under normal conditions, but vulnerable to disruptions, while an excessive focus on resilience creates unprofitable supply chains and causes MNCs to become uncompetitive. Thus, the old dilemma regarding the achievement of efficiency in activities, while managing the risks assumed in carrying out those activities, remains just as relevant today as it did three decades ago.

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