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Global Value Chains In a New Global Reality:

Analytical Issues and Empirical Illustrations

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Global Value Chains In a New Global Reality: Analytical Issues and Empirical Illustrations

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Abstract

Global value chains are inherently dynamic, continuously adapting in line with current micro and macro conditions. We live in a metapolitical world where global value chains are put under pressure, and where they might become fragile if they become too specialized, dispersed, or long-chained. The thesis will discuss key drivers for change. These are: 1) political factors and policies, 2) technological factors, and 3) environmental factors and sustainability. The purpose of our thesis is to examine how these key drivers change global value chains. More specifically, in terms of: 1) *length*, which is defined by the geographical distances and the number of actors involved; and 2) *vulnerability*, which is embedded in the governance, location choices and the rigidity of global value chains. By drawing from multiple theoretical perspectives, we propose a conceptual framework. The framework reflects the layered complexity of macro-economic and political factors that shapes the governance structures and location of global value chains. To enrich our conceptual discussion, we present five empirical illustrations on global value chains. In order to make a pragmatic demarcation, we analyze industrial value chains and companies that have their origin in Norway. This allows us to discuss and explain different vantage points and accounts for extra-firm actors, regional developments, and internalization choices. The findings indicate that technological, political, and environmental factors significantly shape the *length* and *vulnerability* of global value chains.

1.0 Introduction

In the last few decades, we can observe that the world economy is becoming more deeply integrated and interdependent. *Global value chains* (GVCs) have changed our economic and political landscape in fundamental ways. Due to various reasons associated with changes in technology, institutions, and other macro-political conditions, firms have expanded and developed across national borders. In recent times, there is an increasing trend of production activities in developing countries where labor is cheapest. Increased globalization has meant that most products and services are "made in the world". This means that the value chain activities are spread across national borders based on where the firms can benefit from the best resources.

1.1 Research Focus and Analytical Issues

It is known that the transformation of the world economy since the 1980s has some peculiar features. Here, the emergence of GVCs lacks some key dimensions. We live in a metapolitical world where GVCs are put under pressure. If they become too specialized, dispersed or long-chained they might become too fragile. Since macroeconomic and political factors have such a great influence on GVCs, they might need to become more robust, which means dismantling what already exists today.

The purpose of this thesis is to take a tentative approach to conceptualize and give an orderly presentation of the evolution and the current state of GVCs. More specifically, we will discuss key drivers for change in GVCs. The drivers will then be used to give tentative answers the following analytical issues;

1) How these drivers facilitate change in terms of the *length* of GVCs. The *length* of GVC is defined by the geographical distances and the number of actors involved. Regarding *length*, we are concerned with the structural changes in the GVC, the respective actors, and where the activities are performed.

2) How the key drivers affect the *vulnerabilities* of these GVCs. We also consider existing *vulnerabilities*. This includes the *vulnerability* embedded in the governance, location choices and the rigidity of GVCs.

In terms of governance, *vulnerability* is associated with power and control mechanisms, and the replicability of activities. In terms of location choices, *vulnerability* is associated with long logistical value chains and the accompanying international interdependencies. In terms of rigidity, *vulnerability* includes how actors are able to effectively adapt and reconfigure their activities in line with external conditions.

This thesis will conceptualize GVC participation throughout the GVC in its entirety. Furthermore, we will draw on multiple theoretical perspectives to present and analyze the aforementioned changes in GVCs and the accompanying implications. These exist both at a macro-level (i.e., the GVC in its entirety) and micro-level (i.e., firm-level). However, the main focus will be on the macro-level trends and changes. The purpose of presenting the theoretical perspectives is to gain a better and nuanced understanding of GVC and the recent changes. By drawing from multiple theoretical perspectives, we propose a conceptual framework.

1.2 Structure of Thesis

The thesis is organized as follows. First, we present a broad conceptualization of the rise of GVCs. Here, we focus on the evolution of the literature to argue and observe emerging trends and changes in GVCs. It is noteworthy to mention that we examine multiple theoretical perspectives, as conceptual pieces should seek to bridge theories in interesting ways and provide multi-level insights (Gilson & Goldberg, 2015). To understand its underlying characteristics, we present a broad definition of a GVC and the different terminologies.

Second, we present the key drivers of change in GVCs. Third, at the theoretical level, we explore the two dimensions of GVCs: *governance structure* and *location*. The dimensions reflect the early focus of the literature on economic and competitiveness issues, as well as the recent trend of social and environmental dimensions that have been incorporated.

The two dimensions of GVCs will be discussed through three theoretical perspectives: 1) the GVC approach established by economists and sociologists (e.g.,

Gereffi et al., 2005). 2) The GPN perspective that focuses on geographical dimensions (e.g., Dicken et al., 2001; Henderson et al., 2002). And 3) the global factory theory, which in comparison is a more enterprise-oriented microeconomic approach. Here, multinational companies's (MNEs) role as coordinators is a central topic (Buckley, 2011). Moreover, we include economic neoclassical models emerging from international trade theory to better discuss the dimension of location.

The thesis covers both the macro and micro-levels of GVCs as these are intertwined. This in turn makes it difficult to isolate these levels while conducting a thorough analysis. However, we find it essential to define clear boundaries between the macro and micro levels. When referring to the micro-levels, we include firm-level decisions of location and governance. Conversely, the macro-level refers to the GVC in its entirety.

To enrich our conceptual discussion and ensure a close connection to the phenomenon as it unfolds in practice, we intend to present five empirical illustrations on GVCs. In order to make a pragmatic demarcation, we use the difference between industries to create variation in what we study. The unit of analysis is the GVC in its entirety. However, as the micro and macro factors of GVCs are intertwined, we find it necessary to illustrate both industrial value chains and companies that have their origin in Norway. The selected companies will pursue different strategies, but the context of the home country will be constant. However, the variation will be which host country contexts they are involved in. Lastly, we synthesize the aforementioned literature, in order to propose a conceptual framework. In conclusion, we will provide tentative answers to our analytical issues.

2.0 A Broad View on Global Value Chains

Over the years, scholars have presented different definitions of the phenomenon of GVCs. Despite the different definitions of a GVC, it seems that Gereffi and Fernandez-Stark's (2011) proposition captures the main essence of most definitions. The GVC can be 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). The definition includes activities such as design, production, marketing, distribution and support for the end-consumer.

The value chain is governed at a global scale, where value-added activities are located across borders. The reason is that the necessary skills and conditions are often available at a competitive price. The GVC analysis has a holistic approach to global industries. Researchers have studied both from the top-down perspective (e.g. how lead firms structure their global network of partners and suppliers) and from a bottom-up perspective (e.g. by interviewing key managers about how these decisions affect socio-economic conditions in the countries involved).

Over the decades, the value chain model has been widely used at the firm and industry level to study value configurations. At the firm level, Porter (1985) first presented his basic model of the value chain. The model presents the underlying activities that can be divided into primary activities (in- and outbound logistics, operations, marketing, and sales) and support activities (infrastructure, HRM, technology development, and procurement). While the analysis of the value chain at the firm level generates margins for the firm, other scholars have found it less appropriate to apply to all industries. The presentation of value creation in a sequential order was mainly based on the manufacturing industry. Since then, other industries with different core activities have emerged. Such as digital MNEs that use advanced technologies to achieve greater revenues from foreign locations without directly investing in production (Coviello et al., 2017).

Stabell and Fjeldstad (1998) contributed with two alternative value configuration models: value shop and value network. The value shop is characterised by activities that are configured in a non-linear, cyclical fashion. While the activities within a value network are often configured in parallel, where the system relies on interconnected networks. After reviewing these theories, it is evident that the

boundaries of the value chain are loosely defined by different authors. For instance, while Stabell and Fjeldstad (1998) makes clear distinctions of these configurations, others extend the value chain term to include non-sequential arrangements (such as Mudambi, 2008).

This thesis will first and foremost focus on the notion of the GVC in its entirety. Including the industry level and the underlying macro-level conditions that affect these chains. Therefore, this thesis will use the term "chain" in a broad sense. However, we do not omit that activities in a configuration can change from being sequential to becoming more platform-oriented. Thus, we want to observe if this might be the case or not.

2.1 Terminology of Global Value Chains

The terminology of GVCs has been referred to variously as several academic disciplines have studied the field. These being: economic sociology, international economics, development studies, economic geography, supply chain management, and international business (Buckley, 2009a; Coe & Yeung, 2015; Gereffi et al., 2005; Gereffi & Korzeniewicz, 1994b). In addition, other disciplines use different terminologies, such as: global commodity chains (GCCs), global production networks (GPNs), or global factories (Kano et al., 2020).

From economic sociology and development studies, Gereffi and Korzeniewicz (1994b) elaborated on the GCC concept. The contribution illustrates power relations and wealth distribution by explaining; "how production, distribution, and consumption are shaped by social relations" (Gereffi & Korzeniewicz, 1994b, p. 2). The authors addressed a simple typology to explain governance as "producer-driven" or "buyer-driven" chains. These typologies are based on the power and control mechanisms performed by global buyers (retailers, markets, and traders) or producers (original equipment manufacturers). "Producer-driven" chains consist of vertically integrated firms and their associated suppliers. Here, the governance is structured as a management hierarchy. In contrast, "buyer-driven" chains consist of a generic network of independent firms connected without any arranged coordination mechanisms.

Even though the concept of "producer-driven" and "buyer-driven" chains differs somewhat from the dimensions of GVC, it can still be said that the GCC is the originator of the GVC phenomenon. Nevertheless, several weaknesses emerge in the GCCs framework. For instance, it lacks the theoretical underpinnings, and the ability to distinguish between the differences between the two structures. Further, it lacks an understanding of the range of different value chains as it misses its precision and specification (Gereffi et al., 2001, 2005).

By the early 2000s, the rapid growth of GVC literature emerged with a focus shifting from commodities to the geographical fragmentation of value chains. Gereffi et al. (2005) crystallized the phenomenon by developing a modest theory, introducing five governance typologies. In this theory, the forms of governance can be either embedded within a firm or between different firms. However, it can also change as an industry evolves and matures.

Parallel to the GVC phenomenon, the concept of GPN shares a similar assumption that the inter-organizational networks have become a central part in shaping economic activities in different industries. Henderson et al. (2002) developed the foundational work of GPNs. Contributing with the theoretical 1.0 schema, presenting the intra-, inter-, and extra-firm networks. In contrast with the GVC phenomenon, the concept of GPN takes the extra-firm actors into consideration. Extra-firm actors are institutions, NGOs, and supranational organizations. The theory facilitates a better understanding of the interconnected networks that form the global economy. While at the same time, the theory is concerned with how networks impact regional territories (Coe & Yeung, 2015).

In addition to the aforementioned perspectives, the global factory is a parallel concept emerging from the internalization theory. The internalization theory focuses on the premise that economic actors purposely select efficient governance modes to minimize total costs related to production and governance (Benito et al., 2019). Buckley and Ghauri (2004) conceptualized the global factory, and their work is considered as the modern continuation of internalization theory. The framework emphasizes that brand owners serve and organize as an information hub for the entire global factory (Buckley, 2009a). Here, fine slicing activities can lead to

efficiency gains, as one can take advantage of specialization and regional benefits. While at the same time allowing control at a distance due to existing technologies.

While debates over the relative emphasis of different terminologies will continue, one can argue that they all share a focal point. Jointly, they are concerned about the global strategies of leading firms, and the organizational and geographical structures in different industries. For limitation reasons, we propose to use the term “GVCs" in order to simplify and convey the theory in a straightforward manner. Nevertheless, we discuss the theory from different theoretical perspectives that is central to explaining the phenomenon.

Furthermore, we understand that the dimensions of disaggregation and geographic dispersion exist in different parts of the value chain. These dimensions possess complex knowledge-sharing processes that can be both offshored and outsourced. However, we do not omit that activities in a configuration can change from, e.g., being serial to becoming more platform-oriented. Thus, we want to observe if this might occur in our theoretical analysis and empirical illustrations.

3.0 The Key Drivers of Global Value Chains

While scholars have examined the cost-drivers and value-drivers for value chains, there seems to be less focus on identifying the key drivers for change. Thus, this thesis seeks to discuss some broad drivers for change in GVCs. Furter, we find it necessary to discuss some of the consequences and mechanisms of these changes.

In that regard, we find it essential to state what is meant by changes in GVCs. GVCs are dynamic in their geographical *length*, location, number of involved firms, activities, governance modes, and coordination mechanisms. However, we are concerned about macro trends and their impact on GVCs. Indeed, as we are conceptualizing changes in GVCs in its entirety, we are not interested in analyzing isolated industry- or value chain-specific changes.

We expect that there exists a vast array of drivers for change. For limitation reasons, we present key drivers in terms of three broader categories: 1) political factors and policies, 2) technological factors, and 3) sustainability and environmental factors. The key drivers are dynamic in the long term, and a presentation of these broader categories will yield a conceptualization that may keep its relevance in the long term.

3.1 Political Factors and Policies

Politics and states have traditionally had a minimal role in the debate about the evolution of the GVC-based global economy. Mayer and Phillips (2017) propose that states' roles are far more complex. More specifically, there exists a significant complexity between private and state governance. It is apparent that in today's global landscape, political factors and policies are influencing GVCs. Tariffs, international political relations, sanctions, and country-level political trends are some of the factors that can affect trade patterns. However, there is still a need for more sustained research on the impact of policies on GVCs (Neilson et al., 2014).

Some political trends have a greater effect on GVCs. For instance, increased affective polarization in the U.S, could cause notable influence on several GVCs (Boxell et al., 2020). One explanation of the polarization is the high exposure of

international trade. More specifically, the rising import competition by China significantly affects the political views in trade-exposed countries (Autor et al., 2020). Although polarization is mostly present in the US, it is clear that such country-level trends affect GVCs. In addition, it may be the underlying facilitator for other political trends that are affecting GVCs to a larger degree. For instance, Autor et al. (2020) argue that affective polarization in the U.S. is accompanied by increased support for economic nationalism and trade protection policies.

While politics and policies have had a significant impact on the underlying composition of GVCs, this impact may be even more evident today. Although the literature has emphasized that firms (instead of states) play the leading role in determining terms of production (Mayer & Phillips, 2017), increased economic nationalism and protectionism are challenging this view. Research indicates that economic nationalism is on the rise in western Europe (Colantone & Stanig, 2019).

In the emerging platform of economic nationalism, we observe investment and trade policies. These fosters protectionism and a higher degree of opposition to supranational institutions (e.g., WTO and the European Union). Such economic protectionism should not be regarded as a cause but rather a consequence (Eichengreen, 1986). Evenett (2019) argues that some of the underlying causes for increased protectionism include economic recessions, and a high degree of exports from China. The phenomenon is known as the "China shock" (Colantone & Stanig, 2019; Autor et al., 2020). The effects of these protectionist trends on GVCs are significant, and will be later discussed in this thesis.

The impacts of political responsibility and policies related to private governance also has an impact on GVCs. Private governance, which is the governance of the world economy by non-governmental institutions, has increased over the years. One explanation is the public systems failing to adequately respond to the social pressure. Indeed, other scholars have noted an increase of businesses taking political responsibility beyond what is legally required (Scherer & Palazzo, 2011). This in turn is hypothesized to be dependent on the economic leverage of the lead firms in the particular GVCs (Mayer & Gereffi, 2010). Additionally, Mayer and Gereffi (2010) argue for a more efficient private governance if corporate interests are aligned with social concerns.

However, in recent discussions it is argued that the world will start to experience a shift back towards public governance. A main cause for this shift is the environmental factors, which will be later discussed in this thesis. Other causes include costly monitoring and control, in addition to an inadequate representation of workers (Mayer & Gereffi, 2010). Even so, we argue that the increased political trends towards economic nationalism and protectionism are important facilitators for a partial shift towards increased public governance on GVCs. The effects of this will be discussed in this thesis.

3.2 Technological Factors

3.2.1 Digital Platforms

In recent times, GVCs are changing under pressure from digital innovation and development. It is an increasing trend of digital technology that has taken place. Those being: digital platforms, blockchain, automation, and 3D printing. Digital technology challenges GVC's performance in many ways. For instance, it reduces the entry-level barriers for new firms through digital platforms (e.g., Amazon, Alibaba and eBay). The digital platforms pose a market that connects sellers and buyers with each other, instead of using third parties. This leads to a reduction in initial fixed costs associated with GVC performance. Furthermore, the access to digital platforms and e-commercialization facilitates increased GVC performance. More specifically, it provides scope for smaller firms coming from countries with poorer infrastructure. Thus, enabling them to specialize within a segment through digital technologies.

By providing multi-party access to information, a digital platform (e.g., blockchains) can improve the process flow within a GVC that enhances verification and monitoring. Thus, blockchain can help reduce the entry barriers for countries with fragile institutions. Making participation in GVC activities more accessible. However, these digital platforms pose new challenges. For instance, their advantage of information insights can lead to price discrimination and thereby challenge regulations of the competitive market.

3.2.2 Automation and 3D-Printing

Emerging technologies such as automation and robotics have both positive and negative effects on GVCs. For instance, automation and robotics reduce the demand for labor, which leads to a need to restructure the labor force. Furthermore, automation works as an alternative solution to offshoring as firms in developed countries. This in turn reduces labor costs without having to move production to host countries. While the firms retain control over the value configuration that takes place during production, as the GVC becomes more centralized. Conversely, low-cost countries will suffer from the use of automation as their cheap labor will be outcompeted. Accordingly, it affects their GVC performance. However, the low-cost countries will perform an important function as they can provide the inputs needed in the production process.

Over the last years, the debate over the increased use of 3D-printing has aroused interest. For instance, papers such as The Economist (2012) have predicted that 3D printing will induce the next industrial revolution (Hopkinson et al., 2006; Laplume et al., 2016). Affecting mostly industries such as machinery and equipment. 3D printing can reshape GVCs, leading to a greater number of reshoring. The reasons for this are that the required skills are less available in low-cost countries. Thus, the technology of 3D printing threatens to outperform retailers, distributors, and manufacturers (Lipson & Kurman, 2013). On the other hand, 3D printing can increase productivity. By optimizing the customers' needs and tailoring adaptations that previously would have taken much longer to produce with traditional manufacturing.

3.3 Sustainability and Environmental Factors

GVCs are experiencing increased pressure related to sustainability and corporate social responsibility (CSR). Accordingly, they might need to adjust to meet these expectations. CSR is one of the most closely studied forms of private governance (Bair & Palpacuer, 2015). Here, initiatives by firms through private governance (e.g., CSR measures), have an effective influence on social pressure (Mayer & Gereffi, 2010)**.** Prior relevant organizing and the dramatic potential of the issue are

important factors for mobilizing collective action. Thus, resulting in more effective social pressure.

Increased focus on sustainability and ethical production is a form of effective social pressure. This form has resulted in many firms cooperating with other organizations that take a larger social responsibility. Indeed, research indicates that competitive advantages may be sourced from being attentive to the consumers' interests and concerns (Porter & Kramer, 2006). While CSR measures are more likely to be adopted when corporate interests align with environmental or social concerns (Mayer & Gereffi, 2010). It is not common that these measures lead to competitive advantages. The reason is that corporate interests do not follow the social concerns, as other and more cost-efficient measures usually exist. Therefore, the increasing social concerns may affect GVCs differently, depending on the corporate alignment of its involved firms.

Environmental factors are also reflecting the dynamics in GVCs. For instance, the COVID-19 pandemic was, to a large extent, caused by human-made environmental instability (Arora & Mishra, 2020). While the pandemic itself has not increased the *vulnerability* of GVCs, it certainly has highlighted existing *vulnerabilities*. During the pandemic, some GVCs did not manage to sufficiently deliver the expected production. This in turn highlights the underlying *vulnerability*, which is rooted in the complexity of the GVCs. When a GVC possesses complexity in logistics, the number of involved firms, and geographical span, there are many possible breaking points. The actual *vulnerabilities* of these breaking points are, to a certain extent, unknown until a severe global event occurs.

Evidently, sustainability and environmental factors have a significant, and most likely increasing, impact on GVCs. Both in terms of how these value chains adapt and change over time, but also in terms of the existing *vulnerabilities*. As consumers, institutions, and governments are increasing their environmental focus, GVCs might need to adapt. The resulting changes in these GVCs will be discussed in this thesis.

4.0 Key Dimensions of Global Value Chains

To gain a better and nuanced understanding of GVC and the recent changes, this chapter will review two dimensions of GVC; *governance structures* and *location*. We include the theoretical principles of the previously presented terms; GVC, GCC, GPN, and global factory. By detailing these theoretical perspectives, our purpose is to consider the different dimensions that make up the GVC. We will later use these dimensions to further discuss and purpose a conceptualized framework.

4.1 Governance Structures

In this section, we review the emergence and present state of the governance literature. The purpose is to synthesize key theoretical views from various disciplines. Our goal is to understand governance from different theoretical perspectives in order to examine how the differences in the theoretical approaches may account for changes in *length* and *vulnerabilities* in GVCs.

For limitation reasons, we present three governance theories: 1) theory related to different ways in which international businesses organize themselves, developed by Gereffi, Humphrey and Sturgeon (2005); 2) a theory of convention in GVCs, and 3) the GPN approach. The purpose of this chapter is to present the theory in a new context characterized by changes in technology, increased political activity, and sustainability. This in turn can provide a springboard for new research.

GVC scholars review governance in a different way compared to other theoretical perspectives. For instance, the theory emerging from international political economics and law has studied governance as part of institutions. These institutions could be: the World Trade Organization (WTO), International Monetary Fund, and the World Bank (Ponte & Sturgeon, 2014). On the other hand, the more radical version of political economy views governance in a different way. The perspective focuses on the relationship between multinational corporations, institutions, and a third actor such as the WTO, which intends to present the interests of corporations (Cammach, 2003; Held, 2010). From here, it is clear that theory emerging from a political economy perspective is concerned with the effectiveness of global

economic governance; for whose interest and what consequences this entails for whom.

In contrast, the GVC governance literature is interested in MNEs and how their powerful position shapes the GVC. The GVC literature studies the role of lead firms in cross-border business networks. More specifically, it is concerned about how lead firms achieve value creation by structuring the activities in a cost-effective way. The business networks exist both at the internal level (as a part of an MNE) and at the external level. These networks gather resources, information, production, distribution, and consumption that each actor benefits from.

"Governance" in the literature of GVC is explained by the notion that they do not arise spontaneously, automatically, or systematically (Gibbon et al., 2008). In fact, these processes are driven by strategies and arrangements made by specific actors in the market. The GVC governance studies the practices, power dynamics, and organizational forms that affect the nature and structure of cross-border business networks (Ponte & Sturgeon, 2014). In the rest of this chapter, we synthesize the different theoretical contributions of GVC governance. In order to discuss and present it in a new context.

4.1.1 Governance as Coordination

The most significant theorization of GVC governance was Gereffi et al. 's (2005) five typologies. The theory was published as a further development of the previous work of Gereffi & Korzeniewicz (1994a). Gereffi et al. (2005) offers a well-established taxonomy of five governance forms. The paper builds on transaction cost theory, and expands on markets and hierarchy as governance types. As in transaction cost theory (e.g., Williamson, 1975), the hierarchical form is categorized by vertical integration with governance through managerial control. On the other hand, the market form is driven by price with a low barrier to switching to new partners.

Gereffi et al. (2005) drew on production networks, firm capabilities and learning, to purpose three governance modes. 1) "captive linkages" where buyers exert their power on suppliers by leveraging the high switching cost that suppliers face. 2)

"relational linkages" are linkages with a high degree of mutual dependence and high asset specificity. However, these are often accompanied by a lower ability to codify transaction-relevant information and knowledge. 3) "modular linkages" that are categorized by relatively low asset specificity and complex transactions than markets. In addition, these are characterized by the ability to codify information and knowledge that are relevant for the transaction (See figure 1).

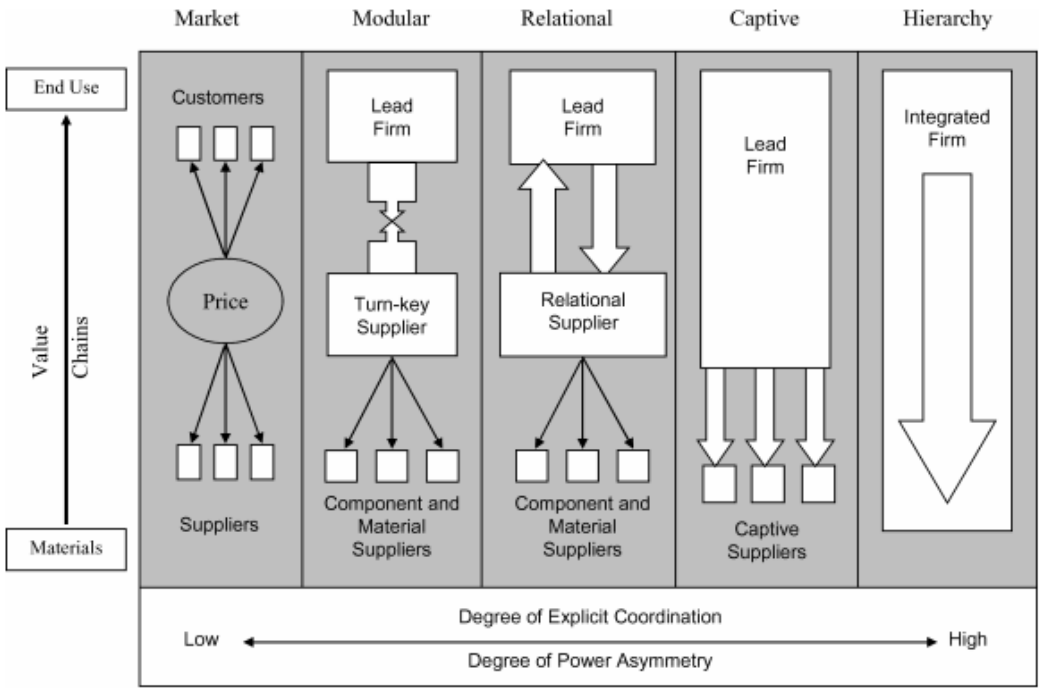


Figure 1: Five GVC Governance Types. Source: Gereffi et al. (2005)

The conceptualization of the five typologies is based on three determinants. Those being: 1) capabilities in the supply chain, 2) the ability to codify transactions, and 3) the complexity of the transactions (Gereffi et al., 2005). These factors account for remarkably many intra-chain dynamics. For instance, it accounts for how lead firms may use technological improvements to lower the complexity. Furthermore, it reflects how trust and reputation can affect the governance mechanism within value chains. In accordance with the GVC phenomenon, the notion of power is present in the framework. Gereffi et al. (2005) emphasizes several different lead firm-supplier power relations. From low power asymmetries in market linkages, towards high asymmetries in vertically integrated hierarchies and captive value chains.

4.1.2 Normalizing GVC Governance

Further theoretical contributions mobilized convention theory to focus on normalization and standardized processes of GVC governance (e.g., Ponte & Gibbon, 2005; Gibbon et al., 2008). The terminology "normalization" indicates that a practice should be in compliance with a standard or norm (Gibbon et al., 2008). Furthermore, the theory focuses on distinguishing between overall drivers and various forms of coordination. Thus, the convention theory moves beyond the work of Gereffi et al. (2005), as it explores several dimensions that frame the buyer-supplier relations within GVC governance.

Convention theory is based on the seminal work of Boltanski and Thévenot (1991). The paper focuses on the dimension of judgment and its function in practice. Based on philosophical theory, Boltanski and Thévenot (1991) presented six different ideal-type 'orders of worth'. Explaining how these contribute to influencing people's judgment in an organization and in economic practice. Furthermore, the convention theory has also focused on the coordination mechanisms between different companies via the establishment of quality conventions (Eymard-Duvernay, 1989; Ponte, 2009; Ponte & Gibbon, 2005; Ponte & Sturgeon, 2014; Wilkinson, 1997).

Ponte and Sturgeon (2014) proposed a framework that gathered the theoretical basis behind convention theory. The framework highlights how each individual order can lead to different focus areas of justification when being challenged. Additionally, Ponte and Sturgeon (2014) focused on the different challenges and how they are based on both questions and measures of product quality, and lastly, how they have different transmission potential along GVCs.

For limitation reasons, we choose not to go deeper into the literature of convention theory. Nevertheless, it is of great value to understand how it shifts the focus from the structure-oriented work of Gereffi et al. (2005), to the normative nature of coordination in GVCs. Thus, convention theory goes beyond the three dimensions of complexity, codification, and supplier competence. Thus, the convention theory allows for a meso-level bridge between micro-level explanations and interconnections, and macro-level governance in GVCs.

4.1.3 Governance From a GPN Approach

The GPN approach is a parallel theoretical development emerging from scholars of social science. The GPN analysis is concerned with assessing all external dynamic conditions surrounding the network, such as its geographical scale. The conceptual GPN framework was originally introduced by Henderson et al. (2002). The framework is called the GPN 1.0 schema, which proposes three different networks that arise in economic activity. Those being: 1) intra-, 2) inter-, and 3) extra-firm networks (see figure 2).

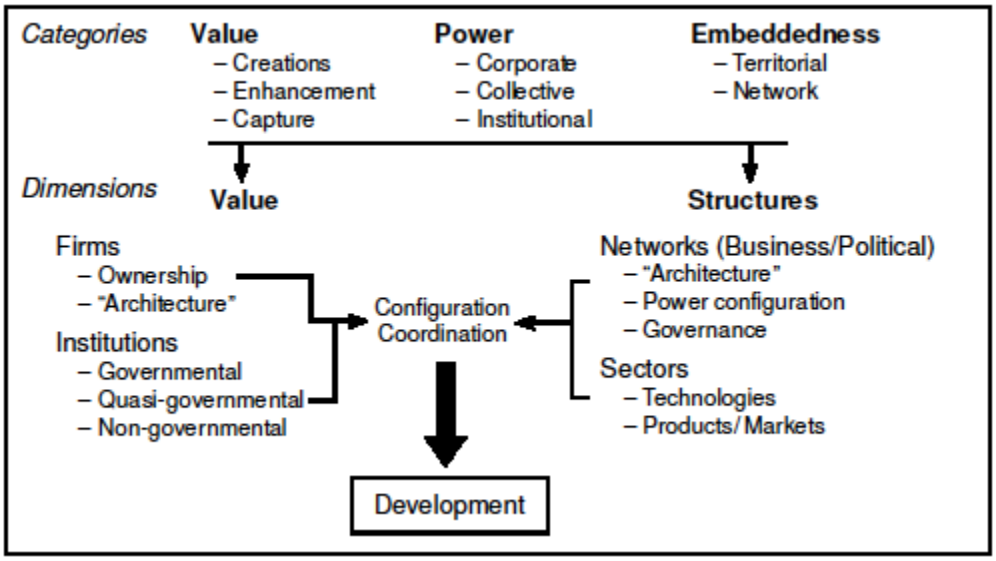


Figure 2: GPN 1.0 Schema. Source: Henderson et al. (2002)

"Extra-firm networks" are explained as extra-firm institutions (such as government agencies, NGOs, and consumer groups) that have the ability to form a firm's activities. Hence, the scheme goes beyond the notion of inter-firm networks that both GCC and GVC explain. Furthermore, the three networks are discussed in light of global, regional, local economic, and social dimensions. Henderson et al. (2002) highlight the importance of how the world economy has changed in terms of capital, labor, knowledge, and power. In addition to the position of institutions and how they are involved in affecting these changes.

Thus, the framework examines the intra-network mechanisms and the role of intra-inter-and extra firm actors (such as governance, EU, and WTO) and the networks' impact on geographical regions. Between these actors, flows of goods and services are produced, distributed, and consumed along the value chain.

The GPN 1.0 schema goes beyond previous GVC governance literature by including: 1) extra-firm actors in the analysis, 2) including the external conditions such by mapping the spatial configurations that are part of the governance that spans across nations. 3) analyzing governance across vertical and horizontal connections in production systems. And lastly, 4) GPN takes a comprehensive turn, arguing that governance is more contingent and variable over time and that governance is shaped by external regulatory and institutional functions.

4.1.4 A Dynamic Theory of GPNs

Coe and Yeung (2015) presented a comprehensive theorization of interlinked value creation in the global economy. Here, Coe and Yeung (2015) defined GPN as "an organizational arrangement, comprising interconnected economic and non-economic actors, coordinated by a global lead firm, and producing goods or services across multiple geographical locations for worldwide markets" (Coe & Yeung, 2015, pp. 1–2). Moreover, the authors explained that lead firms are primarily expanding their competitiveness based on three drivers. Those being: 1) cost, 2) flexibility, and 3) speed.

In accordance with Gereffi et al.'s (2005) framework, Coe and Yeung (2015) acknowledge modular linkages. These linkages occur from standardization, and result in significant cost benefits. Furthermore, these linkages apply to services and products, where non-core services can be outsourced to specialized cost-effective regions. While the location choices may help lead firms in reducing total costs, the dynamic capabilities of flexibility and speed are equally important. Indeed, lead firms will seek to maintain a high degree of flexibility when choosing how to organize and govern.

While modular linkages provide flexibility, lead firms may want to locate activities within industry-specific regions. These regions obtain a high concentration of possible suppliers. Furthermore, lead firms capture competitive advantage through speed. The increased demand for quicker time-to-market has resulted in competitive opportunities (Coe & Yeung, 2015). Here, technological innovations and close location to end-users have been driving forces in realizing a quicker time-to-market.

However, it is argued that regions are prone to focus their technological innovation efforts differently. For instance, East Asian firms tend to focus on technology diffusion management, while product- and process innovations are more prominent in Japan, Europe, and America (Mathews & Cho, 2007).

The framework conducted by Coe and Yeung (2015) is especially suitable for analyzing how extra-firm institutions (E.g., governmental agencies and supranational organizations) shape firm interactions. Hence, moving beyond the phenomenon of GVCs's focus on inter-firm relations. Moreover, the GPN approach moves beyond the "chain" logic and includes complex and intersecting horizontal and vertical ties. While at the same analyzing governance modes in the context of extra-firm institutions.

Coe and Yeung (2015) argue that the GPN 1.0 schema lacks the explanation of causal mechanisms. These mechanisms link the main conceptual categories of 1) value 2) power, and 3) embeddedness. As a result, the authors contributed with an expansion of the GPN perspective. Introducing the new framework GPN 2.0 schema (See Figure 3). Several differences distinguish the old framework from schema 2.0. For instance, the authors focus on more precisions regarding the actors and elements within GPNs.

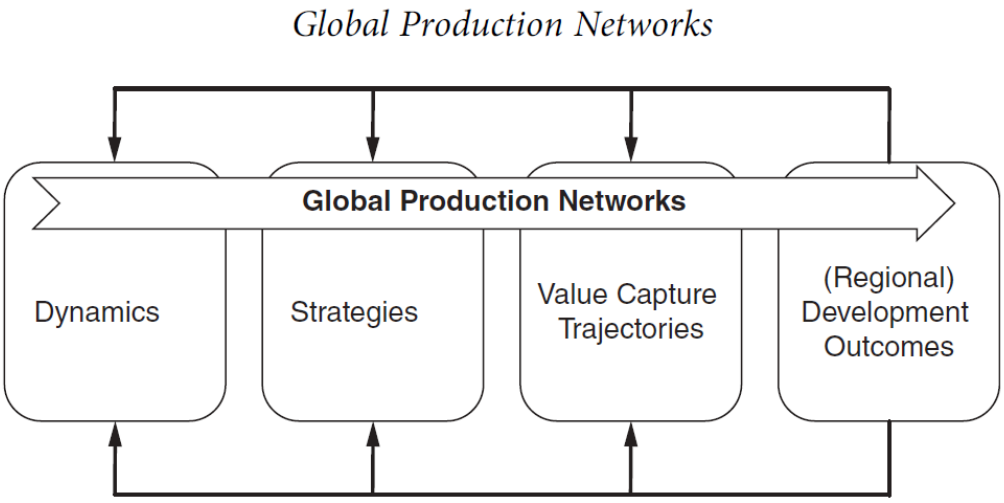


Figure 3: GPN 2.0 schema. Source: Coe & Yeung (2015).

Furthermore, the conceptual framework accounts for how firms and networks interact and impact regional economies to a larger degree. Lastly, the GNP 2.0 schema has an enhanced focus on the underlying dynamics that impact the strategic

choices. Thereby, the schema explains how extra-firms and the political- and environmental factors shape the underlying dynamics in GVCs and GPNs. Moreover, the schema emphasizes the influence a geographical scope has on technological innovation (Mathews & Cho, 2007). This in turn will enhance our analytical discussion on technological factors. Accordingly, we find it fruitful to draw upon the GPN perspective and Coe and Yeung's (2015) conceptualization.

4.1.5 Global Factory on Governance

In recent times, the term "global factory" has gained traction among scholars. The theory is seen as an extension of internalization theory, and builds upon Coase's (1937) seminal framework. The global factory focuses on efficiency in governance. More specifically, the theory is concerned with minimizing internal costs (agency costs) and external costs (transaction costs). Furthermore, the global factory analyzes the internalizing markets and the associated costs.

Here, Buckley (2009b) highlights several costs associated with internalizing markets. More specifically, resource costs that usually increase when one external market is internalized into several internal markets. Furthermore, the author addressed that costs associated with communication and problems related to foreignness also leads to higher costs in the internal markets (Buckley, 2009b).

The continuous evaluation of external- and internal costs in the value chain allows for dynamic assessments of how the activities should be governed. For instance, "fine slicing" of activities makes it possible to compare the sliced activities with external alternatives. These comparisons can lead to outsourcing if it is more profitable. In general, the internalization choices and the accompanying location decisions are the essences of the global factory (Buckley, 2009b). These choices might affect the *length* of the value chain. In terms of the number of decision makers, and in terms of the geographical *length* through the location choices. During decision-making, firms tend to base their decisions on how it may affect their resilience. The reason being that increased flexibility and knowledge management are complements to these key decisions (Buckley, 2011).

4.2 Location

The dimension of *location* focuses on where activities should be geographically distributed and performed. The purpose of this chapter is to synthesize key theoretical perspectives emerging from 1) the GVC approach, 2) the GPN perspective, and 3) neo-classical models in international trade theory. This enables us to further discuss the literature on location in a new context characterized by changes in; technology, increased political activity, and sustainability, which can provide a springboard for new research.

A central topic within the GVC literature has been to address the importance of geographical scope that is present in global industries. However, GVCs can occur at different geographical levels. For instance, it can arise at a global, national or regional level. Location is largely shaped by macro factors both in a firm's home country, and its host country. These macro factors are often related to economic development and its underlying conditions of the labor market, employment rate, the technological environment and the degree of institutional involvement.

In terms of the technological environment, the institutional benefits and regulations prove to have a great influence. For instance, IP protection and a high degree of education makes it easier to establish such innovative environments. Most often, the actors of the GVCs will be governed and controlled by leading market players and technologies that have their origin in developed countries. Accordingly, these can maximize and utilize resources and activities in their favor. In light of this, one can observe that technological advantages have a great influence and thereby shape the geographic composition of GVCs (MacCarthy et al., 2016).

4.2.1 Offshoring and Reshoring

One of the most debated topics in globalization literature is "offshoring". The phenomenon was already observed in the 1960s when foreign direct investments involved captive offshoring. Since then, different theoretical perspectives have examined the location of economic activities. Those being, the international business theory and the economic geography literature (Buckley & Casson, 1976; Dunning, 1993; Dicken, 2003; Fujita et al., 1999).

As a consequence of offshoring, the topic of "reshoring" has aroused more interest in the last decade. There are several reasons for why lead firms chose to reshore their activities. For instance, increased knowledge in ethical production, higher transport costs, and industrial policies are some of the reasons. Although reshoring from low- to high-cost- countries is not a recent phenomenon, it is seen that in some industries, there has been an increasing trend due to advanced technology.

Drawing on the GPN framework, Lund and Steen (2020) analyzed the reshoring of nine Norwegian manufacturing firms. The authors discovered that advanced technologies used in manufacturing affects and drives for reshoring. Furthermore, Lund and Steen (2020) emphasized that the effects of macro factors (e.g., global economy and changes in the international market) are of great importance. The study shows that the manufacturers achieved a comparative advantage by combining infra-firm processes (advanced technologies) and extra-firm processes.

In light of our thesis, reshoring is an example of how things have changed in terms of location choices. This is explained for two reasons. First, reshoring as presented means that a lead firm moves production back to the home country; hence it has changed location. Second, in high-cost countries, there is more real capital employed per laborer, which often changes (especially in production), as these countries use more real capital per person compared to low-cost countries. Here, it often includes a change in the production method or the input factors. This in turn makes it more efficient to move production to the home country to maximize value creation.

4.2.2 Comparative and Competitive Advantages

A central topic within economic theory is the notion of "comparative-" and "competitive advantage". The purpose of presenting this theory is to better understand why lead firms locate their production or services. Economic theory explains that localizations are not equal, they are heterogeneous, and we can explain this in certain ways. We review and compare two of the most seminal models that are derived from the comparative advantage mindset. Those being: The "Ricardian trade model" and the "Heckscher-Ohlin-Samuelson model" (HOS model).

Furthermore, we present the concept of competitive advantage as it unfolds in practice. We then aim at integrating these insights of location into our discussion.

The term comparative advantage is often used to explain the production choices in countries and regions. In essence, the theory is interested in finding the optimal production locations that minimize the opportunity costs of producing a certain set of goods or services. The opportunity cost is the cost of producing one alternative of a good or service in terms of another. A country will achieve a comparative advantage if its opportunity costs of producing a good or service are lower compared with other countries.

The Ricardian model was initially developed by David Ricardo (1817). The model highlights the economic, institutional, climatic, and natural factors that make countries different from each other. According to the author, these advantages are given, which means that countries come with their existing resources and inducements. The author presented an example of the production of wine in Portugal, and clothes in the UK to illustrate differences in productivity.

In Ricardo's (1817) example, Portugal had superior climate conditions, specialized capabilities and experiences for effective wine production. In comparison, the UK had the capabilities to produce cloth efficiently. As both the countries had a comparative advantage in producing cloth and wine, respectively, they experienced gains from trade. Later contributions have modernized the theory by focusing on technology. In the last 50 years, there has been a greater discussion regarding the advantages. Here, it is argued that they are not given but created through technology, infrastructure investments, and the education system.

The HOS model is a seminal neoclassical model of international trade that is an extension of the Ricardian model. In comparison, the model focuses on two goods and two factors of production instead of one. The model is restricting factor mobility across countries and assumes identical technologies. As a result, one is able to determine a correlation between production level and the relative factor endowment. In fact, one of the noteworthy theorems of this model is the Heckscher-Ohlin theorem. According to this theorem, a country exports the good that is factor intensive in the factor the country has relatively more of. Whereas they import the

goods that are intensive in the factor the country has relatively less of (McLaren, 2012).

Although the Ricardian and HOS models illustrate several important dynamics (e.g., trade liberalization), they do have some shortcomings. In terms of GVCs, one of the critical shortcomings is the lack of raised industry productivity through reallocation. These models do not account for intra-industry trade and productivity differences between exports and non-exporters (Bernard et al., 2007a). Later contributions, such as the "integrated" heterogeneous firms model (Bernard et al., 2007b), account for dynamics that the aforementioned models overlooked. However, later contributions also entails a more opaque understanding of the underlying mechanisms.

Furthermore, the GVC actors are concerned with minimizing the cost of production. Accordingly, the choice of location may fall on the country with a competitive advantage in production. However, this does not omit comparative advantage research from this discussion. Indeed, a high degree of factor utilization may facilitate the country to focus on comparative advantage in production. Here, countries and local actors choose to produce in a certain way to maximize their potential. However, GVC actors will emphasize locations with an absolute advantage as long as the location possesses the necessary factors of production.

4.3 Reflection on Previous Literature

Over the last few decades, scholars from different theoretical perspectives have examined how lead firms organize themselves in the global economy. Here, governance structures and location have been and still are the centerpiece of GVC analysis. The studies are characterized by the circumstances that have been present at the time the theories were established.

For instance, in simpler times, it was logical to focus on dimensions of market and capability-seeking activities of MNEs. The theoretical explanation has been important for our fundamental understanding of international activities. However, it does not highlight the fragmentation of GVCs. Furthermore, it does not include the central function of capabilities and they make a big difference in knowledge,

production, and efficiency. These capabilities provide advantages in economic development, as we see today in China, Russia and Vietnam.

After the earlier view, GVC has tried to create a more complex and dynamic picture of global performance. The framework conducted by Gereffi et al. (2005), expands the theory of markets and hierarchies. By presenting three different modes of inter-firm coordination. As presented, the framework has taken geographical conditions into account. Nevertheless, several theorists have criticized Gereffi et al.'s (2005) seminal framework. For instance, Lee (2010) argued that the theory only analyzes micro-level factors of relationships, individual transactions, and certain value chain parts. Accordingly, the framework does not take the overall chain governance into account (Lee, 2010).

As presented in our literature review, other scholars have proposed a complementary approach of governance. For instance, researchers have examined the normative conditions of coordination that take place (such as Gibbon et al., 2008; Ponte & Gibbon, 2005). Furthermore, the theoretical contributions from the GPN approach emphasized the importance of powerful external actors. More specifically, researchers have contributed to shaping how GVCs are structured. Here, "governance" is presented as a vulnerable dimension affected by changes that occur at the level of powerful actors (such as institutions, consumers, NGOs, employees). These are affected by the impact of regulation, lobbying and civil-society campaigns.

For instance, institutional actors have a vital function for global activity. The institutional actors have the ability to shape regulations regarding trade and cooperation. Here, political relations have an impact on the accessibility for international activity. Moreover, GVC performance is strategically organized where cost-benefit is taken into account. Thus, when institutional actors obtain great power, the strategic benefit of, for example, having access to a cheap labor market might be aroused. In addition to political relations, the consumers have a great impact on how GVCs are structured. By protesting or boycotting against environmentally harmful actions, consumers can make a significant change.

Correspondingly, workers have an impact on GVC structure. Through NGOs, workers can carry out global strikes against specific firms, industries, or broader economies. The purpose of this discussion is to present previous accumulated literature on GVC governance, and highlight the fact that GVCs are highly vulnerable. In a time where technological and macro-political factors affect the performance of GVCs, it is essential to understand the structural consequences it entails. And not least, challenge the relatively young literature to explain how these processes change and how to deal with these changes to continue with the activity of GVCs.

4.3.1 Increased Concentration

As presented, the theory within GVC governance refers to the composition of network structures (see Coe & Yeung, 2015; Gereffi et al., 2005; Henderson et al., 2002). Although these networks are important to leading firms, they can be heterogeneous in terms of depth, density, and openness (Lee, 2010). From our literature review, several studies emphasize the influence of networks on control, innovation processes, and the appearance of lead firms. In terms of density, we argue that the density of networks in GVCs has developed over time with emerging technologies.

Furthermore, we observe that the governance structures of GVCs have become more concentrated. One of the explanations is the result of changes in the global economy, following the financial crisis in 2008 and 2009. The financial crisis led to extreme vulnerability and emerging economies. This in turn led to an increase in local activity. Following this, governance in GVC has encountered new challenges associated with a smaller number of suppliers than before. These are often larger and more strategically accessible to the larger market (Gereffi, 2014). Hence, the governance structures have become significantly denser and localized over the past decade, something we discuss in our synthesis.

Thus, we observe that the more actors involved, the greater the probability of using comparative and absolute advantages for individual companies. On the other hand, a firm might become vulnerable when more actors are involved in the process. Accordingly, firms and GVCs are forced to balance the cost benefits accompanying comparative and absolute advantages with resilience that accompanies more

compact configurations. Here, the compact structures often have fewer actors and reduced geographical distances.

In recent times we see that the ongoing COVID-19 pandemic has highlighted the already existing *vulnerabilities*. Accordingly, we experience a rise in economic protectionism. Thus, firms may prioritize more resilient configurations and coordination mechanisms, which will be discussed in our synthesis. Further, we highlight the notion that GVC literature largely reflects macro-level dimensions that significantly contribute to shaping GVC performance and development.

5.0 Empirical Illustrations

In this chapter, we present five empirical illustrations to show how the key drivers for change may affect different GVCs. The illustrations are of different characters and will therefore be structured into three levels. Those being: 1) macro context, 2) technology and industry context, and 3) company context. In terms of macro contexts, it is important to note that they are of great importance, even though they arise within a relatively specific time frame. Nevertheless, they are significant as they change the decision parameters, which have consequences for how the GVCs are performed.

The illustrations will give us insights into different drivers and effects. Thus, we want to shed light on various aspects by presenting contexts and cases that encompass the key drivers of change: 1) technological factors, 2) political factors and policies, and 3) environmental factors and sustainability.

To limit the impact of externalities, we have chosen to analyze Norwegian firms and industries that are part of a GVC. In this meaning, we have not limited the cases to any specific industries or configurations. Moreover, we acknowledge interconnections between the macro-and micro-level of GVCs. Hence, we have chosen to include illustrations that analyze the status quo from a single company's perspective. While other illustrations include the entire GVC or industry as the analytical context. The illustrations are derived from news clippings and historical data about previous value chain configurations. To ensure clarity, we intend to present a table of the illustrations, their associated key drivers, and their effect on the *length* and *vulnerability* of GVCs.

5.1 Macro Context

The COVID-19 Pandemic: Vulnerabilities and Undesirable Dependencies

Scholars have argued for a shift towards more concentrated GVCs (e.g., Asmussen et al., 2007). Here, the ability to fine-slice activities and take advantage of regional differences can lead to efficiency gains (e.g., Buckley, 2009a, 2009b). However, the ongoing COVID-19 pandemic has challenged the long-term sustainability of GVCs. Indeed, it highlights the existing *vulnerabilities* accompanying such fine-

sliced configurations. For instance, logistics between activities and across borders have become vulnerable as a result of instability.

The pandemic has affected both the demand and supply side of production, leading to reconfigurations. Some companies have reconfigured their activities completely and even entered into new GVCs. For instance, earlier in the pandemic, we experienced a significant shortage of medical equipment and antivirals. More specifically, surgical face masks and effective alcohol-based disinfectants. The rapid growth in global demand for these products resulted in overworked GVCs that could not meet the global demand.

Accordingly, some firms transformed their existing activities to help relieve some of the pressure of these GVCs. For instance, a Norwegian liquor producer, Arcus, reconfigured their production. Since the company has a long tradition in mass-producing liquor, they had the equipment and capabilities to switch over to produce disinfectants effectively (Sjuve, 2020). At that time, the Norwegian market experienced a shortage of disinfectants. Luckily, Arcus could use their distillers to produce alcohol-based disinfectants. Furthermore, Arcus had the ability to enter the new value chain as the content in disinfectants could be manufactured from various organic mediums that were sourced regionally. This in turn allowed Arcus to act flexibly and thereby reduce their *vulnerabilities*.

As China has been a major producer of these consumables, Europe and other western countries were highly dependent on their production. Due to political tensions, the dependence on China made several countries *vulnerable*. Thus, the urgent need to increase production facilitated political and institutional support. In fact, Arcus met the demand from local governments and institutions (Sjuve, 2020). However, several countries previously overlooked the extent of the dependency on China for vital consumables. Here, the real *vulnerabilities* in the GVCs were first recognized when the acute shortage and reliance on these consumables surfaced.

Emerging from the GPN approach, the competitiveness of the production networks is assumed to be driven by cost, flexibility, and speed (Coe & Yeung, 2015). However, the pandemic has shifted the demand and increased the pressure on the supply side. Hence, flexibility and speed have in short term gained importance

compared to costs. Accordingly, some GVCs have been reconfigured to meet the increasing need for flexibility and speed.

For instance, a more dispersed configuration where activities are characterized by replication in different regions, can reduce *vulnerabilities.* On the one hand, it allows for local production closer to the end market. Thereby, limit the complexity of global distribution and coordination. However, such configurations do not take full advantage of the possible comparative and absolute advantages accompanying specialized and fine-sliced configurations.

While the pandemic has led to drastic reconfigurations of several GVCs, the longevity of these reconfigurations are yet to be determined. However, it is debated whether these GVCs will return to the same *vulnerable* configurations without any substitutes. In fact, national governments are likely to intervene in the production side of vital consumables. To ensure that these value chains do not face the same *vulnerabilities* in the future. More specifically, to ensure that these GVCs can (at least partly) meet the local demand in a crisis situation. On the other hand, as the critical need for these consumables start to diminish, competitiveness based on cost efficiency and specialization will gradually returnø Yet, to what extent is currently unknown.

Brexit and The Norwegian Seafood Industry

In a referendum in June 2016, a majority of the UK residents voted that the UK should leave the EU (NHO, 2018). This political change has continued to be negotiated in 2021. The UK is considered one of the most important countries for Norwegian trade. As 20% of Norway's exports of goods and services go to the British market. This in turn is of great importance to, among others, the petroleum industry, the supplier industry, and the seafood industry (NHO, 2018).

In this context, our purpose is to shed light on how an absent Brexit agreement in the seafood industry can have major consequences for the export of salmon. Thus, resulting in *vulnerable* logistics as all fish must be checked at the border. Accordingly, affecting both the quality of the salmon and delays in deliveries (Skalleberg, 2020).

In retrospect, after 1th of January 2021, when Norway lost the common regulations with the UK through the EEA agreement, it now looks so far in Brexit that Norway has avoided the worst horror scenario. Nevertheless, the current situation is considered challenging as there is significant uncertainty associated with the procedures for transport (Mauren, 2021). The uncertainty causes major logistics issues related to planning, as several queues arised a the national borders.

Political factors such as Brexit show how quickly GVCs become *vulnerable* as a consequence of changes in the political picture. Brexit has in many ways affected Norway's salmon exports to the UK when fresh salmon fell by 16 percent in January 2021. Following a continuous reduction in February with a 32 percent fall (measured in volume) (Mauren, 2021). In this case, it turns out that the British have increased their local production of salmon and thus had no need to export the products from Norway to meet the national demand. In recent times, a trade agreement has been established, which has strengthened and changed the framework conditions. This has been of positive significance for the seafood industry as it increases the predictability of trade, according to the Minister of fisheries and seafood, Odd Emil Ingebrigtsen (Regjeringen, 2021).

5.2 Technology and Industry Context

The 3D Printing Industry

The 3D printing industry provides a useful setting to illustrate both the macro and micro factors of the aforementioned literature review. 3D printing enables the utilization of components that otherwise would be too expensive or impossible to produce. Thus, companies use the technology to achieve faster product development processes. Several companies strive to adopt 3D printing to their value chain as it enables them to accelerate time to market. Thereby, quality-assured customer satisfaction and demand.

The 3D printing industry opens up intelligent digital production ecosystems. In this industry, value creation is driven by software, equipment, and people that form an unbeatable combination of technological innovation. Here, the *length* (i.e,, geographical scope) of the GVCs becomes shorter, due to the decreased need for

suppliers across borders. More specifically, the demand for local suppliers has increased in this industry. The technology does not require cheap labor compared to traditional manufacturing work, and there are not particularly high design or engineering costs.

Furthermore, the demand for tailor-made products accordingly minimizes the need for warehouses. This in turn shapes the GVC as it becomes shorter in terms of actors involved. Hence, 3D printing means that the value chain goes from having several actors who store goods, wholesalers, and manufacturers, to going directly from production to delivery.

The local approach to both production and innovation entails a faster response to solve technological issues. Thus, the companies within the GVC can achieve comparative advantages. By continuously improving processes and products from a geographically concentrated area. The emergence of changes in technology challenges the literature on GVCs in many ways. Indeed, it changes the overall structure of how the actors are organized within a particular GVC. Information flow, security, and knowledge sharing will, to a large extent, become a more important part of the GVC. Hence, it will be more *vulnerable* to make use of actors operating in other countries.

Fieldsmade is an example of a company that is part of the 3D-printing industry. The company produces high-quality 3D-printed spare parts in materials such as titanium, steel, aluminum, and plastic. Here, they supply to, among others, the Norwegian Armed Forces and Equinor (Oreld, 2019). The 3D-print has provided the opportunity for Equinor to obtain on-demand production on-site, including digital warehouses (Fieldmade, 2021). Furthermore, the company takes 3D printing to new heights as the technology cuts down the time spent associated with delivering spare parts used on Equinor's platforms (Equinor, 2021).

Accordingly, we can observe that the *length* of the GVC (which Equinor is a part of) significantly becomes shortened. The reason being that the components streamline production, requiring less logistics, transport, planning, and warehousing. Here, the value chain becomes even more digitized. Where the technology takes place in ecosystems, characterized by quickly established

products and services. In addition, the innovation behind the technology helps to challenge and improve logistics issues associated with transport and transfers. This, in turn, means that the *length* in terms of the number of actors are significantly reduced, due to the decreasing need for control and securement of products and services.

5.3 Company Context

I.P Huse: Robotization, Politics, and Reshoring

I.P Huse is a world leader in producing winches for anchor handling vessels. The company is located in Harøy outside Ålesund, with over 100 employees (proff.no, 2021a). I.P Huse has previously chosen to outsource its production to countries that offer cheaper production alternatives. Accordingly, their manufacturing has taken place in countries like Russia, Czechia, and Ukraine. However, in 2016, I.P Huse announced the reshoring of manufacturing activities back to Harøy (Stensvold, 2016). As discussed, both technological and political factors can facilitate the reconfiguration of location choices in GVCs. In the following illustration, we discuss the circumstances around I.P Huse's reshoring and its impact on their respective GVC.

As discussed, comparative advantage is one of the underlying causes for geographically scattered GVCs. Factors such as cheap labor, regional specialization and easy access to regional resources may cause a comparative advantage. However, the productivity differences across countries are not static. Technological innovations and changes in relative wages continuously affect the comparative advantages. Accordingly, the possible gains from offshore manufacturing. In an interview with project manager Håkon Heieraas, he stated that: "I.P Huse flag home production where we can utilize our robot technology. In sum, there are several things that speak for homesourcing. Both developing the products and making prototypes are easier when we have production here" (Stensvold, 2016).

Emerging robotic manufacturing technologies have recently reduced the focus on wages of manufacturers. In retrospect, this has allowed for an increased emphasis on quality and control. Since reshoring has allowed for more convenient monitoring and optimization, I.P Huse has benefited from relocating. More specifically,

effective innovation - due to the proximity between the manufacture and central actors in the shipbuilding industry.

Although technological innovations enable reshoring, political factors have also pushed for such reconfigurations. For instance, the tension between western countries and Russia, may have revealed underlying *vulnerabilities*. Here, the possibility of new sanctions and an institutional distance between these countries may result in undesirable liabilities. As a result, the GVC experienced increased resiliency as to increased independence. However, the easy access to the required quality of steel from Norwegian and European actors (Stensvold, 2016) result in decreased *vulnerability*. Accordingly, I.P Huse's reshoring has strengthened their overall resilience, as less international coordination is necessary.

Concisely, the *length* of the GVC has decreased both geographically and in terms of the number of actors. Whereas the underlying and aforementioned technological- and political factors have facilitated the reconfiguration. More specifically, it has decreased the possible gains by comparative advantages and highlights potential *vulnerabilities*. Accordingly, the cost-savings are no longer significant enough to account for more complex and vulnerable configurations.

Yara: Crop Fertilizers In The Sub-Saharan African Region

In the following illustration, we present an overview of Yara's value chain and its characteristics. Furthermore, we discuss the firm's positioning within the Sub-Saharan region. In terms of Yara's corporate interests, the social pressure for developing the region, and how extra-firm actors may have influenced the process.

Yara is a chemical company headquartered in Norway. The core business is to produce nutrition and fertilizers for the sustainable growth of crops. The fertilizer supply chain is short, in comparison to other production supply chains. Thus, the complexity of the value chain itself is reasonably low. Moreover, five countries account for 50-80% of total control over global production (Hernandez et al., 2018). Accordingly, major producers such as Yara, possess significant market power. Moreover, research has shown a significant correlation between the high level of market concentration and higher prices. Indeed, a 10% increase in competition

could lead to a 13-19% increase in fertilizer use in the Sub-Saharan African region (Hernandez & Torero, 2013).

In later years, Yara expanded its operations to the African region. Here, the company has collaborated with several local organizations to enhance agriculture development (Yara, 2016). In 2015, Yara acquired a leading fertilizer distributor in the area, named Greenbelt Fertilizers (Yara, 2015). The purpose of this was to better control the downstream distribution network. Thus, Yara's internalization strategy is a result of reduced transaction costs and the creation of synergies in the distribution network.

Increased market concentration and optimization of distribution networks have led to a dependency on major actors. The dependency on major actors can facilitate sustained growth of fertilizer use in the area. The reason is that major actors have the capabilities to improve the distribution networks. In addition, they have the ability to increase the structural rigidity of the chain. As a result of improved fertilizers in the Sub-Saharan African region, the price is reliant on the effectiveness of the distribution network, and the import prices. Moreover, the low use of fertilizers in the region (Hernandez et al., 2018) has created significant opportunities to capture new parts of the market. While governmental involvement regarding crop fertilization varies across the countries, most of the distribution has shifted towards the private sector. However, most countries in the region have active fertilizer subsidy programs (Hernandez et al., 2018).

As companies and governments have been encouraged to help with the African hunger crisis, Yara's participation in the food production has been appreciated. Thus, the company's adaptation to social pressures has thereby enabled an expansion in the region. Moreover, effective social pressure has encouraged corporate actions beyond what is legally required. For instance, during the COVID-19 pandemic, Yara pledged to commit $25 million to provide food for Africans and continuously educate farmers on the benefits of using fertilizers (Yara, 2020).

Furthermore, it is important to consider the extra-firm actors involved. For instance, the Norwegian government is a significant shareholder in Yara with over 30% ownership (proff.no, 2021b). However, the Norwegian government has

traditionally been relatively little involved in Yara's ethical and social responsibilities. Another example is Hydro, a Norwegian company partly owned by the state. Here, Hydro has faced backlash for significantly polluting the rainforest and its rivers (e.g., Eraker, 2019). Nonetheless, the government is adamant that corporate goals in state-owned firms must be achieved in a sustainable and responsible way (Nærings- og fiskeridepartementet, 2019). However, to what degree the government has been able to affect state-owned firms' CSR efforts positively is up for discussion.

In comparison, the local policymakers in Africa have been crucial for Yara's positioning. Here, the policymakers have contributed through regional political decisions. Due to the facilitation of the privatization of distribution networks, Yara has had the opportunity to improve several conditions of its respective GVC. For instance, Yara has had the opportunity to vertically integrate downstream. Reducing the number of standalone actors, and improving the efficiency of the distribution networks. As a result, the *length* of the GVC (i., in terms of the number of standalone actors) has become shorter. Thus, facilitation of regional decision-makers through legislation for efficient chain composition and governance will potentially result in shorter GVCs.

5.4 A Summary of The Empirical Illustrations

Five empirical illustrations have been presented to highlight some of the impacts that the key drivers for change can pose on GVCs. It is important to note that the exact effects of the key drivers depend on the GVCs' contexts. Below is a brief summary of the impact on the *length* and *vulnerability* in each particular case.

Illustration	**Key Driver**	**The Effect on Length and Vulnerability**
The Covid-19 Pandemic	Political Factors and Policies, Environmental Factors	The pandemic highlights existing vulnerabilities rooted in GVCs. The demand for antivirals has resulted in firms reconfiguring their activities to increase the local supply. This in turn, has reduced the dependency on

		China. Accordingly, it has resulted in regionalized chains that are closer to the end-user and are more resilient than before the pandemic.
Brexit and The Norwegian Seafood Industry	Political Factors and Policies	An absent Brexit agreement in the seafood industry makes the GVC vulnerable. It results in several logistics issues, delays in deliveries, and thereby reduced quality of the salmon, following up with uncertainty associated with transport procedures.
The 3D Printing Industry	Emerging Technology	Value creation driven by software, equipment, and people in digital production ecosystems. Shrinks the GVCs; fewer suppliers across borders, tailor-made products - no need for warehouses.
IP Huse	Emerging Technology, Political Factors and Policies	Technological innovations have reduced I.P Huse's possible gains from comparative advantages as manufacturing wages are not as important anymore. Hence, they have decided to reshore their manufacturing, resulting in a shorter and less vulnerable GVC, as there existed political tensions between the countries and more complexity.
Yara	Political Factors and Policies, Sustainability and Environmental Factors (CSR)	Yara has entered the Sub-Saharan African region and has bought a local distributor. The local decision-makers have facilitated such moves through the privatization of the distribution network. Moreover, the alignment of social pressure and Yara's corporate interests has made the move easier. The result is fewer actors in the value chain and a more resilient chain.

Table 1: Overview of the illustrations

6.0 Towards a Conceptual Framework

In the following chapter, we will draw upon the aforementioned theoretical perspectives and discuss the key drivers for change and the accompanying implications. The purpose is to synthesize what we have processed so far in our thesis and further discuss GVCs in a new context affected by the key drivers of the phenomenon.

To synthesize and illustrate our results, we propose a conceptual framework. The purpose of the framework is to present the key drivers that establish the structure, how they are interconnected, and how they together affect the properties *length* and *vulnerability* of GVCs. Our framework consists of the three explanatory variables we have inferred affect the governance of GVCs: 1) political factors and policies, 2) technological factors, and 3) environmental factors and sustainability.

6.1 Political Factors and Policies

From our literature review, we observe that it is necessary to expand beyond the GVC approach when discussing political factors and governance. Since the term "governance" refers to the governance of suppliers by lead firms, the term lacks a focus on the political dynamics within GVCs. More specifically, the GVC approach has largely discussed power relations between firms. However, it lacks analyzing power relations between firms and the state or institutions. Thus, we found it necessary to draw on other research perspectives, such as the GPN approach.

The renewed protectionism and economic nationalism, presented in this thesis, will shape GVCs in years to come. It will naturally lead to pressure and increased support for reshoring. As a result, we observe GVCs that occupy smaller geographical distances. The regionalization will undoubtedly affect interfirm relations. Although the nature of this impact is not yet clear, we can draw on the theoretical perspectives to propose some of the effects on GVCs.

Increased regionalization can lead to a more integrated culture in the GVC as the players reside in the same region. For instance, the regional culture of the Nordics has led to what is commonly referred to as a trust-based society. Here, relations and

interactions are more dependent on trust compared with other regions. Although Gereffi et al. (2005) recognize the importance of trust in *relational value chains*, it is assumed that such governance is predominantly accompanied by high asset specificity and mutual dependence. However, the regional cultural context may play a more important role in governance choices in the face of renewed protectionism.

Moreover, there will be significant impacts on the *vulnerability* of GVCs. In geographically dispersed GVCs, significant *vulnerabilities* exist. The more complexity that exists within a GVC, the more possible breaking points are present. The complexity will be greatly affected by the geographical disparity where activities are performed in many countries. Hence, when we experience increased regionalization, we expect that this will increase the value chain's resilience. As previously noted, such location choices and the accompanying effects on chain resilience and flexibility are central in the global factory theory.

Although increased regionalization is expected, it will not necessarily include a rise in single-region or single-country value chains. Indeed, the potential for increased resilience is unlikely to outweigh the cost-benefits. Too regionalized production systems are often doomed to fail, as one single country will not be able to replicate the cost benefits of more geographically dispersed value chains (Buckley, 2011). Furthermore, Buckley (2011) argues that countries adjust their policies in the sense that they strengthen or shift their comparative advantage. Acting as a magnet for economic activity. In turn, deliberate political decisions can facilitate a higher concentration of firms that are aware of the comparative and absolute advantages.

As presented, the GNP approach takes the political factors into account. The GPN approach focuses on how industrial state policies can facilitate economic activity through tax benefits, loans, and grants. Accordingly, policies have the potential to enable activity re-locations throughout value chains, depending on the potential cost benefits. Extra-firm activities and policies are often implemented. This in turn, can facilitate the inter-region movement of desired workers or connect local suppliers to global lead firms (see Coe & Yeung, 2015). Although such incentives and policies affect the gegoragical *length* of GVCs, the scope will depend on the specific context or policy in which the company operates.

Moreover, the GPN approach accounts for direct involvement by the state and other extra-firm actors. For instance, it is common to see states take equity positions in lead firms like Huawei and Equinor. Even though extra-firm actors are generally supportive, their relationship with suppliers and lead firms can be challenging. The reason for this is that one must appropriately react to environmental and safety violations and labor unrest. Accordingly, the GNP approach emphasizes that a lead firm's implementation of inter-firm control should be viewed in light of the policies and initiatives implemented by extra-firm actors (see Coe & Yeung, 2015).

Another characteristic of GVCs is the political tolerance for accepting higher levels of market power exerted by lead firms (Mayer & Phillips, 2017). Here, it is important to note that countries are subject to different context and pursue different political and economic strategies. Thus, it is important not to generalize political trends. However,we can observe a global trend towards increasing market power concentration in many industries. The implication of this trend involves significant effects on GVC governance.

For instance, if the political trend towards a decline in competition policies continues, we expect to observe governance forms encompassing captive linkages (see Gereffi et al., 2005). Moreover, if the competition policies allow it, we may see an increase in highly integrated lead firms (vertically and horizontally). However, these hierarchies may not be able to deal with the complexity of certain goods. Especially when there is a product that relies on tacit knowledge and there are limited capabilities in the supply chain.

The political tolerance described above may result in lead firms capturing an even larger portion of the added value in the GVCs. Accordingly, suppliers might not be able to sufficiently expand their capabilities as the necessary resources may be unavailable. As discussed, the following lack of capabilities in the supply-base can facilitate even more integrated lead firms. However, we request further research on the exact consequences of such political tolerance on GVC governance and supply base capabilities.

6.2 Technological factors

From the literature on governance structure, several authors address the technological factors and how they shape how GVCs organize themselves. In addition to this, other studies have delved deeper into the subject and tried to analyze how innovative digital changes have actually changed the structural basis of GVC governance (Foster & Graham, 2017; Gereffi & Wu, 2018).

For instance, Foster and Graham (2017) studied the notion of digitalization in the three conceptual categories of GPN (i., embeddedness, value, and power). Here, Foster and Graham (2017) discovered the importance of digitalization in embeddedness. Digitalization has several positive effects as it supports the network transformation. Thus, the technology's function has major repercussions on how GVC is structured as there is a tendency for fewer actors. Accordingly, trade can occur more efficiently and faster across actors without the need for long chains with several intermediaries.

Other studies address how the notion of digital infrastructures (e.g., the Internet) has transformed the basis of governance structures of GVCs. Explaining a "platform-oriented structure" as presented (i., Amazon, eBay, and Alibaba) (see Wu and Gereffi, 2018). These leading platforms create a new space for consumers and suppliers directly, thereby being called B2C or B2B platforms.

Moreover, it is essential to point out that these platforms in no way isolate themselves from the company-driven chains in a digital economy. Indeed, they are often visible in the context of leading firms that are part of a more traditional production-driven chain or a buyer-driven chain. For instance, automotive (e.g., Ford), energy and heavy industry (e.g., Equinor, steel production, and shipbuilding), agriculture (e.g., Yara) and retail (e.g., Wal-Mart and IKEA).

Thus, platformization affects the organization of different actors and how they collaborate. The phenomenon has led to a shift from "individual products and services to platforms as the basis for offering value" (Nambisan et al., 2019, p. 1465). This in turn poses new challenges for GVCs. Those being; 1) new ways of internalization; 2) developing and delivering value to global customers in a new

way; and 3) where knowledge building and relationship dynamics play a crucial role to create value. Digital platforming facilitates a set of building blocks, which can connect hundreds of firms. As presented, such an organization creates a network effect where ecosystems and clusters benefit from each other's resources. Accordingly, these organizations will more quickly create innovative solutions for value creation.

6.2.1 Concentration – Fewer Actors

Another aspect of changes in digitalization is the fact that lead firms can change their business models faster and more efficiently. This can be done by including or excluding network components. This allows for the emergence of innovative- and entrepreneurial initiatives to adapt to new market needs. These platforms often set geographical restrictions (e.g., innovation hubs and clusters), which in turn excludes some actors within the GVC.

More specifically, producers and suppliers may be excluded from the GVC performance, as leading firms prefer to maintain value creation in concentrated areas. Here, knowledge sharing and information flow are essential resources. The need for fewer and more geographically concentrated actors affects what we have presented as long-chained GVCs. Indeed, more actors are now disrupted, and value creation is made more efficient with the increased use of new technology.

Furthermore, leading firms face challenges of governing activities in a digital environment. The reason for this is that digital environments are characterized by a high degree of coordination and use of resources. At the same time, lead firms must maintain the relationship within the ecosystem. Here, lead firms might relate to actors who have different expertise, and do not necessarily obtain the same boundaries and power expectations as the rest of the network.

While the phenomenon of platformization is still a young topic within the GVC literature, it is a very exciting field to study for future research. A platform can be described as a "global virtual value chain" (Kano et al., 2020), where leading firms facilitate and develop new technologies. Here, knowledge, expertise, and

experience are highly valued in the ecosystems that form the basis for value creation.

As discussed, it will be interesting to further study power dynamics. More specifically, analyze whether power imbalances occur and how network exchanges affect the GVC and their activities. As well as studying business models under change; speciation versus standardization. And lastly, the need for integration and how leading firms should relate to different boundaries in digital value chains.

6.2.2 3D Printing

As presented, 3D printing is one specific example of a technology that has recently been shown to shape GVCs. More specifically, the technology can affect the *length* of value chains (i., geographical scope and numbers of actors involved). In light of this, Laplume et al. (2016) examined whether 3D printing has an effect on GVCs, and how the technology affects the density. The study shows that the technology has the greatest impact in industries that are characterized by short productions, low degree of automation, and that obtains low economies of scale.

Thus, the technology helps to shape GVCs in terms of their *length*. Furthermore, how locally it behaves as it satisfies the needs of clusters, engaged firms, and customers. There are a number of different reasons why GVCs are becoming denser and more localized. For instance, there is a greater need for control over technology. While at the same time maintaining a dense innovative environment. Thus, the process is streamlined by shortening joints and activities in GVCs that are in line with the production of 3D printing.

However, the literature still lacks a more comprehensive discussion about technology-oriented dimensions. More specifically, how they both upgrade and reconstruct manufacturing GVCs. Thus, it could be interesting, for future research to examine whether 3D printing leads to further unbundling or re-bundling processes. Hence, how this affects manufacturing activities in GVCs. Analyzing whether the activities are better characterized by a workshop than a pure traditional factory. Furthermore, it would be interesting to study whether GVCs become more

resilient by breaking down the number of actors involved, both purely geographically and in terms of organizational structure.

6.3 Sustainability and Environmental Factors

Environmental factors and sustainability have several significant effects on GVCs. Here, environmental efforts from both internal governance and external governance should be considered in this discussion. In an environmental context, internal governance encompasses how lead firms exert their power and configure to facilitate ethical and sustainable production. This can be realised by directly affecting the suppliers' environmental impact by demanding certain production standards (Bush et al., 2015).

Environmental upgrading can be incentivised if it has the potential to increase the down-stream demand or entail higher added value. De Marchi et al. (2013) defined the term as: "the process by which economic actors move towards a production system that avoids or reduces the environmental damage from their products, processes or managerial systems" (De Marchi et al., 2013, p. 65). The downstream demand can, for instance, be facilitated through the public sector's purchasing powers. Furthermore, sourcing strategies and environmental considerations for lead firms can directly affect the downstream demand. (Bush et al., 2015). Thus, lead firms can directly impact their supply base through how they choose to configure and govern the GVCs.

A more broad-ranging form of governance is external governance. Here, external governance is concerned with how regulatory and normative practices affect consumption and production. More specifically, in terms of environmental and social conditions (Bush et al., 2015). External governance is aligned with the GPN perspective, as it accounts for extra-firm's roles and actions to a larger degree. Here, Multi-stakeholder initiatives (MSIs) could help develop credibility over certain production systems (Ponte, 2014). Such initiatives can help lead firms in decreasing their reputational risk (McCarthy et al., 2012). These MSIs can, for instance, encompass certification programs or the development of industry standards.

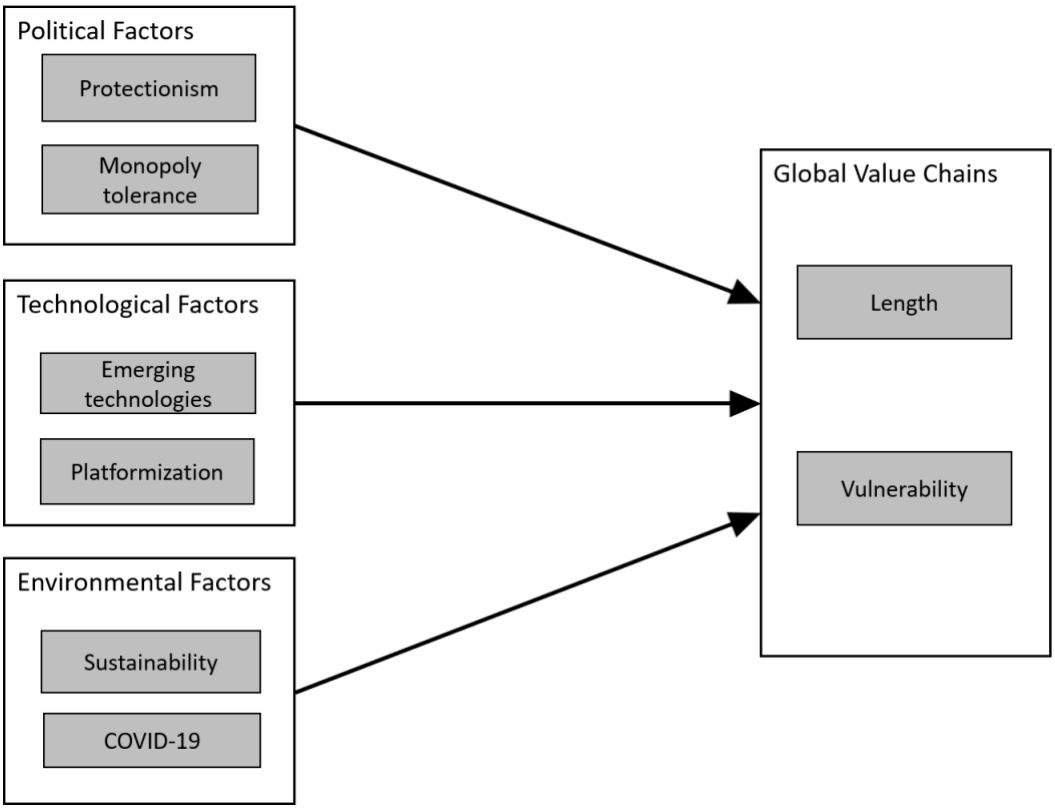
Moreover, Both NGOs and lead firms may create private certification standards (PCSs). The motives for PCSs can be a potential threat for lead firms. The reason for this is that they may involve over-regulation or other shortcomings in legislation (Béné, 2005) On the contrary, PCSs can guide production standards in GVCs. Accordingly, states may also increase the legitimacy of such initiatives by demonstrating support. Indeed, such support can generate credibility in heavily regulated industries (Gulbrandsen, 2014).

As effective social pressure advocates for changes, firms will have to adapt their operations and who they collaborate with. Hence, social pressure, boycott and institutional involvement enable more sustainable reconfigurations of these GVCs. However, as the social pressure is not necessarily aligned with the corporate interests, the effects of such efforts will fluctuate significantly depending on the industry and involved firms (Mayer & Gereffi, 2010).

Moreover, as the complexity of GVCs has risen in the past decades, it can be easier for firms to disclaim responsibility for environmental impacts. Here, the largest social- and environmental sinners may not be directly linked to the lead firms, but rather exist within suppliers' supply base. The increasing *vulnerability* of GVCs may result in lead firms seeking to increase their resilience by reducing the governance complexity. Accordingly, it can bring forth the social- and environmental sinners that previously got lost in the complexity of the GVCs, and increase the responsibility of lead firms.

6.4 Abbreviated Presentation of The Conceptual Framework

To illustrate our findings, we propose a conceptual framework. The framework presents the key drivers and illustrates their effects on the *length* and *vulnerability* of GVCs. In addition, we included some of today's most impactful drivers for each broader key driver category. Here, it is important to note that the importance and effect of each key driver will vary in different GVCs over time. We believe that the broader categories will continue to affect GVCs in the future. However, we acknowledge that new impactful key drivers will emerge under each broader key driver category.



Framework 1: Conceptual framework

7.0 Implications and Future Research

The current thesis presents a conceptual analysis of the GVC phenomenon. The evidence presented is based on five empirical illustrations, which are tentative, and therefore not conclusive. The purpose is to highlight and discuss the research focus and analytical issues. However, we recommend these to be further analyzed in an empirical research setting.

The implications of this analysis at the macro-level of GVC appear when discussing the key drivers of change. The broad nature of presenting the key drivers makes it impossible to account for all of the effects that they inflict. Thus, this thesis presents three broader categories that we believe are central to the current and future GVC analysis. These categories include several factors that will be of different significance for future GVCs. Some factors may prove to be a large part of future GVC performance. Whereas other factors will be of minor importance or be of an uncertain nature for long-term GVC analysis.

In this thesis, we have aimed at conceptualizing the overarching trends on the *length* and *vulnerabilities* of GVCs. However, it is important to recognize that the exact effects will vary across different GVCs. For instance, while some industries may be vulnerable to shifts in the macro-political landscape, others may experience minuscule effects. Moreover, the relative importance of certain drivers will be far greater for certain GVCs than others. While we do recognize this heterogeneity, we still believe that a broad conceptualization yields valuable insights on the global and overarching changes on GVCs.

After proposing a conceptual framework for GVC analysis, we discovered relevant angles for future research. More specifically, we recommend future researchers to study the interconnection between the key drivers. Here, researchers can establish a discussion about how the key drivers affect each other; and what effect the different combinations have on the *length* and *vulnerability* of GVCs. These GVCs can occur both in single industries or across different industries. We advocate scholars from different disciplines to collaborate and share cross-pollination of ideas in order to create robust GVCs.

8.0 Conclusion

In this thesis, we have thoroughly investigated the phenomenon of GVCs. Specifically, we discussed three key drivers for change: 1) political factors and policies, 2) technological factors, and 3) environmental factors and sustainability. The purpose of our thesis is to examine how these key drivers change GVCs. More specifically, in terms of: 1) *length*, which is defined by the geographical distances and the number of actors involved; and 2) *vulnerability*, which is embedded in the governance, location choices and the rigidity of global value chains. In order to give tentative answers to the analytical issues we reviewed several theoretical perspectives: GVC, GCC, GPN, and the global factory.

Our discussion has led to tentative answers to our analytical issues. The analysis suggests that political factors and policies are continuously affecting GVCs, in fundamental ways. We notice a trend towards increased protectionism where firms are politically encouraged to source and produce locally. While economic nationalism results in more regionalized chains, it also entails increased resilience due to a reduction in the GVCs' geographical complexity. Moreover, a trend towards a decline in competition policies has facilitated increasingly integrated lead firms, both vertically and horizontally. This in turn shortens the GVC, and could hinder sufficient expansion of supplier's capabilities. This is because suppliers may lack the necessary resources.

Furthermore, our analysis shows that technological factors such as platformization and emerging technologies shape the structural bases of GVC governance. Platformization affects the relational dynamics as it facilitates network transformation. As the 3D printing industry involves a greater need for control and geographical proximity, it makes GVCs denser. This in turn creates new challenges for GVCs. For instance, it sets geographical restrictions as producers and suppliers across borders are less needed. Hence, it creates an environment with geographically concentrated actors. However, the GVCs face challenges in terms of organizing these activities as it accumulates a higher degree of coordination and transactions.

Lastly, our analysis shows that environmental factors such as increased global engagement on sustainability affects the dimensions of GVCs. More specifically, increased social pressure for CSR and social sustainability may greatly impact the geographical scope and actors involved. Moreover, our thesis has discussed how the ongoing COVID-19 pandemic has highlighted *vulnerabilities* such as the dependency on China for vital consumables. Indeed, in the realization of these *vulnerabilities*, firms and governments have chosen to reconfigure certain activities temporally. Accordingly, we observe that certain GVCs have become more robust and exceedingly regionalized (E.g., production of antivirals and medical equipment). However, the longevity of these reconfigurations is yet to be known.

To highlight these theoretical findings, we presented five empirical illustrations that reflect important aspects of the GVC composition. To synthesize and illustrate our results, we have suggested a conceptual framework for GVC analysis. Further, we identified a number of implications to help future research. Accordingly, this thesis gives insights into the phenomenon of GVCs. From our study, we have observed the importance of robustness in GVCs. Those being: 1) the fewer countries a GVC exists in, the more robust it is. 2) Actors must balance the economic advantages emerging from competitive and comparative advantages, with the robustness that follows from increased concentration in the GVC.

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