MASTER THESIS

Course code: BE309E Name/Candidate no.: Kamila Trine Jørstad/5

Can Government Grants Support Firms Environmental Upgrading and Integration in GVCs?

Firm-Level Evidence from Governmental Grant Programmes in Central and Eastern Europe

---

Date: 29.05.2020 Total number of pages: 81

NORD University

www.nord.no

Summary

It is essential to understand how government policies can support the participation of regions, countries and companies in global value chains (GVCs), as it is vital for economic and social development. There is a need for effective policies and programs that can increase the ability of emerging country firms to access and gain higher added-value from their participation in GVCs, also known as upgrading. To date, the literature has mainly focused on the influential role of the lead firm, with limited attention paid to the role of states as active development actors in GVCs. This paper contributes to an emerging stream of literature that attempts to address this research gap. On that background, the following research question has been formulated:

How can government grant programmes support local suppliers integration and environmental upgrading within GVCs?

The purpose of this study is to shed light on how government grant programmes can support domestic firms. To answer the research question, the thesis article examines the "Green Industry Innovation" programme funded by the Norway Grants. For the case study, a qualitative research design was selected. The analysis builds on the GVC framework, more precisely the "four pillars" model, in assessing how effective the Programme has been in supporting local firms GVC inclusion. The model is further extended by integrating the upgrading theory from the GVC literature. More precisely, the recent theory on environmental upgrading, to assess how these instruments supported the environmental upgrading of four select GII-projects consisting of Central and Eastern European furniture suppliers.

A significant finding from the thesis article shows that the application of the "four pillars" in combination with a governmental grant programme that plays an active role in *strategically facilitating* linkages with eligible lead firms and different end-market niches can support local firms environmental upgrading and integration within GVCs. However, in order for governmental grant programmes to support integration in GVCs, the thesis article suggests that public actors must understand the synergies and mutual trade-offs between the *economic*, *social* and *environmental* upgrading dimensions To access niche markets and entering higher-value-added activities in GVCs, some forms of upgrading dimensions are perquisites. The thesis article further argues that programmes able to integrate the three upgrading dimensions within their design can magnify sustainable development outcomes and secure more long-standing GVC integration of domestic firms. The knowledge obtained through this research has further shed light on the growing importance

of states role in shaping development outcomes in GVCs. It may be used to expand the GVC framework, the “four pillars” model, to include the upgrading dimensions. The findings can further contribute to the development of new GVC-oriented industrial policies at country, regional and national level.

Preface

This master thesis concludes my Master in Science of Business within the specialization "International Business and Marketing", resulting in 30 ECTS credits.

I have chosen to write the dissertation in an article format with a corresponding folder, unlike the more traditional master's thesis. The motivation behind this has been the prospects of contributing to the literature by addressing the importance of the environmental agenda and the growing role of states in shaping development outcomes in GVCs, with the ambition of publishing the article after censorship. Writing an article based master thesis has been both rewarding as well as demanding. The process has pushed me outside of my comfort zone on several instances, which I have learned greatly from. First of all, I would like to express my sincere gratitude to my supervisor Christel Elvestad, who has contributed with high competence and knowledge, and given me good guidance throughout the process. The master thesis would not have been the same without her advice and support. I am thankful to my family, friends and partner for their encouragement, patience, and support during the process of writing this master thesis

This is the introductory chapter of the article based master thesis, which provides a broad definition of the theoretical and methodological aspects of this thesis. It includes discussion and explanation of the key theoretical aspects of the GVC literature, critical analysis of methods used, and reflection on the limitations of the study.The *Journal of International Business Policy* (JIBP) is the chosen journal for publication of the article. This journal is the leading outlet for theoretical and empirical research in all areas of policy that relates to international business. The article is therefore written according to the guidelines of the journal.[1]

Nord University, 29. May 2020

Kamila Trine Jørstad

1 http://resource-cms.springernature.com/springer-cms/rest/v1/content/15245432/data/v1

Literature list

List of Figures and Tables

Introductory Chapter

List of figures

List of tables

Scientific Article

List of figures

List of tables

Abbreviations

APEC	Asia-Pacific Economic Cooperation
CEE	Central and Eastern European
COC	Code of Conduct
CSR	Corporate Social Responsibility
EnvU	Environmental Upgrading
EU	European Union
FDI	Foreign Direct Investments
GVC	Global Value Chain
IB	International Business
ICT	Information and Communications Technology
MNE	Multinational Enterprises
OECD	Organization for Economic Co-operation and Development
SME	Small-to-Medium-Size Enterprises
UNCTAD	United Nations Conference on Trade and Development
UNIDO	United Nations Industrial Development Organization
WTO	World Trade Organization

1. Introduction

The emergence of *global value chains* has in recent years become a dominant aspect of the global economy. Global value chains (GVCs) can be defined as "the full range of activities that firms, farmers and workers carry out to bring a product or service from its conception to its end use, recycling or reuse" (Ponte, Gereffi, & Raj-Reichert, 2019, p.1). A significant aspect of the GVC framework is that production of goods has become internationally fragmented and countries have become vertically specialized in different stages of the production process rather than specific products or services (Buckley, 2009; Buckley & Strange, 2015; Hegemejer & Mućk, 2018). The GVC framework has thus quickly become a new framework for analyzing economic globalization and international trade (Lee, Gereffi, & Beauvais, 2010; Gereffi, 2013;Werner, Bair, & Fernández, 2014; Larsen, 2016).

Participation in GVCs may contribute to global prosperity, as countries have the opportunity of complementing each other by utilizing their respective comparative advantage at every step of the production process (APEC, 2014). Integration into GVCs can be a pathway for further economic and social development and value-added generated from cooperation within international production networks (Fernandez-Stark, Bambler & Gereffi, 2012). Domestic firms can integrate into GVCs by supplying, sourcing from, establishing partnerships with lead firms and multinational enterprises (MNEs), or by themselves becoming an multinational enterprise (OECD-UNIDO, 2019). However, participating in GVCs is also characterized by high entry barriers, increased competition, diversification, and asymmetrical relationships. The challenges and opportunities related to GVC participation have sparked debates amongst international business and development scholars on how emerging markets firms and countries can benefit from competing in GVCs (Primo Braga, 2013; Bamber, Fernandez-Stark, Gereffi & Guinn, 2014; OECD, 2016).

Since the beginning of their economic transition, Central and Eastern European (CEE) countries have become more deeply integrated into world economy and global production networks. CEE-countries benefit from skilled and relatively inexpensive labor force and a rather stable political and economic environment. Governmental incentives and development in infrastructure has increased the attractiveness for investors. The flow of foreign direct investments (FDI) into the region has resulted in the internationalization of their production, participation in GVCs, and in the international labor division (Cieślik, 2014, Vlckova, De Castro, & Antal, 2015). GVC research frequently highlights the shift towards a specialization in higher value-added goods as one of the indicators for upgrading (Morrison, Pietrobelli, & Rabellotti, 2008).The rationale behind is that the higher the value of the value chain activity the more advanced (i.e. upstream) the country's position in GVCs. Today, a large share of the external trade of CEE countries passes through global value chains in which the local

firms are usually situated further "downstream" (e.g. final assembly of products) in the global value chains compared to larger euro-area countries, which are in turn located "upstream" (ECB, 2019).

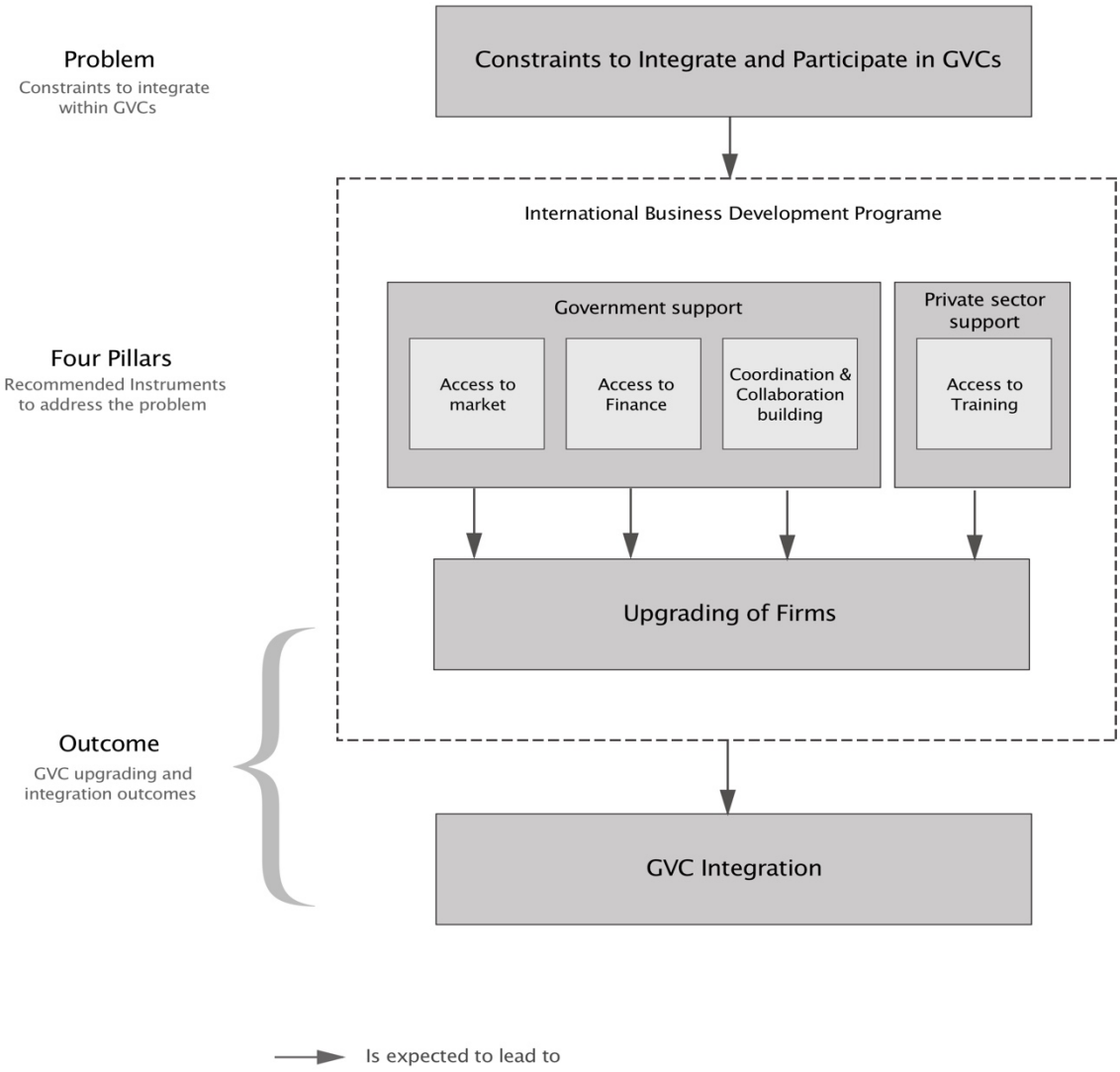
According to Cieślik (2014), trends from recent years show that many CEE country's position in GVCs is rapidly deteriorating. This may indicate that the regions role as a link in the global production chain is decreasing (ECB, 2017). Furthermore, an increasing number of CEE firms are being met with contemporary challenges linked to the "green growth" development in Europe, particularly related to the increasing role of regulations and sustainability standards required for them to integrate and participate in global value chains. Lead firms expect their local suppliers, to include environmental concerns into their business activities. The lead firm is responsible for governing the whole value chain and sells the final products. Although many Central and Eastern European countries have an positive approach to the concept of sustainable development, the efforts have been overshadowed by existing socioeconomic problems, particularly related to environmental protection standards (Raszkowski & Bartniczak, 2019). Current policies are not fit for the task, despite the availability of substantial financial opportunities, such as the European Union (EU) structural funds. The main problem with existing policies is their excessive focus on research-driven growth, which results in the neglect of sources of productivity growth (Radosevic, 2017). An important challenge is how to design global value chain-oriented policies, since the future growth of CEE firms depends upon their ability to integrate into- and improve their position in global value chains.

It is essential to understand how public policies can support the participation of regions, countries and companies in GVC as it is vital for economic, social and environmental development (Pietrobelli, Rabellotti, and Van Assche, 2019;). In particular, there is a need for effective policies and programs that can increase local suppliers ability to access and gain higher added-value from their participation in global value chains. New realities require novel policy prescriptions, and Gereffi (2013) promotes the adoption of GVC-oriented industrial policies focusing on the development of GVC activities as well as international supply chain linkages. However, to date, policy prescriptions have remained very general. Thus, there is a need for delineating the impact of GVC-oriented policies on firms' participation in GVCs, their ability to capture value, and on the economic and social significance (Tokatli, 2012; Van Assche & Van Biesebroeck, 2018). Although, there has been a rise in policies and government-led programmes targeting domestic firms linkages with foreign lead firms and their associated benefits, there is to this day limited empirical evidence on whether and under what conditions they are effective (OECD-UNIDO, 2019). Thus this thesis addresses though its article the above mentioned research gap by asking the following research question:

"How can government grant programs support local suppliers integration and environmental upgrading within GVCs?"

In order to answer the research question, the thesis article studies the case of the Norway Grants funded "Green Industry Innovation programme" (GII). It draws inspiration from the GVC analytical framework called the "four pillar" model of small-to-medium-size enterprises (SME) inclusion in GVCs (Fernandez-Stark *et al*., 2012). The model is based on four pillars (i.e., its instruments) which are: access to market, access to finance, access to training, and coordination and collaboration building. These instruments are used to assess how the GII-programme supported local firms integration in GVCs. The model is further extended, by integrating the upgrading theory from the GVC literature. More precisely the recent theory on environmental upgrading, to assess how these instruments supported local firms environmental upgrading. Below is an illustration of the conceptual model:

Figure 1: Conceptual Framework



Source: Own development inspired by the "Four-Pillar" model of Fernandez-Stark et al. (2012).

2. Theoretical framework

2.1 International Business and Global Value Chains

The evolution of globalization has had a significant impact on the international business environment during the last two to three decades, as it has grown to becomes more complex and dynamic, particularly when it comes to "where business activities are undertaken (i.e. their location) and how they are organized (i.e. their governance)" (Benito, Petersen & Welch, 2019, p.1). The primary drivers behind these changes has been the rapid expansion of information technology, the low cost of communication and the global reduction of trade barriers. According to Khattak & Pinto (2018, p.11), a significant aspect of the change we are witnessing is the emergence of "functionally integrated but globally dispersed industrial networks" which now makes up more than 80% of the international trade (UNCTAD, 2013).

The internationalization and fragmentation of firms *value chain* imply that activities which previously were conducted within the firm's boundaries or in close proximity are now finely-sliced and broken up across geographical and organizational boundaries (Kano, Tsang, & Yeung, 2020). A value chain is described as the full range of activities which are necessary to create finished goods or services (Ponte *et al.,* 2019). The value chain perspective has given rise to a new field of research and analysis within the discipline of political economy; namely "the Global Value Chain" (GVC) (Khattak & Pinto, 2018). The GVC approach provides an analytical and methodological tool for analysing economic globalization and international trade (Lee *et al.*, 2010; Gereffi, 2013; Werner *et al.*,2014; Larsen, 2016). Although GVC research has sprung out from the field of political economy, it has attracted the attention and been subject to investigation in different academic disciplines, such as international business (IB), regional and development studies, supply chain management, and economic geography (WTO, 2017; Khattak & Pinto, 2018; Kano *et al*., 2020). While the GVC literature is mainly focused on analysing the value chain, IB-scholars have traditionally placed their interest on the internationalization theory, and the role of multinational enterprises (MNEs) (Mudambi, 2008; Gui, 2010; Strange & Humphrey, 2018).

There is a growing consensus among IB-scholars that GVCs represent the most critical aspect of today's globalised economy, evident by the increasing body of IB literature attempting to comprehend the GVC phenomena and extend internationalization theory by incorporating elements from the GVC theory (Turkina & Van Assche, 2018; Strange & Humphrey, 2018). The GVC literature can expand IB Scholars knowledge on the growing role of global lead firms in defining the terms and conditions of value chain participation, and how it affects local suppliers and workers engaged in them (Pietrobelli *et al*.,2019). International Business scholars can thus leverage on the GVC theory to expand their perspectives from the *private perspective* on the performance of firms to countries and regions through a *public perspective* used by policymakers (Van Assche, 2018). This can be done by

analysing the conditions and policies that influence suppliers and workers value chain participation and their learning paths to facilitate upgrading (Barrientos, Gereffi, and Rossi., 2011).

2.2 The GVC Analytical Framework

In recent years, economists and policy makers are increasingly incorporating the global value chain (GVC) framework as a significant development paradigm (Eckhardt & Poletti, 2018). The strength of using the GVC framework is that the global economy is increasingly structured around global value chains. The broad and flexible methodology of the framework provides researcher with an comprehensive insight to how global industries are organized by analyzing the structure and actors involved in a given industry (Gereffi & Fernandez-Stark, 2016). The global value chain (GVC) framework has also been employed by several international organizations, including International Labor Organization, the United Nations Conference on Trade and Development, the World Bank and the World Trade Organization (Gereffi, 2018). By applying core concepts such as "governance" and "upgrading", the GVC framework provides a holistic view of global industries, both from the top-down and bottom- up, by examining the job descriptions, technologies, standards, regulations, products, processes and markets in specific industries and locations (Gereffi & Fernandez-Stark, 2016). Furthermore, the GVC framework focuses on the order of the value-added within an industry, from its conception to the end use beyond. According to Gereffi & Fernandez-Stark (2016), a global value chain analysis consists of six main dimensions, or components, which are:

(1) ***Input-output structure of a GVC*****:** refers to mapping the value chain by identifying the main activities/segments in a global value chain
(2) ***Geographic scope***: geographic analysis of the value chain
(3) ***Governance*** **:** analysis of how the GVC in governed and controlled
(4) ***Upgrading*****:** analysis of firms ability to move up to higher value activities in the value chain
(5) ***Local institutional context*****:** identifying how local, national and international policies shape countries participation in GVCs
(6) ***Stakeholder analysis****:* analysis of stakeholders involved to determine their role in the chain.

GVCs importance for economic development matters in various ways, especially since a country's ability to prosper depends on its participation in the global economy, that is to an extent measured by their role in GVCs (Gereffi & Lee, 2012). Enabling countries to break into GVCs requires both investment and trade, which are mainly dependent upon efficient global supply chains in order to contribute to growth. According to Gereffi (2015, p. 6), a key factor in such efficiency is the development of infrastructure, which leads to international trade through the construction and improvement of physical facilities that link national economies (e.g. information and communications

technology (ICT), airports, and roads). Given the rising popularity of GVCs, the frequently asked question is not if, but how to integrate, into value chains in a balanced global economy. National policy makers in both developed and emerging countries are taking into consideration how GVCs can be used as development strategies at country, regional and local levels (Taglioni & Winkler, 2016).The framework goes beyond traditional approaches, as it looks at sectors and inter-firm relations, as opposed to focusing on the nation state or the firm. This allows the GVC approach to integrate the global with the local, and the firm (micro) with the meso and macro levels and offer valuable insight for policies (Pietrobelli & Staritz, 2017).

However, there are challenges to the GVC analytical framework. Ton *et al.* (2019), highlights that a major challenge of studying value chains is that they by nature are open, multilayered systems with multi-dimensional economic-and developmental outcomes. Furthermore, value chain analysis is often time, place and product specific, which can leave out important dynamic effects (Lie, 2017). There has been analytical challenges specifically related to micro-level GVC analysis of firms participation and upgrading in global value chains. This is because the researchers are predominately concerned with country-or industry-level analyses based on input-output tables (Morrison *et al*., 2008). The limitation to that approach being that it confines GVC participation to the "statistical prism of industries" (Fortanier, Miao, Kolk, & Pisani, 2019, p. 433).

The following sub-chapters provide an in-depth description of the core concepts of governance, GVC integration, and upgrading. It is important to highlight that this thesis article is focused on governmental programmes and does therefore not apply the concept of governance, which is used to addresses the power relations between firms in a particular value chain.

2.2.1 GVC Governance

The vast majority of the theoretical and empirical research on international industries from a GVC perspective has concentrated on how governance is structured (Bair, 2008; Khattak & Pinto, 2018). The concept of governance is a crucial aspect of the GVC framework (Gereffi & Fernandez-Stark, 2016). By analyzing governance structures, one can understand how chains are controlled and coordinated by powerful actors. According to Gereffi (1974, p.97), governance can be defined as "authority and power relationships that determine how financial, material and human resources are allocated and flow within a chain". GVCs are often governed by "lead firms", usually multinational corporations (MNEs), who shape the way GVCs are structured and organized. The many aspects of production activities of suppliers are pre-defined by lead firms and depended upon their ability to meet private and voluntary global standards and requirements to gain access to and upgrade within GVCs. Lead firms are viewed as gatekeepers who define the criteria's for accessing regional and global markets (Morris and Staritz, 2019). The authors Gereffi, Humphrey and Sturgeon (2005),

identified that there are five main governance structures which shape GVCs: market, modular, relational, captive and hierarchy. The governance structures are measured by three variables:

(1) **Complexity:** the complexity of information shared between chain actors
(2) **Codification:** how the product information can be codified
(3) **Capabilities:** the degree of suppliers competence

The first governance structure is *the market*, which is described as the simplest form of governance. It involves transactions that are of simple nature, and exchanges are categorized by "arms-length" meaning that it is little or no formal cooperation between actors and cost of switching to new partners is low. *Modular* governance occurs when its relatively easy to codify complex transactions. The partnership between buyer and supplier (i.e. linkages) are more substantial because of the high volume of information exchanged between the firms. Suppliers in these structures make products to a customer's specification taking full responsibility for the process technology, which makes switching costs low. *Relational* governance happens when there is a complex information exchange between buyers and sellers, which is not easily transmitted or learned. This results in regular interaction and knowledge sharing between the parties. These linkages require trust and a common reliance, and the lead firm exerts control through setting specifications for the suppliers. In *Captive* governance chains, small suppliers are dependent on one or a few larger buyers that often exert a great deal of power. In these linkages, there is a high degree of monitoring and controlling by the lead firm, in addition to high switching costs for both parties as the suppliers adapt to the conditions set by the buyer. Lastly, *Hierarchical* governance is characterized by vertical integration (i.e. both development and manufacturing takes place "in-house"). The dominant mode of governance hierarchical value chains is managerial control. By understanding the different governance modes provided by the model, policymakers can use it as a guide to facilitate the transformation of value chains from one governance type to the other (WTO, 2017).

2.2.2 GVC Integration

Integration into GVCs can be a pathway for further economic and social development and value-added generated from cooperation within international production networks (Fernandez-Stark *et al.*, 2012). The GVC literature describes how value chain integration improve countries industrial competitiveness through the transfer of technology and other types of knowledge-sharing which occur in vertical linkages between lead firms/MNEs and domestic firms (OECD-UNIDO, 2019). Vertical linkages are defined as "all value chain relationships created between MNE subsidiaries and local firms in the host economy" (Jindra *et al*. 2009, in Tusha, Jordaan, & Seric, 2017, p.4). Within vertical

linkages, there is a distinction between *backward linkages*, the relationships between foreign firms and domestic firms in upstream sectors, and *forward linkages* which refer to domestic firms as customers of foreign firms (Tusha *et al.,* 2017). One can, therefore, define domestic firms GVCs integration by their supply chain linkages. According to OECD-UNIDO (2019), firms are integrated into GVCs when they are supplying, sourcing from, establishing partnerships with lead firms and multinational enterprises (MNEs), or by themselves becoming a lead firm. Participation in GVCs is expected to be strengthened when domestic firms are able to establish stronger linkages with foreign firms, both abroad or domestically (ibid.). OECD-UNIDO (2019) developed a simplified framework that illustrates the potential trajectory of firms participation in GVC through supply chain linkages, and how their participation can be strengthened (table 2).

Table 1: Trajectories of Firms Participation in GVCs

How can firms participate in GVCs?	Type of Linkage	Backward Linkages	Forward Linkages
	Trade Linkages (direct & indirect)	Importing inputs	Exporting outputs
	Domestic Linkages (with foreign investors)	Sourcing inputs from foreign MNEs	Supplying outputs to foreign MNEs
How can firms strengthen Participation in GVCs?	• Deepening trade linkages • Deepening domestic trade linkages with foreign investors • Receiving inward FDI		
How can firms become main actors in GVCs?	• Firms can integrate/participate in GVCs by themselves becoming an lead firm or an MNE		

Source: Adopted by the authors based on OECD-UNIDO (2019, p. 23).

Within the GVC literature, domestic firms competitiveness is highlighted as an essential factor for integrating into GVCs (OECD-UNIDO, 2019). Fernandez-Stark *et al.*, (2012), argue that the key to integration in any value chain lays in firms competitiveness, i.e., their ability to provide the desired quantity and quality of a specific product in a way that distinguishes them from other firms. Research from OECD-UNIDO (2019) takes this argument further by suggesting that developing a competitive industry beforehand may be a prerequisite for successful GVC integration. The latter argument is consistent with GVC theories on suppliers capabilities as important factors for attracting lead firms to outsource or offshore production (ibid.). It is particularly evident in knowledge-intensive industries, where specific industrial capabilities are essential to creating linkages with foreign firms.

However, there are several identified constraint that domestic firms face that inhibits them from being able to compete and participate in GVCs. The competitiveness bottlenecks are usually related

to issues such as low productivity, the inability to deliver excellent product quality, lack of network and business partners, and poor compliance with international standards. When firms can overcome these constraints, they have the opportunity to increase their competitiveness and participate in value chains in a sustainable manner (Fernandez-Stark *et al.*, 2012). The recent applications of the GVC analytical framework, such as the "four-pillar model" by Fernandez-Stark *et al.* (2012), investigates how industrial policy can facilitate opportunities for inserting domestic firms, in particular SMEs, in global value chains. The next section gives an in-depth description of the "four-pillar" model for value chain inclusion, which also forms the basis of the conceptual framework of the thesis.

The "Four-Pillar" Model of GVC Integration

Fernandez-Stark *et al.* (2012) identified four major constraints to GVC participation: lack of access to market; lack of training (technical, interpersonal and entrepreneurial skills); lack of collaborative networks (among domestic firms and with chain stakeholders); and lack of finance. In order to help domestic firms overcome their competitiveness constraints and facilitate GVC integration, Fernandez-Stark *et al.* (2012) propose an instrument for intervention, namely the "four-pillars model" for value chain inclusion. The model can be applied to a wide range of development initiatives, and depending on the severity of the beneficiaries competitiveness bottlenecks, it will require longer interventions where all four pillars are included into the design of the intervention. In cases where beneficiaries possess advanced capabilities, the number of pillars can be reduced.

"Pillar 1" Access to market: refers to how the presence of value chain linkages between producers (domestic firms) and lead firms can be created. Many domestic firms struggle to access global markets due to e.g., cultural-, educational-,and geographical factors, and lack of network with other firms to establish business contracts (Fernandez-Stark *et al.*, 2012). These firms rarely participate in international trade fairs, receive no publicity, are lacking the awareness of potential buyers requirements for participating in their value chain, or that there even exist a market for their products (Fernandez-Stark *et al.*, 2012). Due to these constraints, potential foreign buyers are not aware of their exitance. Therefore, the first stage of any value chain intervention is to establish a link between the domestic firm and the buyer. To accomplish this it is advised to educate foreign lead firms on the business potential of sourcing from domestic firms, as well as facilitating interaction (e.g. matchmaking events, meetings, trade fairs etc.) between the local company and the lead firm.

"Pillar 2" Access to training: this approach is aimed at providing domestic firms with the skills and capabilities to meet the demands of their target market. Many domestic firms are in need of improving their productivity and product quality, be introduced to new technologies and innovations, and to

comply with international requirements or standards that govern entry into GVCs. According to Fernandez-Stark *et al.*, (2012), developing countries firms are often lacking knowledge about how to comply with standards set by demanding foreign buyers. To facilitate entry into GVCs, its essential that value chain interventions cover the following elements: awareness of the need of training, technical training concerning production, entrepreneurship, financial literacy, and internal operations skills, such as labour, health, and safety standards and corporate social responsibility (CSR).

"Pillar 3" Access to finance: entering GVCs requires certain investments in infrastructure, equipment and machinery, and obtaining certifications. However, emerging markets firms often face liquidity and credit constraints and are unable to access formal finance channels (Fernandez-Stark *et al.*, 2012). These constraint inhibit them from making the needed investments to improve their productivity and to upgrade into higher value products, which limits their potential to participate in GVCs. There are various ways a value chain intervention can facilitate access to finance. Previous approaches include direct financing in the form of a loan from the lead firm, government grants, and buyers contracts to receive loan provision from banks. However, approaches that are based on bank loans can lead to additional constraint for the domestic firm due to interest rates and loan terms. The executing agency responsible for the value chain intervention, must coordinate with the banking sector regarding these issues to secure effective financial instruments designed to cater to the needs of domestic firms.

"Pillar 4" Collaboration and Coordination: domestic firms, and particularly those that are SMEs, lack the scale to enter value chains on an individual basis. This is foremost because they do not produce adequate quantities to attract foreign buyers and they lack the reputation to work with other chain actors. Therefore it is important that they organize to achieve economies of scale. Horizontal coordination and collaboration between firms can lead to the development of new ideas, better management of common problems, reduction of information asymmetry, and build social capital. However, it is not always easy for domestic firms to organize. Interventions must therefore inform firms of the benefits of collective action and a strong formal organization. Secondly, it is important that domestic firms collaborate with chain actors and understand how the chain it is structure, and the role they play in it. Vertical coordination and collaboration refers to the interaction between actors in the chain to create linkages, and their collaboration and information sharing to strengthen the performance of the whole value chain. Chain actors are usually input providers, intermediaries, buyers, industry associations, government institutions focused on industry development, export promoting agencies and regulatory institutions (Fernandez-Stark *et al.*, 2012). Value chain interventions can help to bring together these institutions and chain actors to help providing insight

into challenges and opportunities, with the goal of coordinating and designing a common development strategy.

2.2.3 Upgrading in GVCs

Economic Upgrading

Upgrading is a central pillar of the GVC framework (Ponte *et al.,* 2019). It was developed on the background that one could analyze globalization by exploring how the international production networks of firms were organized and controlled, and how firms, states and other public-private actors in emerging economies could access the uneven distribution of benefits from globalization (ibid.). Ponte *et al.* (2019) highlight that GVC scholars who apply the upgrading framework are particularly concerned with studying the uneven development within and amongst counties in the globalized economy. This is done to determine how countries can participate gainfully in GVCs (ibid.) The traditional GVC literature on the concept of upgrading is well-developed and usually refers to upgrading as "economic upgrading"(Humphrey & Schmitz, 2004; Kishimoto, 2004; Schmitz, 2006). The GVC literature defines it as: "firms, countries or regions advancing to higher value activities in GVCs in order to increase the benefits (e.g. security, profits, value-added, capabilities) from participating in global production (Gereffi, 2005, p. 171). Humphrey & Schmitz (2002) identify four types of economic upgrading paths by applying the GVC-framework:

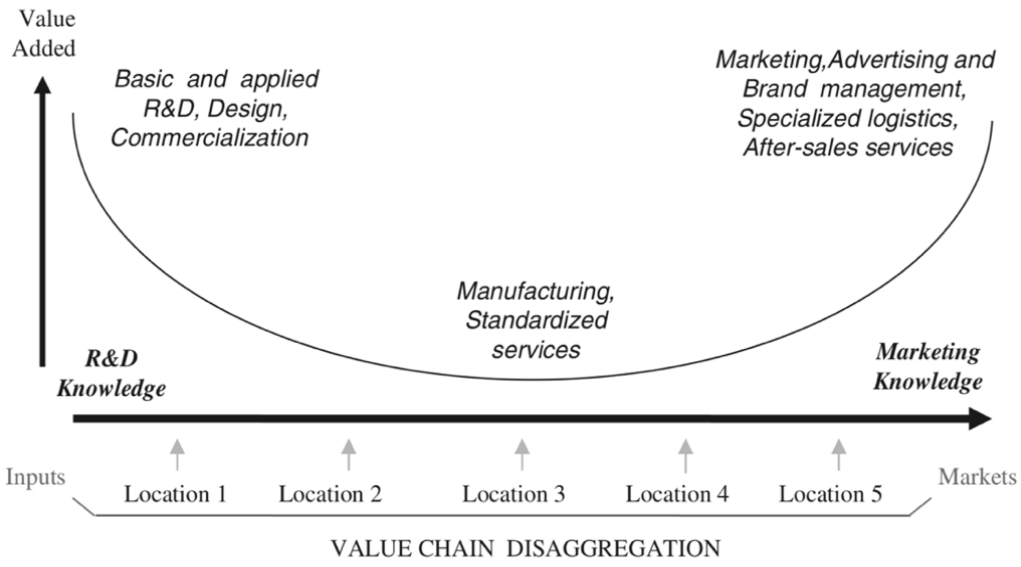
- *Process upgrading* happens when inputs transforms more efficiently into outputs by reorganizing the production system or introducing superior technology;
- *Product upgrading*, or alternatively moving into more sophisticated product lines;
- *Functional upgrading* takes place when acquiring new functions (or abandoning existing functions) to increase the general skill content of the activities;
- *Inter-sectoral upgrading* is the entry of a firm into a new value chain. It occurs when firms move into new but often related industries.

It is crucial to highlight that the process of upgrading is not necessary linear, as firms might jump or skip stages in the upgrading process (Ponte et al., 2019). Furthermore, it's important to be aware of the misleading homogeneity and heterogeneity in the definition of the upgrading stages, as these vary by both industry and over time (ibid.). Furthermore, Ponte et al. (2019) points out that the upgrading process, particularly functional upgrading, might be blocked by powerful lead firms in the value chain. They have the governance to decide which firms will be supported in their upgrading and often restrict the upgrading to merely process and product upgrading.

In the globalized economy firms are seeking to maintain or increase their competitiveness to participate in GVCs, and a feasible measure to achieve this is often to "upgrade" their production.

The main challenge related to upgrading in GVCs is to analyze the conditions under which countries and firms can "move up the value chain" from primary assembly activities using low-cost and unskilled workers to more advanced forms of "full package" supply and integrated manufacturing (Gereffi & Fernandez-Stark 2016). To a greater extent the highest value activities are in pre- and post-production manufacturing services, as illustrated by the so called "smile curve of value creation" (figure 2). Generally developing countries tend to be concentrate in higher value activities as opposed to developing countries who are often situated in lower value activities (Gereffi & Fernandez-Stark, 2016). In order to upgrade, domestic firms are dependent upon the lead firm who governs the chain, as they define the upgrading opportunities and limitations (Larsen, 2016). New research concerning countries ability to climb up the smile curve suggests that recent technological and organizational innovations (e.g., 3D-printing) might reshape how vale is distributed along the curve which will eventually straighten the curve into a "smirk" (Ponte, 2019).

Figure 2: "The Smile of Value Creation"



Source: Mudambi (2008, p.707).

Environmental Upgrading

The heightened environmental awareness among consumers, increasing importance of environmental standards, and the implication of climate change has caught the attention of GVC scholars, as studies have begun to revolve around the dimension of environmental upgrading (EnvU) (Khattak & Stringer, 2017; Khattak & Pinto, 2018; De Machi *et al*., 2019). The concept of EnvU differs from traditional GVC analysis on upgrading, as it is not necessarily linked to shifting to higher functional positions in the value chain (Bolwig, Ponte, du Toit, Riisgaard, & Halberg, 2010). The

processes and mechanisms that enable EnvU are specifically important for emerging countries, where GVC participation can have devasting effects on local socioeconomic outcomes (Clarke & Boersma, 2015). There are different drivers for environmental upgrading among domestic firms. Most are driven by the prospects of increasing competitiveness through acquiring certifications and complying with standards, differentiation, and cost saving. On the other hand, they are driven by external pressure to "go green" from customers, lead firms and policymakers (Ponte *et al*., 2019).

According to Khattak & Pinto (2018), it is possible to study environmental upgrading from two perspectives; from economics and management perspectives. The economics perspective views environmental upgrading as a process where economic actors introduce or enhance processes, techniques, practices, systems, and products to entirely avoid or reduce the harmful impacts of environmental damages (Khattak & Pinto, 2018). Management studies view environmental upgrading as something that takes place inside companies when environmental performance is improved through changing "product and process technology, management systems, waste and emission treatment and so on" (Jeppesen & Hansen, 2004, p.263). Khattak, Stringer, Benson-Rea, & Haworth (2015) highlight the importance of incorporating "social processes" to the management perspective on environmental upgrading. Social processes view employees as key actors in environmental upgrading (Khattak & Pinto, 2018). Successful implementation of environmental upgrading depends upon firms ability to change employees mindset through training and engagement in environmental management policies and strategies Khattak *et al*. (2015).

Although there is an increased interest in incorporating environmental aspects into the GVC analysis, EnvU remains the least investigated area of GVC literature (Khattak & Pinto, 2018). Furthermore, the growing number of conceptualizations on environmental upgrading often lack the perspective of social processes. One of the most recent definitions on the concept is provided by the author's De Marchi, Di Maria, Krishnan and Ponte (2019, p.312) who define it as: "any change that results in the reduction of the firm's ecological footprint – such as their impact on greenhouse gas emissions, on biodiversity losses and on natural resources overexploitation, that is, when the net gains in environmental improvements are more than the losses". Drawing from the existing debates on economic and social processes, De Marchi *et al.* (2019) suggest that one can classify environmental upgrading into three types:

- *Process improvements* happen through eco-efficiency, i.e. the reorganization of production systems or the use of superior technology, such as the reduction of energy or materials used per unit of output;
- *Product improvements* in the development of sophisticated, environmentally friendly product lines, such as the usage of recyclable, recycled or natural inputs, avoidance of toxic materials and so on.;

- *Organizational improvements* take place when there is an organizational enhancement of the way a firm is conducting its business and managing the organization, an effort often related to the achievements of standards and certifications.

2.3 GVC-Oriented Public Policies-How to Facilitate SME Inclusion and Upgrading

Research on development within GVCs has traditionally been rooted in the Washington Consensus paradigm[2], and has thus broken with the "state-centric" approach to understand development, and focuses instead on the influential role of MNEs and global lead firms in shaping development outcomes through their value chain governance (Horner & Alford, 2019). However, studies indicate that the organization of the global economy is entering a new phase, which will transform the governance structures of GVCs (Gereffi, 2013). Evident by the growing body of research that focuses on the role of the state within GVCs, while drawing attention to the limited research states have received in promoting domestic firms participation in GVCs, and in understanding industry governance and upgrading (Brun & Lee, 2016). Although there is limited research on states in GVCs, there is an increase in value chain interventions being adopted by state agencies as part of the post-Washington Consensus generation of policies addressing the role of states in advancing development strategies (Larsen, 2016; OECD-UNIDO, 2019). Horner & Alford (2019), take the state-centric argument further by stating that the role of the state will be the most critical issue in contemporary GVC research.

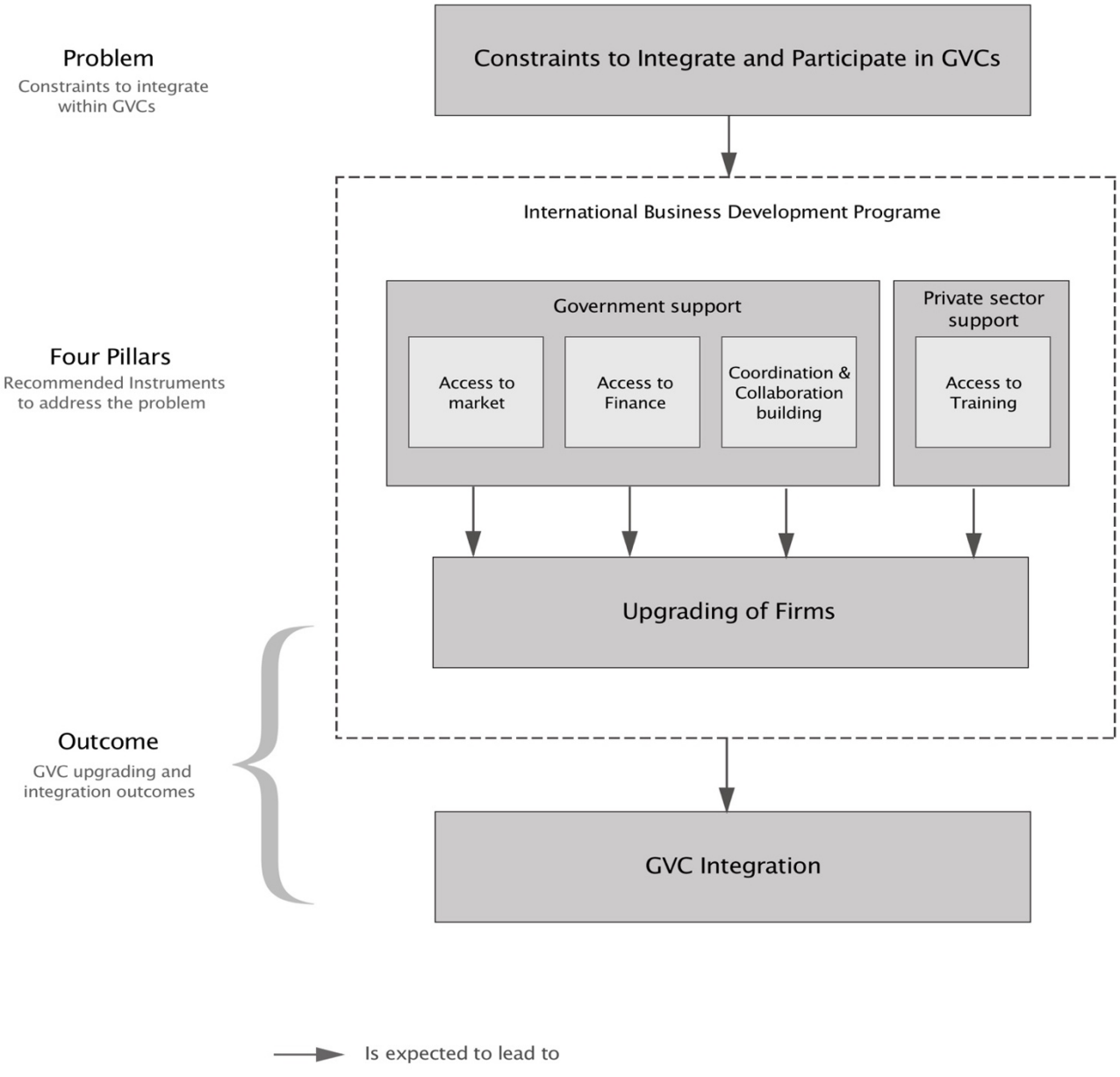
Recent literature on firm upgrading is also concerned with bringing the role of states back into GVC research. Selwyn (2008) underline that public institutions are possibly the key drivers for upgrading processes, as they can assist domestic suppliers to access global markets and support them to maintain their position in them. Khattak & Pinto (2018) stress that future research on environmental upgrading will have to address the research gap concerning how formal and informal institutions (e.g., governments, NGOs, communities) interact and collaborate with private governance to facilitate domestic firms environmental upgrading. The future research agenda should additionally integrate and address economic, social and environmental upgrading dynamics into the GVC analytical framework (Khattak & Pinto, 2018).

However, to this date the public policy prescriptions on how to support countries, regions, firms, and clusters to attract and benefit from GVCs, have remained notably general (Pietrobelli *et al.*, 2019). The need of fostering firms, and in particular SMEs, participation in GVCs is vital for economic, social and environmental development (OECD, 2018). Thus, this study attempt to fill the research

[2] The Washington Consensus is a transnational economic policy paradigm rooted in the idea of moving developing countries to the free markets in the 1980s and 1990s, coupled with increased privatization of state-owned industries (Babb, 2012).

gap concerning public institutions role in in shaping development outcomes in GVCs. To do so, it analyzes the degree of environmental upgrading of domestic firms participating in government grant programs, applying the concept of upgrading provided by De Marchi et.al, (2019). It assesses how government grant programs have enabled firms to overcome the four major constraints/pillars of GVC inclusion that domestic firms face when trying to integrate within global value chains. The conceptual framework which is illustrated below (figure 3), builds on the "four-pillars model" of sustainable GVC inclusion provided by Fernandez-Stark *et al.*, (2012), while also integrating the concept of upgrading from the GVC literature to extend the knowledge.

Figure 3: Conceptual Framework



Source: Own development inspired by the "Four-Pillar" model of Fernandez-Stark et al. (2012).

As described in earlier, the four major constraints faced by domestic firms wanting to integrate and participate in value chains are access to market, access to training, finance, and collaboration and coordination (Fernandez-Stark *et. al*., 2012). Public policy business development programs such as, governmental grants can facilitate access to finance that is critical for domestic firms to be able to integrate and upgrade in GVCs. Grant programs can also provide training that is vital for capability of domestic firms to be able to meet the standards and environmental demands of lead firms developing their entrepreneurial, technical, financial and soft skills. This upgrading affects the comparative positioning of domestic firms in GVCs and may either result in an a sustainable income increase, or the avoidance of downgrading and being pressured into a "race to the bottom" (Kaplinsky & Morris, 2017). Furthermore, grant programs can provide companies access to new value chains by linking companies together. Making these connections can e.g., involve educating leading firms regarding the business potential of sourcing from local producers in donor countries and assistance in the matchmaking process between companies. Measures to assist coordination and collaboration building between companies can be crucial and should occur at both a horizontal and vertical level. Horizontal coordination amongst producers facilitates the formation of producer groups needed to reach economies of scale and provide opportunities to add value to their products. Also, coordination and collaboration amongst the chain stakeholders is crucial for chain performance and upgrading. For instance promoting dialogue and public – private partnerships has proven very beneficial for industry advancement at local and country level (Pietrobelli & Staritz, 2017). Particularly emphasis has been given to the role of public-private partnerships (PPP) in GVCs, as a growing number om multilateral and bilateral development agencies have partnered with businesses to leverage private capital, knowledge, technology, and access to markets towards achieving development goals (Abdulsamad & Manson in Ponte *et al*., 2019).

On that background, one can argue that public policy programs that adopt the holistic "four pillars" model of value chain inclusion into their programme design, stand a higher chance of supporting SMEs to overcome the four major constraints that limit their competitiveness and integration into global value chains (GVCs). These competitiveness constraints are: access to market, access to finance, access to training and coordination and collaboration building. In order to answer the research question, the thesis article studies the case of the Norway Grants funded "Green Industry Innovation Programme" (GII). Policies aimed at inserting local firms in GVCs may alone not enough to yield the above mentioned benefits, as they can create "shallow integration" (i.e., firms enter lower-end assembly segments with limited capability building). Governments plays a crucial role in creating "deeper integration" through policies that aim at supporting both integration and upgrading, with the

intention of supporting local firms move into more knowledge-intensive areas where value-added is higher (Ponte et al., 2019). Neilson, Pritchard, and Yeung (2014, p.3) argue that it its ultimately states actions that "creates the enabling conditions that shape whether or how firms, regions and nations are able to engage with global markets, and their capacities to upgrade these engagements". Selwyn (2008) underlines that public institutions are possibly the key drivers for upgrading processes, as they can assist domestic suppliers to access global markets and support them to maintain their position in them.

3. Methodology

This section presents the methodological approach of the study. Including the choice of methods,- data collection and analysis, as well as reflection on research limitation and ethical considerations.

3.1 Research question and research design

The main research question of this study is: *How can government grant programs support local suppliers integration and environmental upgrading within GVCs?* More specifically the thesis addresses:

- How can government grant programmes support the environmental upgrading processes?
- What role does environmental upgrading of local firms have for fostering GVC integration?

In consideration of the exploratory and complex nature of the research question(s), a case study approach was selected, which is appropriate to answer research questions of the "how" and "why" type (Yin, 2003). The case study is described as a methodology that focuses on contemporary social phenomena and events that have real-life context (Yin, 2003). For the case study, a qualitative research design was selected as it is particularly suited for exploratory research questions that strive towards gaining a deeper understanding of a phenomena. The connection between the research question(s), theoretical framework, selection of methods, and research quality were continually examined according to Yin (2003) and Saunders, Lewis, & Thornhill (2009) approach to case studies and qualitative research design.

The use of qualitative case studies is a well-established approach which has been applied to a diverse range of study areas (Welch, 1999). However, the same diversity is rarely observed in the methodological approaches of case studies, as the vast majority relies on interviews as the main source of data (ibid.). This is done despite the fact that the bestselling author within case study research, Yin (2003), recommends the use multiple data sources to achieve triangulation. Triangulation happens when data is collected through different techniques, that together strengthen the credibility and trustworthiness of the study (Saunders *et al.*, 2009). In this case study, triangulation

was achieved through the use of archival data, survey data and interviews. The objective of the study is the "Green Industry Innovation" Programme, which consisted of a project portfolio of various business development projects within different economic sectors. Shortly after the Programme was fully concluded in 2017, Innovation Norway assessed its outcomes through the "customer effect survey" *Kundeeffektundersøkelsen* conducted by Oxford Research (Oxford Research, 2018). However, because the Programme was not designed according to the GVC framework, the survey did not answer questions regarding upgrading and GVC integration. To gain a deeper insight into the outcomes of the Programme on environmental upgrading and local firms GVC integration it was necessary to conduct qualitative in-depth interviews as a supplement the survey data.

The sectors in the Programme ranged from low-tech to high-tech industries. The GVC framework examines the structure and dynamics of actors within a *single* industry (Gereffi *et al*., 2005). Thus, it was essential to select one particular industry in order to assess the industry-specific outcomes the Programme had on environmental upgrading and GVC inclusion. Four projects from the furniture industry was thus chosen for a deeper GVC analysis. That way, the findings demonstrated here illustrate what has worked and what has been possible to achieve in individual projects and specific contexts through the GII-Programme. Although, the focus on a single case of a public program, the analysis includes outcomes from individual projects within the program (i.e., more than one unit of analysis). Such study design is according to Yin (2003) called an embedded case study design. The furniture industry was chosen as it is considered one of the most critical sectors in the CEE economy, particularly in Poland, where furniture account for a significant share of the country's exports (Augustyniak & Mínska-Struzik, 2018). Furthermore, the industry presents great opportunities for environmental upgrading.

3.2 Empirical context and data sources

The Europe 2020 strategy emphasizes the need for increased competitiveness of green enterprises and the development of clean technologies in transitioning towards a green economy (EEA-Norway Grants, 2019). Norway and the European Union (EU) both advocate to the principles of the sustainable development goals (SDGs) and share a common objective of creating competitive and dynamic knowledge-based economies (EEA/Norway Grants, 2019). With funding from the Norway Grants, "The Green Industry Innovation" Programme (GII) was implemented in eight Beneficiary countries between the years of 2009-14. These were Bulgaria, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Slovakia. The main target group of this business development program were small-to-medium-size enterprises (SMEs). The program was guided by the following objectives (EEA-Norway Grants, 2019):

- Increased competitiveness of green enterprises
- Greening of existing industries
- Green innovation
- Green entrepreneurship

The expected outcomes of the grant programme was to realize new business opportunities, green supply chain development, increase competitiveness of green firms by encouraging more sustainable production processes, product design and services. This program enabled cooperation between actors in the Beneficiary countries and Norwegian lead enterprises based on partnership projects, with the intention of increasing knowledge sharing, gaining direct access to new markets and supply chains, and exploring the enormous potential of eco-efficient technologies. Although the strategy documents of the programme do not explicitly refer to it as a value chain intervention, the vocabulary is formulated in terms of "market access", "value added", "greening of supply chains", as well as the provision of grant assistance to domestic firms and creating linkages with foreign between local and foreign firms. The programme did not cover actors from the whole value chain, as it only focused on domestic firms close to the production node of the value chain. The programme was designed for a five-year period and has since been replaced by the similar five-year programme "Business Development, Innovation and SMEs".

Innovation Norway (IN) – "the Norwegian Government's most important instrument for innovation and development of Norwegian enterprises and industry" - has been program operator and/or donor program partner in close cooperation with the Beneficiary states (Innovation Norway, 2019). The main role of Innovation Norway as a programme operator was to engage relevant stakeholders from the Beneficiary countries and Norway, perform challenges and needs analysis of eligible firms, and to define the programme strategy (i.e. define focus areas, call of proposals for eligible applicants, evaluate amount of grant support per project, and result indicators). The Norwegian Ministry of Foreign Affairs and the Enterprise Europe Network (EEN) has been regularly engaged and offered help to assist in project approvals and in the business matchmaking process.

Data sources

The research paper relied on multiple data sources for the analysis of the case study. Each of them provided different insights but all contributed to increasing the validity by establishing "converging lines of inquiry" (Yin, 2003, p.35-6). The research paper is mainly based on a comprehensive document study of archival data from Innovation Norway and the Financial Mechanism Office of the EEA and Norway Grants, and interviews with both local and Norwegian firms participating in the

four selected projects from the furniture industry. However, as mentioned previously, the GII-Programme was not designed according to the GVC framework. This posed problems when analyzing the Programmes impact on firms environmental upgrading and GVC inclusion purely based on secondary data research. To give an example, a question in the survey investigated what kind of international cooperation arose from participating in the Programme. 70,2% of the respondents said it lead to cooperation with suppliers, where 40% of these collaborations resulted in signing supplier contracts (Oxford Research, 2018).

Furthermore, the survey does not investigate what kind of supplier contracts were signed, or how the domestic firms participate in these new linkages (i.e. whether it is forward or backwards GVC participation). The survey found that the Programme led to significant environmental improvements, but they are not seen in the context of the environmental upgrading trajectories according to the GVC literature. Therefore, to answer the research question(s), it was necessary to do a "follow-up" of the survey and document analysis with primary data interviews based on the GVC analytical framework. The following paragraphs explain the choices of data sources.

Archival data

Archives can be defined as "documents made or received and accumulated by a person or an organization in the course of the conduct of affairs and preserved because of their continuing value" (Ellis, 1993, p.2). The review of secondary data consists of studies of available project indicators, programme documents and final reports stored in the EEA and Norway Grants data and results portal (e.g. monitoring, administrative, and financial data). The EEA and Norway Grants data and results portal is a comprehensive tool that visually illustrates the results of the 2009-2014 funding period (EEA-Norway Grants, 2019). The benefits of using archival data in contemporary-oriented research and in theory building is threefold : 1) it can add "empirical depth" by generating new types of data and support verification of theoretical explanations that have been based on different data sources; 2) archival data is useful for generating "developmental explanations", i.e., explaining the processes of change; and 3) archival data is suited for challenging existing theories and to build new theoretical models (Welch, 1999, p. 2).

Survey data

Secondary survey data sources is data collected through the survey strategy, which is typically done by questionaries' (Saunders *et al.*, 2009). In this study, the "customer effect survey" conducted by Innovation Norway was used, which measured the outcomes of the GII-programme based on the degree in which it led to increased cooperation between Norwegian and domestic companies and its

environmental impact[3]. The survey consisted of data and info-graphics of projects based on collaboration with Norwegian companies receiving grants and participating in the EEA grant programs.

Primary interview data

Interviews are beneficial to gather valid an reliable data that are suited to the research question(s) and objectives (Saunders *et al.*, 2009). The Primary data was collected through in-depth phone and email interviews with domestic firms in Poland and Romania, and their Norwegian project partners. Additionally, Innovation Norway was interviewed to fill the information-gap from the secondary data regarding specific training activities organized in the GII-Programme.

To summarize, the secondary data sources give an overall detailed account of all projects within GII-Programme, and measures its outcomes based on the degree in which it led to increased cooperation between Norwegian and local companies and its environmental impact. The primary data sources were used to strengthen the research by validating the information given in the secondary data sources and to provide in-depth insight into how selected projects achieved environmental upgrading and integration within GVCs. The table below presents an overview of the data sources used in this research:

Table 2: Overview of secondary data sources

Name	Source	Year	Description
GII Project descriptions	EEA and Norway Grants data and results portal 2009-2014	2020	Summaries of Individual GII Project, including detailed descriptions and achieved outcomes
End review of the EEA and Norway Grants 2009-2014	ECORYS	2019	Detailed review of the programme period 2009-2014
Kundeeffektundersøkelsen 2017 (Customer effect survey)	Oxford Research	2018	Post-GII Programme assessment of its impact on bilateral cooperation and environment
Green Industry Innovation. Programme Romanian. Infographic	Innovation Norway	2016	Infographic summarizing the GII-Programme outcomes in Romania
Mid-term review of the EEA and Norway Grants 2009-14. Report	CSES	2016	Assessment of the efficiency and effectiveness of the EEA/Norway Grants at the current stage
Baseline study on bilateral relations	NCG	2013	Baseline study of the bilateral relations in the grant programmes 2009-2014

[3] **Impact** refers to the Programmes influence on environmental development.

"Key information-Green Industry Innovation Programmes"	Innovation Norway	2012	Report of the current situation of the Green Industry Innovation programme in the Beneficiary countries.
Regulation on the implementation of the European Economic Area (EEA) Financial Mechanism 2009-2014. Regulation	EEA and Norway Grants,	2011	The official regulation concerning the general rules governing the EEA Financial Mechanism 2009- 2014 at its programmes

3.4 Project Selection Criteria's

This section describes the strategy chosen to process the secondary data in order to find projects suitable for the GVC analysis. Through a comprehensive review of the secondary data sources, an original longlist consisting of 57 projects within the waste management and manufacturing sector was created. The projects were collected from three Beneficiary States: Poland, Bulgaria and Romania, on the background that Innovation Norway was Project Promoter in those. In order to reduce the longlist to project that could explore the research question(s) more in depth, a *purposive sampling* strategy was applied because it provides information-rich cases (Saunders *et al.*, 2009). Projects were selected based on fulfillment of the following conditions: *(1) Interfirm- linkages:* all cases consist of a joint partnership-project between local firms and Norwegian lead firms; *(2) environmental upgrading:* the projects selected have experienced some degree of environmental upgrading (i.e., process improvements, product improvements, and organizational improvements); *(3) amount of project grant*: the chosen projects had a project grant of more than €200.000; (4) *furniture industry;* manufacturing firms from the furniture industry were chosen for the purpose of detailed value chain mapping, and *(5) policy lessons:* the selected cases offer relevant policy lessons for future international business development programs either in terms of their success or failures. As a result of the purposive sampling strategy, a selection of four projects have been used for a deeper GVC analysis (see table 1). The chosen projects were analyzed through the rich archival data. In case of projects 1, 2 and 4, the project firms were also interviewed.

Table 3: General characteristics of project studied

	Project 1	***Project 2***	***Project 3***	***Project 4***
Country	Romania	Romania	Bulgaria	Poland
Project location	Cluj-Napoca County	Cluj-Napoca County	Sofia City Province	Mazovia Province
Project grant	€ 341 099,00	€ 247 364,00	€ 398 000,00	€ 462 500,00
Enterprise category	Large Enterprise	Large Enterprise	SME	SME
Target stage of value chain	Production	Production	Production	Design, Production
Target Product	Wood furniture	Wood furniture	Wood furniture	Wood furniture

Source: Authors.

3.5 Interview Guide

Non-standardized in-depth interviews were conducted with project participants, guided by the main-and subsidiary research questions. The reasoning behind conducting and in-depth interview is due to the data collection questions being large in number, complex and open-ended. Easterby-Smith, Thorpe & Jackson (2015) highlight that the use of open-ended questions should help researcher avoiding bias, as they allow for appropriately phrased follow-up questions to explore the topic and produce a more detailed account. The author choose to use semi-structured interview guides, as they allow researchers to "probe" answers, in situations where one want the interviewee to explain or build further on their response (Saunders et al. 2009). The interview guides were structured around six predefined themes based on the analytical framework of the study in addition to the vale chain intervention guidelines by Fernandez-Stark et al. (2012).

First, questions aimed at identifying the firms product/and or services, mapping the value chain to establish the segments in which the domestic firms participate in, the relevant stakeholders, and whether the firms are part of a global value chain. Firms were provided with an illustrative picture of a value chain corresponding to their industry to avoid misunderstanding and aid a common understanding of the value chain concept. Following this, the firm was asked question to identify firms key competitiveness bottlenecks, as these are often indicators of constraints that hinder GVC integration, and to determine where they needed intervention in the value chain. Next, the presence of the "four-pillar" model in the GII-programme was investigated by asking the firms questions related to "access to market", "access to training", "access to finance" and "collaboration and coordination building". This was done to assess the support from the Public Programme to the domestic firms. The following questions aimed at evaluating the degree of environmental upgrading and whether the firms strengthened their participation or become integrated in global value chains

(GVCs). Questions were designed such that the responses could be linked to certain types of environmental upgrading and firm-level GVC integration (see chapters 2.2.2 and 2.2.3). Appendix A gives a complete account of the questions.

3.6 Conducting Interviews

Within each of the companies interviewed, the main project responsible to understand the firms drive to participate in the programme, their green competitiveness bottlenecks that hindered the local suppliers from accessing new global markets, the environmental upgrading outcomes of the project, as well as their GVC integration post-programme. In total, seven interviews with five key informants from Poland, Romania and Norway was conducted, in addition to one interview with Innovation Norway. The interviews consisted of two in-depth phone interviews with the Polish and Romanian firm, two open-ended email interviews with the two Norwegian lead firms, and two "follow-up" email interviews with the Polish and Romanian companies. One interview was conducted with Innovation Norway to gain deeper insight into their organized activities in the GII-Programme. All interviews were conducted between March and May 2020 (for a detailed description see table 4).

Since several of the themes include sensitive information about the firms, the latter were promised confidentiality. Therefore, the paper does not refer to any persons, enterprises or brands by name. We secured the anonymity of the interviewees by using codes as identifiers. Each interviewee was given a participant number ranging from one to five, e.g. "Interviewee 3, April 2020/CEO" means interviewee number 3. The interviews began with a brief introduction to the research purpose. As part of this, each participant was sent an detailed summary of the research by mail prior to the interview, in addition to information regarding their right to confidentiality and anonymity.

Before conduction the interviews, the participants were made aware of the previously agreed right to confidentiality and anonymity and that nothing said would be attributed to them without obtaining their permission. The in-depth phone interviews lasted between forty minutes and one hour. To document and ensure both transparency and traceability, the interviews were recorded on audio tape and were transcribed shortly afterwards. The permission to conduct audio-recorded interviews was agreed upon with the participants beforehand. Audio-recording interviews can strengthen research as it provides an accurate and unbiased record, and allows for direct quotes to be used (Easterby-Smith *et al.,* 2015). However, Saunders *et al.* (2009) points out that it may also inhibit some interviewees responses, as some might have an negative reaction to being recorded, which can decrease the reliability of the study.

Table 4: In-depth interviews

#	Project	Enterprise		Interviewee	Date	Method
1	Project 1 and 2	Romanian supplier	(2)	Operational Manager	March 2020	Telephone and email interview
2	Project 1 and 2	Norwegian Lead Firm	(1)	Operational Manager	April 2020	Email interview
3	Project 4	Polish supplier	(2)	CEO	April 2020	Telephone interview
4	Project 4	Norwegian Lead firm	(1)	CEO	April 2020	Email interview
5	Programme Operator	Innovation Norway	(1)	Senior Advisor	May 2020	Email interview

In parenthesis, the number of interviews conducted.

3.7 Data Analysis

Maxwell (2013) explains that all qualitative studies must decide on how the analysis should be conducted based on the rest of the research design. A fundamental principle of qualitative research is that "data analysis should be conducted simultaneously with data collection" (Coffey & Atkinson, 1996, p.2). The advantage of this approach is that it allows the researcher to focus more on the interviews, and to decide how to test the emerging conclusions. In qualitative research there are mainly three analytical strategies (Maxwell, 2013, p.236): categorizing strategies (i.e. coding and thematic analysis), connecting strategies (i.e. narrative analysis and individual case studies), and memos (i.e. writing reflecting memos on findings). According to Maxwell (2013), one should generally seek to incorporate all these methods. In this study the qualitative analysis process began by reading the interview transcripts line by line. Thereafter, primary and secondary data were analyzed using the categorizing strategy, by identifying codes based on the GVC literature review. The semi-structured interview guide based on the conceptual framework and research question(s) aided in grouping the codes into categories. The next step was to map the furniture value chain by identifying and outlining the domestic firms existing value chain as discovered through the in-depth interviews with key informants. A value chain analysis is considered as "the science of identifying bottlenecks and opportunities between different stages of production tasks" (Taglioni and Winkler, 2016, p.12).This was achieved by identify the most important segments of the chain (e.g. inputs, production, and processing), and where the domestic firms are currently participating in order to determine where intervention was needed. Then, the position of the firm in the value chain and its ownership status was identified (i.e. whether the firm is a subsidiary or an independent company).

The category development is listed in Appendix B. The coding of the interview transcripts was carried out with the support of the online spreadsheet-database "Airtable".

3.8 Reflections on the Limitations of the Study

There are several advantages of building theory from case studies, especially when it comes to combining the richness of qualitative information with deductive analysis (Eisenhardt & Graebner, 2007). Nevertheless, as with other research strategies, there might be some research limitations and other potential challenges that need to be addressed to assure the quality of the research project.

The major constraint faced regarding the case of the «Green Industry Innovation Program» was that it consisted of various sectors and industries in eight Beneficiary countries. Most value chain interventions focus on one specific country and its industry to identify local factors and domestic firms position in global value chains. To provide comprehensive industry analysis and policy recommendations, it was necessary to reduce the number of Beneficiary countries. Polish, Bulgarian and Romanian suppliers that operated within the furniture industry were included in the study. The importance of the furniture industry, coupled with Innovation Norway's role as a Programme Operator, provided us with an information-rich case-study. However, it is essential to be aware that even within narrowly defined industries in specific countries there are significant differences in how local firms are integrated within GVCs, and in their market differences, such as firms productivity, financial assets, and skill intensity (Bernard *et al.*,2007; Fortanier *et al.*, 2019). GVCs are heterogenous, and future research will need more disaggregated data analysis combining both the macro and the micro perspective to provide an deeper understanding of the phenomenon (UNIDO, 2018).

Saunders *et al.* (2009) refer to reliability and validity as criteria's to strengthen the credibility and to measure the quality of the research project. Reliability refers to the extent collection and processing of data will provide consistent findings, or similar findings if alternative research was conducted (Easterby-Smith *et al*., 2015).The *reliability* of the study was strengthened through being transparent about how the research was conducted, and by providing a detailed descriptions of the research design, within this a descriptions of methods of data collection. The research project has had an strong emphasis on using reliable secondary data sources, which were directly gathered from the EEA/Norway grants data and results portal and acquired by e-mail from the program responsible at Innovation Norway. In addition, reliability was strengthened throughout the research process by authors critical and reflective thinking.

To further improve the reliability of primary data, the potential *information bias* was addressed. Comparisons and contrast were made through the narratives emerging from the domestic firms with

those coming out of their Norwegian project partners, thus obtaining a more objective measure of the linkages between the firms and project outcomes. However, as with all conversations, these interviews were subjected to interview bias related to poor recall and poor articulation. Particularly considering that the final project of the GII-programme was finalized three years ago and that the interviewees were all non-native English speakers. For some of the interviewees, it was challenging to grasp complex concepts and to express themselves. Informants were aided with example illustrations and a simplified description of concepts.

The authors Ton, Vellema, & de Ruyter de Wildt (2011), highlight that studies within the field of value chain interventions struggle to systematically address issues of validity. Validity is defined as "the extent to which an account accurately represents the social phenomena to which it refers" (Silverman, 2005,p.380). The challenge of studying value chains is that they by nature are open, multilayered systems with multi-dimensional economic-and developmental outcomes. Furthermore, value chain interventions are often time, place and product specific. The unique characteristics of these interventions puts constrains on generalizability, i.e. *external validity*, and drawing conclusion, as they are unlikely to be repeated in a similar way (Ton *et al.*, 2011). However, it is important to highlight that the external validity in this study does not rely of statistical generalization, as the aim of this study is to "generalize a particular set of results to some broader theory" (Yin, 2003, p.10) and is thus applicable to analytic generalization. Analytic generalization has been achieved by replicating the same phenomenon of previous case studies on value chain interventions using the "Four-Pillar model" but under different conditions. To enhance the *construct validity*, i.e. determining correct operational measures, the variables and broader concepts have been clarified by leveraging on previous literature on value chain analysis, as it is critical to understand the key outcome indicators and how they should be measured. To answer the threat to validity and produce a solid conclusion, Ton *et al.* (2011) advocates for the use of a mixed methods approach. Although a mixed method approach was not possible to achieve in this study given the timeframe, triangulation through the collection of information from a diverse range of individuals and settings, and the use of both qualitative and quantitative data from individual interviews and secondary data surveys have been essential. In case studies, triangulation is often perceived as a key feature (Ghauri, 2004). It happens when data is collected through different techniques, that together strengthen the credibility and trustworthiness of the study (Saunders *et al.*, 2009). Furthermore, triangulation offers the benefit of strengthening the research by diminishing the weaknesses or biases related to one specific method (Maxwell, 2013).

Research Ethics

Throughout the research process, ethical issues will be of high importance and as a researcher, it will require ethical integrity. Research ethics cannot be separated from the research design, it must be taken into consideration at every step of the research project, from choosing the research objectives, methods, data sources and research sites, to critically considering how data is collected, preserved, and presented (Saunders *et al.*, 2009; Maxwell, 2013). This can be done by following a set of chosen ethical principles and by adapting the research strategy or choice of methods accordingly. The authors Johannesen *et al.* (2006, p.93) have summarized the ethical principles of Nerdrum (1998), which describe that in any research project there are three ethical principles one must consider: (1) the informants right to personal autonomy and self-determination; (2) the researcher duty to respect the informants privacy; (3) the researchers responsibility to avoid causing harm.

The research paper of this thesis applied the ethical principles of Nerdrum (1998), which were considered from the very beginning until the end of the research project. With each interview request the participants received information regarding their right to refuse participation at any time and the protection of their identities through the course of the research. Participants of the in-depth phone interviews were asked for the permission to record the interview. The oral and written consent was secured from the interview participants before any discussion began. After the interviews, each participant was given the option of reviewing the transcribed interview, which gave room for objection and ensure correct interpretation of data. Additionally, the Norwegian center for Research Data (NSD) was consulted concerning ethical standards of privacy protection.

References

Asia-Pacific Economic Cooperation (APEC). (2014). "Integrating SMEs into Global Value Chains: Policy Principles and Best Practices." Issues paper. No.6. APEC Policy Support Unit.

Augustyniak, D. & Mínska-Struzik, E.(2018). The competitiveness of Polish furniture exports, *Drewno*, vol. 61, pp. 21-38.

Bamber, P., L. Fernandez-Stark, G. Gereffi and A. Guinn. (2014). Connecting Local Producers in Developing Countries to Regional and Global Value Chains: Update", OECD Trade Policy Papers, No. 160, OECD Publishing.

Barrientos, S., Gereffi, G., & Rossi, A. (2011). Economic and social upgrading in global production networks: A new paradigm for a changing world. *International Labour Review*, vol. 150(3-4), pp.319-340.

Benito, G., & Petersen, B., & Welch, L. (2019). The global value chain and internalization theory. *Journal of International Business Studies*

Bernard, A. B., Jensen, J. B., Redding, S. J., & Schott, P. K. (2007). Firms in international trade.
Journal of Economic Perspectives, vol. 21(3), pp. 105–130.

Bolwig, S. Ponte, S., du Toit, A.,Riisgaard, L. & Halberg, N. (2010). Integrating Poverty and Environmental Concerns into Value-Chain Analysis: A Conceptual Framework. *Development Policy Review*. Vol. 28, pp. 173-194.

Brun, L., & Lee, J. (2016). The Role of the State in Global Value Chains. Conference: Society for the Advancement of Socioeconomics (SASE), Berkeley, CA (USA).

Buckley, P.J. (2009). The governance of the global factory: Location and control of world economic activity. Academy of Management Perspective, 29 (2), 237-249.

Buckley, P. J. and Strange R. (2015). Internalisation thinking: From the multinational enterprise to the global factory. International business review, 18, 224-235.

Coffey A, & Atkinson, P. (Eds.). (1996). *Making Sense of Qualitative Data. Complementary Research Strategies.* Sage Publications, London, UK

Cieślik, E. (2014). "Post-communist European countries in global value chains". *Ekonomika,* Vol. 93(3), pp. 25-38.

Clarke, T. and M. Boersma (2015), The governance of global value chains: unresolved human rights, environmental and ethical dilemmas in the Apple supply chain, *Journal of Business Ethics*, vol. 143 (1), pp.111–31.

De Marchi, V., Di Maria, E.,Krishnan, A., & Ponte, S. (2019). Environmental upgrading in global value chains, In book: *Handbook of Global Value Chains*, Publisher: Edward Elgar, pp.310-323

Easterby-Smith, M., Thorpe, R., Jackson, P. (2015) *Management and business research*. 5th ed. London, SAGE publications.

Economic Bulletin (ECB). (2017). "The impact of global value chains on the macroeconomic analysis of the euro area", Issue 8.

EEA Grants 2019, Retrieved November 17, 2019, from https://data.eeagrants.org/

Eisenhardt, K. M., & M. E. Graebner. (2007). "Theory building from cases: Opportunities and challenges," *Academy of Management Journal*, vol. 50(1), pp.25.

Ellis, J. (ed.) (1993) *Keeping Archives*, 2nd edn, Melbourne: D.W. Thorpe.

European Central Bank (ECB). (2019). The impact of global value chains on the euro area economy, ECB Working Group on Global Value Chains, No. 221.

Fernandez-Stark, K., Bambler, P. and G. Gereffi (2012): Inclusion of Small- and Medium-Sized Producers in High-Value Agro-Food Value Chains. Duram N.C.: Duke University Center on Globalization, Governance & Competitiveness for the Inter-American Development Bank Multilateral Investment Fund (IBD-MIF).

Fortanier, F., Miao, G., Kolk, A., Pisani, N. (2019). Accounting for firm heterogeneity in global value chains. *J Int Bus Stud*, vol. 51, pp. 432–453.

Gereffi, G. (2005). “The global economy: Organization, governance, and development.” In Neil J. Smelser and Richard Swedberg (eds.), *The Handbook of Economic Sociology* (pp. 160-182). 2nd edition, Princeton, NJ: Princeton University Press.

Gereffi, G., & Lee, J. (2012). "Why the world suddenly cares about global supply chains." Journal of Supply Chain Management, vol. 48(3), pp. 24-32.

Gereffi, G., & Sturgeon, T. (2013). Global value chain-oriented industrial policy: the role of emerging economies. Chapter 14 in D. Elms & P. Low (Eds.) Global value chains in a changing world, WTO Publications: Geneva, pp. 329-360.

Gereffi, G. (2013). Global Value Chains in a Post-Washington Consensus World. Rev. *Int. Political Econ*. 2013, 21,pp. 9–37.

Gereffi, G. (2019). Global value chains and international development policy: Bringing firms, networks and policy-engaged scholarship back in. 2. pp.195-210.

Gereffi, G., Humphrey, J., & Sturgeon, T. (2005). The governance of global value chains. Review of International Political Economy, vol. 12(1), pp.78-104.

Gereffi, G. & Fernandez-Stark, K. (2016). *Global Value Chain Analysis: A primer* (2nd ed.). Center on Globalization, Governance & Competitiveness. North Carolina, USA: Duke University.

Gereffi, G. (2014) Global value chains in a post-Washington Consensus world, Review of International Political Economy, vol. 21(1),pp. 9-37.

Gui, L.(2010). “Reshaping the boundaries of the firm: Global Value Chains and lead firms strategies”, in in Pla-Barber, J. & Alegre, J. (Eds.), *Reshaping the Boundaries of the Firm in an Era of Global Interdependence. Progress in international business research,* Vol. 5. Bingley, UK: The Emerald Group Publishing Limited, pp. 29–55.

Ghauri, P. N. (Eds). (2004). *Designing and Conducting Case studies in International Business Research.* Edward Elgar.

Horner, R., & Alford, M. (2019). The roles of the state in global value chains: an update and emerging agenda. Global Development Institute Working Paper Series; No. 2019-036, pp. 1-26. Manchester.

Humphrey, J. & Schmitz, H. (2002). "How Does Insertion in Global Value Chains Affect Upgrading in Industrial Clusters?". Regional Studies, 36(9): 1017-1027.

Innovation Norway. (2019), Retrieved August 05, 2019, from: https://www.innovasjonnorge.no/en/start-page/

Jeppesen, S., & M.W., Hansen.(2004), Environmental upgrading of third world enterprises through linkages to transnational corporations: theoretical perspectives and preliminary evidence*, Business Strategy and the Environment,* vol. 13 (4), pp. 261–74.

Johannessen, A., Tufte, P.A. & Kristoffersen, L. (2006). *Forskerens juridiske og etiske ansvar. Introduksjon til samfunnsvitenskapelig metode*. (S.91-103). Oslo: Abstrakt Forlag.

Kaplinsky., & Morris, M. (2017). How Regulation and Standards Can Support Social and Environmental Dynamics in Global Value Chains, International Centre for Trade and Sustainable Development, Issue paper.

Kano, L., Tsang, E.W.K. & Yeung, H.W. (2020).Global value chains: A review of the multi-disciplinary literature. *Journal of International Business* Studies.

Khattak, A., & Stringer, C. (2017). Environmental upgrading in Pakistan’s sporting goods industry in global value chains: A question of progress? *Business & Economic Review*, vol. 9 (1), pp. 1-23.

Khattak, A., C. Stringer, M. Benson-Rea and N. Haworth (2015), ‘Environmental upgrading of apparel firms in global value chains: evidence from Sri Lanka’, *Competition and Change*, vol. 19 (4), pp. 317–35.

Khattak, A., & Pinto, L. (2018). A Systematic Literature Review of the Environmental Upgrading in Global Value Chains and Future Research Agenda*. Journal of Distribution Science*. vol.16, pp. 11-19.

Larsen, M, N. (2016). Sustaining Upgrading in Agricultural Value Chains? State-Led Value Chain Interventions and Emerging Bifurcation of the South Indian Smallholder Tea Sector, *Journal of Sustainability,* vol.8, pp.1-19.

Lie, H. (2017). Inclusive Value Chain Development: Applying Systems Thinking and Participatory Modeling to Dairy Value Chain Analyses in Nicaragua and Tanzania, Philosophiae Doctor (PhD) Thesis, Norwegian University of Life Sciences, Ås.

Lee, J., Gereffi, G., Beauvais, J. (2010). Global Value Chains and Agrifood Standards: Challenges and Possibilities for Smallholders in Developing Countries. PNAS Early Ed. 2010, 109, 12326–12331.

Maxwell, J. (2012). Qualitative Research Design : An Interactive Approach / J.A. Maxwell.

Morrison, A., Pietrobelli, C., & Rabellotti, R. (2008). 'Global Value Chains and Technological Capabilities: A Framework to Study Learning and Innovation in Developing Countries', Oxford Development Studies, vol. 36 (1), pp. 39-58.

Mudambi, R. (2008) 'Location, control and innovation in knowledge-intensive industries', *Journal of Economic Geography*, vol.8, pp. 699–725.

Nadvi, K. (2008). Global standards, global governance and the organization of global value chains, *Journal of Economic Geography*, vol. 8 (3), pp. 323–343.

OECD-UNIDO.(2019) Integrating Southeast Asian SMEs in Global Value Chains: Enabling Linkages with Foreign Investors. Paris: OECD.

OECD. (2018). Fostering greater SME participation in a globally integrated economy, discussion paper. SME Ministerial Conference.

Oxford Research. (2018). "Tilbake til normalen? Innovasjon Norges Kundeeffektundersøkelse 2017-Førundersøkelsen.

Pietrobelli, C., Rabellotti, R., and Van Assche, A. (2019). Global Value Chain -Oriented Policies. Call for Papers.

Pietrobelli, C., Staritz, C. (2017). "Upgrading, Interactive Learning, and Innovation Systems in Value Chain Interventions", *European Journal of Development Research.*

Ponte, S., Gereffi, G., & Raj-Reichert, G. (Eds.) (2019). *Handbook on Global Value Chains*. Cheltenham: Edward Elgar Publishing.

Ponte, S. (Eds.). (2019). Business, *Power and Sustainability in a world of Global Value Chains*, Zed Books, London.

Primo Braga, C.A. (2013), "Globalization in the 21st Century: The Role of Global Value Chains", IMD, Lausanne.

Radosevic, S. (2017), Upgrading technology in Central and Eastern European economies, *IZA World of Labor*, issue , number 338.

Sarah Babb. (2013): The Washington Consensus as transnational policy paradigm: Its origins, trajectory and likely successor, *Review of International Political Economy*, 20:2, pp. 268-297.

Saunders, M., Lewis, P. & Thornhill, A. (2009). *Research Methods for Business Students*. Pearson, New York.

Selwyn, B. (2008). Institutions, Upgrading and Development: Evidence from North East Brazilian Export Horticulture*. Compet. Chang*, vol. 12, pp. 377–396.

Silverman, D. (2005). *Doing Qualitative Research: a practical handbook,* (2nd ed.), SAGE Publications.

Taglioni, D. and Winkler, D. (2016). Making Global Value Chains Work for Development. The World Bank: Washington.

Tokatli, N. (2012). Toward a better understanding of the apparel industry: a critique of the upgrading literature. *Journal of Economic Geography*, vol. 13(6), 993-1011.

Ton, G., Vellema,S. & de Ruyter de Wildt, M. (2011). Development impacts on value chain interventions: How to collect credible evidence and draw valid conclusions in impact evaluations? *Journal on Chain and Network Science*, vol.11(1), pp. 69-84.

Tusha, D., Jordaan, J.A. & Seric, A. (2017). Are vertical linkages with foreign firms different? Evidence from Vietnam. Preliminary draft.
UNCTAD. (2010). Integrating Developing Countries SMEs into Global Value Chains, United Nations, New York and Geneva.
UNCTAD. (2013). World Investment Report 2013: Global value chains: Investment and trade for development.
UNIDO. (2018). Global Value Chains and Industrial Development: Lessons from China, South-East and South Asia, Vienna International Centre, Austria.
Van Assche, A., & Van Biesebroeck, J. (2018). "Functional upgrading in China's export processing sector." *China Economic Review*, vol. 47, pp. 245-262.
Van Assche, A. (2018). From the editor: Steering a policy turn in international business – opportunities and challenges. *J Int Bus Policy,* vol. 1, pp. 117–127.
Vlckova, J., De Castro, T. & Antal, J. (2015). Upgrading in the Global Value Chains: The Case of the Czech Republic. *Conference: Global Value Chains: Upgrading in the V4 Countries,* Prague
Welch, C. (1999). The Archaeology of Business Networks: The Use of Archival Records in Case Study Research, in McLoughlin, Damian, and C. Horan (eds.). Proceedings of the 15th Annual IMP Conference, pp.1-13, Dublin.
Werner, M., Bair, J., Fernández, V.R. (2014). Linking Up to Development? Global Value Chains and the Making of a Post-Washington Consensus. Dev. Chang., vol. 45, pp. 1219–1247.
World Trade Organization (WTO). (2017). Measuring and analyzing the impact of GVCs on economic development, Global value chain development report.
Yin, R. K. (2003). Case study research. Design and Methods (2nd ed.). Thousand Oaks, CA: Sage Publication

Scientific Article

Can Government Grants Support Local Suppliers Integration and Environmental Upgrading in Global Value Chains? Evidence from Green Industries in Central and Eastern Europe.

Kamila Trine Jørstad

Department for Marketing Strategy and Management, Nord University Business School, Nord University, Bodø 8049, Norway.

Abstract

This paper contributes to an emerging stream of literature that attempts to address the research gap concerning the roles of states as active development actors in GVCs, by examining how governmental grant programmes can support local suppliers efforts to environmental upgrading and integration within GVCs. This article examines the "Green Industry Innovation" programme funded by the Norway Grants. The analysis builds on the GVC framework, more precisely the "four pillars" model, in assessing how effective the programme has been in supporting local firms GVC inclusion. Furthermore, it investigates how the programme supported the environmental upgrading (EnvU) of four select GII-projects consisting of Central and Eastern European furniture suppliers. Our findings suggest that governments can play an active role in strategically facilitating linkages with eligible lead firms and specialized GVCs to support EnvU. However, to foster sustained GVC integration, programmes must include economic, social and environmental upgrading dimensions.

Keywords*: global value chains; government grant programmes; environmental upgrading; domestic firms; industrial policy*

1. Introduction

The emergence of *global value chains* has in recent years become a dominant aspect of the global economy. Global value chains (GVCs) can be defined as "the full range of activities that firms, farmers and workers carry out to bring a product or service from its conception to its end use, recycling or reuse" (Ponte, Gereffi, & Raj-Reichert, 2019, p.1). There is a growing consensus among economists and policymakers that the global value chain (GVC) framework has become a significant development paradigm to promote growth in emerging economies (Gereffi, 2019). By applying core concepts such as "governance" and "upgrading", the GVC framework provides a holistic view of global industries, both from the top-down and bottom- up, by examining the job descriptions, technologies, standards, regulations, products, processes and markets in specific industries and locations (Gereffi & Fernandez-Stark, 2016). As of late, the concept of upgrading has been extended to include *environmental upgrading* (EnvU) (De Marchi, Di Maria, and Micelli, 2013). EnvU is attracting attention from both scholars and firms due to factors such as heightened environmental awareness forcing firms to be responsible for the environmental damage of their business activities (ibid.). The processes and mechanisms that enable EnvU are specifically important for emerging countries, where GVC participation can have devasting effects on local socioeconomic outcomes (Clarke & Boersma, 2015).

The existing GVC studies are firm-centric, in other words they are concerned with studying new forms of firm-to-firm relationships and the role of lead firms. Lead firms are the companies responsible for governing the whole value chain and determining chain participants upgrading opportunities (Larsen, 2016). These studies argue that instruments for upgrading and opportunities for GVC integration or exclusion are mainly determined within the power structures of the value chain (ibid.). The GVC literature has traditionally paid minor attention to the role of governments and institutional frameworks in supporting development outcomes such as upgrading (Larsen, 2016). However, recent debated on the role of states in GVCs has challenged the predominant firm-centrism in the existing GVC literature (Behuria, 2019; Horner & Alford, 2019; Ponte et al., 2019), while some scholar extend the debate further to arguing that the state-GVC nexus is the most important issue of contemporary research

on GVCs (Horner & Alford, 2019).The GVC literature has conceptualized four functions of states: a) *facilitative* (i.e. assisting firms in the market), b) *regulatory* (i.e. measures to restrict activities of firms in GVCs), c) *producer* (i.e. state owned firms), and d) *buyer* (i.e. public procurement) (Horner, 2017,p.7).

It is essential to understand how public policies can support the upgrading of regions, countries and companies in GVC as it is vital for economic and social development. In particular, there is a need for effective policies and programs that can increase domestic firms ability to access and gain higher added value from their participation in global value chains. New realities require novel policy prescriptions, and Gereffi & Sturgeon (2013) promotes the adoption of GVC-oriented industrial policies focusing on the development of GVC activities as well as international supply chain linkages. However, to date, policy prescriptions have remained very general. There is a need for delineating the impact of GVC-oriented policies on firms' participation in GVCs, their ability to capture value, and on the economic and social significance (Tokatli 2012; Van Assche &Van Biesebroeck 2018). Although, there has been a rise in policies and government-led programmes targeting domestic firms linkages with foreign lead firms and their associated benefits, there is to this day limited empirical evidence on whether and under what conditions they are effective (OECD-UNIDO, 2019). Furthermore, current policies are not fit for the task of providing GVC inclusion and upgrading, despite the availability of substantial financial opportunities, such as the EU structural funds. The main problem with existing policies is their excessive focus on research-driven growth, which results in the neglect of sources of productivity growth (Radosevic, 2017). An important challenge is how to design global value chain-oriented policies, since the future growth of CEE firms depends upon their ability to upgrade and improve their position in global value chains. On that background, this article seeks to fill the knowledge gap with the following research question: **"**How can government grant programmes support local suppliers integration and environmental upgrading within GVCs?"

This study examines the so-called "Green Industry Innovation" (GII) Program funded by the Norway (EEA - European Economic Area) Grants. The Norway Grant has a *facilitative* governmental role, as it aims is to open up a new scope of entry points for bilateral relationships and be a gate opener to match actors from the Beneficiary states and donor states at the project level within green industries. According

to Cieślik (2014), trends from recent years show that many Central and Eastern European (CEE) countries position in GVCs is rapidly deteriorating (ECB, 2017). Today, a large share of the external trade of CEE countries passes through global value chains in which the local firms are usually situated further "downstream" (e.g. final assembly of products) compared to larger euro-area countries, which are in turn located "upstream" (ibid.). GVC research frequently highlights the value added when "moving up the chain" as one of the indicators for upgrading (Larsen, 2016; Ponte et al., 2019). The rationale behind is that the higher the value of the value chain activity the more advanced (i.e. upstream) the country's position in GVCs.

The study aims to contribute to filling the knowledge gap concerning the role of state in supporting environmental upgrading and GVC inclusions. The purpose is to shed a light on how government grant programmes can support domestic firms. To address the research question the paper builds on the GVC analytical framework, more precisely the "four pillar" model by Fernandez-Stark, Bambler & Gereffi (2012) to assess how the Programme (1) supported local firms in overcoming the four major constraints/pillars of GVC inclusion; and (2) how the programme supported four selected GII-projects in the CEE furniture industry with their environmental upgrading.

The article is structures as follows: section 2 addresses the emerging concept of environmental upgrading and the research concerning the growing role of states in shaping development outcomes in GVCs. The chapter is finalized with the presentation of the conceptual framework based on the "four pillars" model and the literature review. In section 3, the author presents the research methods. Section 4 presents the "Green Industry Innovation" programme and the four selected CEE furniture industry projects. The results are presented section 5, while section 6 consists of the discussion, policy recommendations and conclusion.

2. GVC inclusion and environmental upgrading - the role of governmental programs

In the globalized economy, firms are seeking to maintain or increase their competitiveness to participate in GVCs, and a feasible measure to achieve this is often to "upgrade" their production. The main challenge related to upgrading in GVCs is to analyze the conditions under which countries and firms can "move up the value chain" from primary assembly activities using low-cost and unskilled

workers to more advanced forms of "full package" supply and integrated manufacturing (Gereffi & Fernandez-Stark, 2016; Ponte et al., 2019). Research on upgrading has traditionally focused on "economic upgrading" through four clearly defined classification of upgrading trajectories: (1) *process*: transforming inputs more efficiently into outputs by reorganizing the production system; (2) *product:* moving into more sophisticated product lines*;* (3) *functional:* acquiring new functions to increase the general skill content of the activities; and (4) *inter-sector upgrading*: entry of a firm into a new value chain/sector (Humphrey & Schmitz, 2002). The study of social upgrading is often studied in the context of economic upgrading. In contrast to economic upgrading, it is the process of improvements of the rights and privileges of workers as social actors, which results in the improvement in the quality of their employment (Barrientos, Gereffi, and Rossi, 2011).

Recent GVC studies are starting to including the concept of environmental upgrading (EnvU) into their analysis due to factors such as heightened environmental awareness among consumers, demand for environmentally-friendly products and manufacturing processes, and the growing importance of sustainability strategies and environmental standards in GVCs (De Marchi *et al*., 2013;Khattak, Stringer, Benson-Rea and Haworth, 2015; Khattak & Stringer, 2017; Khattak & Pinto, 2018; Ponte *et al.,* 2019). One of the most recent definitions on the concept is provided by the author's De Marchi, Di Maria, Krishnan and Ponte (2019, p.312) who define it as: "any change that results in the reduction of the firm's ecological footprint – such as their impact on greenhouse gas emissions, on biodiversity losses and on natural resources overexploitation, that is, when the net gains in environmental improvements are more than the losses". There are different drivers for environmental upgrading amongst domestic firms, such as the prospect of increasing competitiveness through acquiring certifications and complying with standards, differentiation by developing eco-friendly products, and cost-saving through adapting modern and efficient production machinery (De Marchi et al., 2019). On the other hand, they are driven by external pressure to "go green" from customers, lead firms and policymakers (ibid.). Lead firms apply different strategies in pushing their suppliers to EnvU, which are distinguished by *deep* and *shallow* strategies (Ponte, 2019). *Deep involvement* occurs when buyers provide considerable technical support and engage directly with their suppliers. In such strategies, environmental issues and their solutions are being dealt with on a case-by-case basis. *Shallow* involvement in EnvU occurs when

suppliers have the capacity to comply with standards (e.g. ISO 14001) which are demanded by the buyer. The lead firm does not engage with the supplier in a significant manner, and provide no technical or financial support (ibid.).

Although there is an increased interest in incorporating environmental aspects into the GVC analysis, environmental upgrading remains the least investigated area of GVC literature (Khattak & Pinto, 2018). Furthermore, the growing number of conceptualizations on environmental upgrading often lack the perspective of economic and social processes. Drawing from the existing debates on economic and social upgrading processes, De Marchi *et al.* (2019, p.313) suggest that one can classify environmental upgrading into three types:

- *Process improvements* happen through eco-efficiency, i.e. the reorganization of production systems or the use of superior technology, such as the reduction of energy or materials used per unit of output;
- *Product improvements* in the development of sophisticated, environmentally friendly product lines, such as the usage of recyclable, recycled or natural inputs, avoidance of toxic materials;
- *Organizational improvements* take place when there is an organizational enhancement of the way a firm is conducting its business and managing the organization, an effort often related to the achievements of standards and certifications, such as International Organization of Standardizations ISO 14001 on specifying the requirements of an environmental management system, or Leadership in Environmental Design [LEED]).

Khattak & Pinto (2018) stress that future research on environmental upgrading will have to address the research gap concerning how states can interact and collaborate with private governance to facilitate domestic firms EnvU. There is a growing body of research suggesting that the activities undertaken by states are significant in the context of GVCs (Ponte *et al.,* 2019). Horner & Alford (2019) argue that state-GVC nexus is the most important issue of contemporary research within the field of GVCs. The neo-liberal agenda has traditionally highlighted the influential role of lead firms in governing the value chain and determining chain participants development opportunities (Horner & Alford, 2019). Although, lead firms could in principal play a crucial role in supporting emerging countries integration and upgrading in GVCs, they are often driven by their own personal agenda (Pietrobelli & Staritz, 2017).

Lead firms tend only to support domestic firms as long as it fits their strategic interest and does not threaten their position in the value chain. These power asymmetries highlight the need of governments who can moderate the chain-asymmetries while making sure that participation in GVCs yields positive learning spillovers to domestic firms (ibid.).

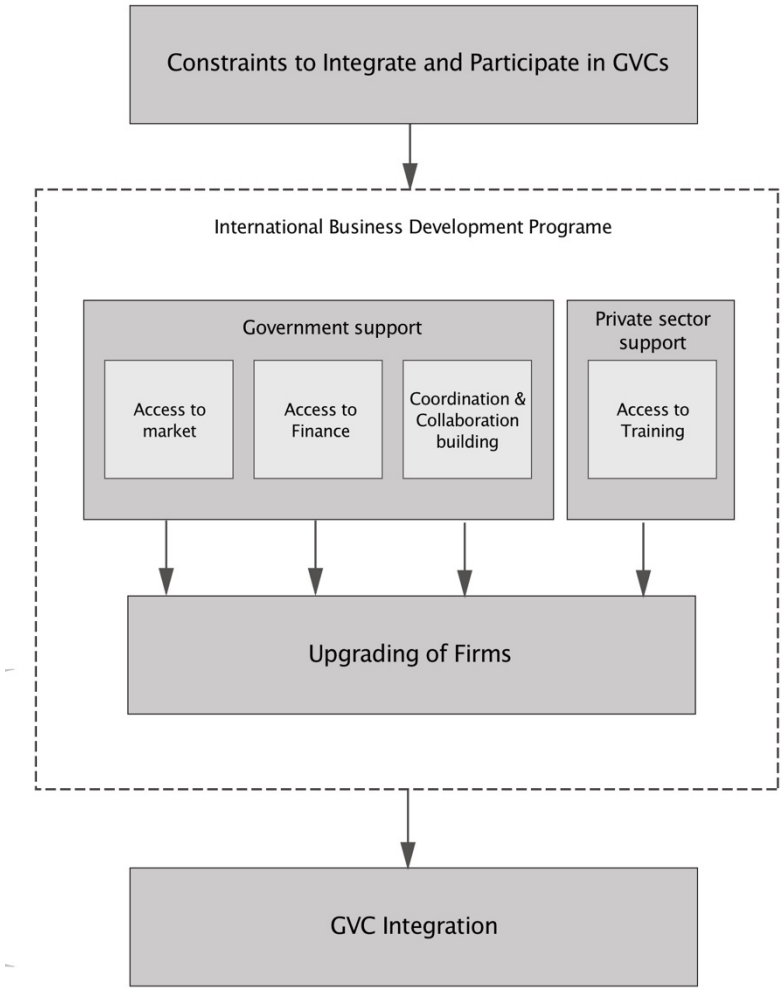
Policies aimed at inserting local firms in GVCs may alone not enough to yield the above-mentioned benefits, as they can create shallow integration (i.e., firms entreating low-end markets with limited prospects of capability building) (Ponte *et al*., 2019). Governments play a crucial role in creating sustainable GVC inclusion through policies that aim at supporting both integration and upgrading, intending to support local firms move into more knowledge-intensive areas where value-added is higher (ibid.). The failure of supporting local firms to develop the capacity needed to upgrade can condemn them to increased economic activity but with declining incomes (Kaplinsky, 2015).

Rodrik (2004) suggest that there is a need for a new generation of industrial policies that can be seen as an arena for "strategic collaboration" between the private sector and the government to develop effective policies and programmes. Pietrobelli & Staritz (2017) support this argument, stating that the involvement of public-private stakeholders and institutions in the development of and implementation of GVC-targeted interventions are crucial. However, when governments collaborate with the public sector, they must understand the lead firms drivers, challenges and strategies, including the asymmetric power relations within GVC, before engaging them with the local industry (Ponte *et al*.,2019). Industrial policies should ensure that these collaborations lead to learning, capability building, sustainability and upgrading prospects of specific GVCs (ibid.).

A growing number of national policymakers in both developed and emerging countries are taking into consideration how the GVC framework can be used as development strategies at country, regional and local levels (Taglioni & Winkler, 2016; Pietrobelli & Staritz, 2017). The GVC framework is beneficial as it goes beyond traditional approaches and looks at sectors and inter-firm relations, as opposed to focusing on the nation-state or the firm. This allows the GVC approach to integrate the global with the local, and the firm (micro) with the meso and macro levels and offer valuable insight for policies (Pietrobelli & Staritz, 2017).

This article takes a point of departure that governmental grant programmes can shape development outcomes such as inclusion and upgrading. The "four pillars" model, which is based on the GVC analysis, has intended to contribute to the international development community's understanding of how one can effectively design programmes that ensure the sustainable inclusion of domestic firms in GVCs, in particularly small-to-medium-sized enterprises (SMEs) (Fernandez-Stark, 2012). The model has identified four significant constraints that domestic firms face when trying to integrate into GVCs: (1) access to market; (2) access to training; (3) access to finance; and (4) collaboration and coordination building (Fernandez-Stark et al., 2012). Below is an illustration of the conceptual model:

Figure 1: Conceptual framework



Source: Authors development inspired by the "Four-Pillar" model of Fernandez-Stark et al. (2012).

The paper argues that government grant programmes can support upgrading and inclusion in GVCs by taking upon a *facilitative role* (i.e. assisting firms in the market) and support local firms through: access to finance, which is critical to enable upgrading. Grant programs can also provide training that is vital for building the capacity and capability of local firms to be able to meet the demands of lead firms and developing their entrepreneurial, technical, financial and soft skills. Furthermore, training could support firms in becoming specialized in niches of higher-value-added activities (Gereffi & Sturgeon, 2013). Grant programs can provide companies access to value chains by linking companies together. Making these connections can involve educating leading firms regarding the business potential of sourcing from local producers in donor countries and assistance in the matchmaking process between companies. Measures to assist coordination and collaboration building between companies can be crucial and should occur at both a horizontal and vertical level (Fernandez-Stark *et al*., 2012). Horizontal coordination amongst producers facilitates the formation of producer groups needed to reach economies of scale and provide opportunities to add value to their products. Also, coordination and collaboration amongst the chain stakeholders are crucial for chain performance and upgrading. For instance, promoting dialogue and public-private partnerships has proven very beneficial for industry advancement at local and country-level (Pietrobelli & Staritz, 2017). Although there has been a rise in policies and government-led programmes targeting domestic firms linkages with foreign lead firms and their associated benefits, there is to this day limited empirical evidence on whether and under what conditions they are effective (OECD-UNIDO, 2019).

3. Methodology

The objective of the study is the "Green Industry Innovation" programme which consisted of a project portfolio of various business development projects within different economic sectors. The sectors in the programme ranged from low-tech to high-tech industries. To analyze how government grant programmes can support local suppliers environmental upgrading and integration within global value chains (GVCs), the author studies the case of the Norway Grants funded "Green Industry Innovation" Programme (GII). More precisely, the programmes joint partnership projects between local suppliers and Norwegian lead firms. To adhere to the GVC framework (Gereffi, 2005), it was essential to select

one particular industry in order to assess the industry-specific outcomes the programme had on environmental upgrading and GVC inclusion. Four projects from the furniture industry was thus chosen for a more in-depth GVC analysis. That way, the findings demonstrated here illustrate what has worked and what has been possible to achieve in individual projects and specific contexts through the GII-programme. The author chose the furniture industry as it is considered one of the most critical sectors in the CEE economy, particularly in Poland, where furniture account for a significant share of the country's exports (Augustyniak & Mínska-Struzik, 2018). Furthermore, the industry presents excellent opportunities for EnvU.

The study relied on multiple data sources for the analysis of the case study. Each of them provided different insights, but all contributed to increasing the validity by establishing "converging lines of inquiry" through the process of triangulation (Yin, 2003, p.35-6). The research paper is mainly based on a comprehensive document study of archival data from Innovation Norway and the Financial Mechanism Office of the EEA and Norway Grants, and interviews with both local and Norwegian firms participating in the four selected projects from the furniture industry. In addition to one interview with Innovation Norway.

The review of secondary data consists of studies of available project indicators, programme documents and final reports stored in the EEA and Norway Grants data and results portal, such as monitoring, administrative, and financial data. The EEA and Norway Grants data and results portal is a comprehensive tool that visually illustrates the results of the 2009-2014 funding period (EEA-Norway Grants, 2019). Furthermore, the "customer effect survey" conducted by Innovation Norway was used, which measured the outcomes of the GII-programme based on the degree in which it led to increased cooperation between Norwegian and domestic companies and its environmental impact. However, the GII-programme was not designed according to the GVC methodology, which posed challenges in determining the GVC integration outcomes based on archival data. To gain insight into the kind of supply chain linkages that were created post-programme, interview questions were designed such that the responses could be linked to specific firm-level GVC integration and environmental upgrading.

The interview data was collected through in-depth phone and email interviews with domestic firms in Poland and Romania, and their Norwegian project partners. Additionally, Innovation Norway was

interviewed to fill the information-gap from the secondary data regarding specific training activities organized in the GII-programme. In total, seven interviews with five key informants from Poland, Romania and Norway was conducted. All interviews were conducted between March and May 2020. For a detailed description of the archival and interview data see tables 1 and 2.

Table 1: Archival data

Name	Source	Year
GII Project descriptions	EEA and Norway Grants data and results portal (2009-2014)	2020
"End review of the EEA and Norway Grants 2009-2014"	ECORYS	2019
"Kundeeffektundersøkelsen"/ Customer effect survey	Oxford Research	2018
"Green Industry Innovation Programme Romania"	Innovation Norway	2016
"Mid-term review of the EEA and Norway Grants 2009-14"	CSES	2016
"Baseline study on bilateral relations"	NCG	2013
"Key information-Green Industry Innovation Programmes"	Innovation Norway	2012
"Regulation on the implementation of the European Economic Area (EEA) Financial Mechanism 2009-2014"	EEA and Norway Grants	2011

Table 2: Interview data

#	Project	Enterprise	Interviewee	Date	Method
1	Project 1 and 2	Romanian supplier (2)	Operational Manager	March 2020	Telephone and email interview
2	Project 1 and 2	Norwegian Lead Firm (1)	Operational Manager	April 2020	Email interview
3	Project 4	Polish supplier (2)	CEO	April 2020	Telephone interview
4	Project 4	Norwegian lead firms (1)	CEO	April 2020	Email Interview
5	Programme Operator	Innovation Norway (1)	Senior Advisor	May 2020	Email interview

In parenthesis, the number of interviews conducted.

4. The "Green Industry Innovation" programme

Norway and the European Union (EU) both advocate the principles of the sustainable development goals (SDGs) and share a common objective of creating competitive and dynamic knowledge-based economies.[1] With funding from the Norway Grants, the international business development programme "Green Industry Innovation" (GII) was implemented in eight Beneficiary countries and designed for a five year period (2009-2014). These are Bulgaria, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Slovakia. The programme has significant development outcomes in the CEE-region, and resulted in 431,610 MWh/year renewable energy production, the creation of 910 green jobs, development of 138 new environmental technologies, commercialization of 86 new environmental technologies, the adaptation and use of 100 new environmental technologies, and the creation of 88 new green services. [2]

The GII-programme was project based, and consisted of a diverse project portfolio with firms from various economic sectors and industries.The objective of the programme was to promote green growth through increasing the competitiveness of green firms by encouraging more sustainable production processes, product design and services, including the greening of existing industries, and supporting green innovation and entrepreneurship.[3] The target group of the program were SMEs. The programme consisted of a rich project portfolio of various business development projects within different economic sectors. The sectors ranged from low-tech to high-tech industries.

The core aspect of the programme was the establishment of collaborative partnerships between entities in the donor states and their counterparts in Norway, with the intention to increase knowledge sharing, gaining direct access to new markets and supply chains, and exploring the enormous potential of the green technologies sector in Europe. Innovation Norway (IN) - the Norwegian Government's most important instrument for innovation and development of Norwegian enterprises and industry has been program operator and/or donor program partner.[4] The Norwegian Ministry of Foreign Affairs (MFA) and the Enterprise Europe Network (EEN) has been regularly engaged and offered help to assist in the business matchmaking process.

4.1 Selected GII-project from the CEE furniture industry

Table 3 below presents the four selected projects from the furniture industry. Project 1 and 2 were driven by their initiative to involve their Norwegian partners, whom they previously were engaged in a buyer-supplier relationship.[5] These Norwegian furniture companies specialize in selling premium-quality furniture and use sustainability as part of their differentiation strategy. They have a vast network of suppliers around the world, mainly located in Central and Eastern Europe.[6] Project 4 received matchmaking support from Innovation Norway, more precisely, through their online partner search portal to find a partner.[7] The partner is a Norwegian furniture company selling branded design furniture, with a network of more carefully selected suppliers.[8] Common for the Norwegian lead firms in the projects is their strong focus on delivering high-quality furniture while increasing the sustainability features of their products. They have a strict code of conduct (COC) on environmental standards which suppliers are required to comply with in order to participate in their value chain. The local supplier's motivation to take part in the GII-programme were the prospects of improving their competitiveness and being able to comply with the buyers COC on environmental standards, which was a necessity to renew the supplier contracts.[9]

Table 3: **General characteristics of project studied**

	Project 1	***Project 2***	***Project 3***	***Project 4***
Country	Romania	Romania	Bulgaria	Poland
Project location	Cluj-Napoca County	Cluj-Napoca County	Sofia City Province	Mazovia Province
Project grant	€ 341 099,00	€ 247 364,00	€ 398 000,00	€ 462 500,00
Enterprise category	Large Enterprise	Large Enterprise	SME	SME
Target stage of value chain	Production	Production	Production	Design, Production
Target Product	Wood furniture	Wood furniture	Wood furniture	Wood furniture

Source: Authors.

5.Results

5.1 Evaluation of Government Grant Program Support to GVC Inclusion

5.1.1 Access to finance

The GII-programme made funding available through a non-repayable project grant. The grant was mainly advertised to SMEs, and only entities from the Beneficiary countries had the opportunity to apply for it.[10] The grants filled a "funding gap" in the Beneficiary countries, as there was little prior support from national or EU funding to the development of green industries.[11] Innovation Norway was responsible for the management of the grant, including the distribution of the funding to the projects, and providing Certifying Authorities with necessary information from domestic firms seeking to obtain certifications.[12] The total grant amount allocated to the Beneficiary countries was € 128 million[13]

The Norway grants account for approximately 50% of the planned project costs.[14] However, the practice of grant allocation varied significantly amongst Innovation Norway in the different Beneficiary countries. In Poland, the grants were calculated based on the projects expected return on investment, in Bulgarian grant rates varied between 25-85 %, while the Romanian funding grant varied between 15-60% of the planned project costs.[15] The remaining balance had to be obtained by the local firms through other sources of co-financing, such as commercial investments or bank loans. For a project to be eligible, it had to present all sources of financing before the project implementation and a budget which presented the activity division between the local and lead firm partner.[16] The budget covered lead firms involvement in the project, including travel, accommodations and training actives.

However, some weaknesses related to this pillar were discovered. Several local firms reported delay in project implementation due to challenges in finding alternative sources of co-founding. Other challenges were related to the slow implementation of projects, as many had not started until 2014 or later.[17] Significant delays also occurred with the payment of the grants. By May 2019, only 68% of the funds were distributed.[18] Although some constraints were surrounding this pillar, interviewees shared the opinion that without the Norway Grant, it would not be possible to make the necessary green investments to improve production processes and remain competitive. In the words of one domestic supplier: "without the grant, we would not have been able to finance such a costly investment project in our company".[19]

5.1.2 Access to market

The GII-programme promoted the creation of international linkages between local firms and lead firms from Norway, Iceland and Lichtenstein. The core aspect of the programme was the establishment of collaborative partnerships between the entities in the donor states and their counterparts.[20] To be considered eligible project partners, both domestic and Norwegian firms were required to share the joint ambitions of the green development objectives of the programme.[21] The announcement and application process of the programme was strongly advertised in the European Economic Area (EEA) as an excellent arena to search for business partners or suppliers in new markets, and as a strategic tool for risk reduction.[22] Overall, the grant programme consisted mostly of joint partnership projects between clients (76,6%) and suppliers (70,2%), where 40% of these collaborations resulted in the establishment of new supplier contracts.[23]

The programme facilitated the creation of linkages through an online partner search database, and various joint activities during the preparation phase to aid firms in establishing partnerships. This aid included international conferences, seminars and specialized workshops on topics of common interest, matchmaking events, study tours and visits, and short term technical cooperation and exchange of expertise.[24] Access to market was further facilitated by smaller grant support, particularly for SMEs, to cover translation and travel costs to meet potential partners.[25]

To further strengthen local firms linkages with their foreign partner, the programme supported the obtainment of various environmental, health, and managerial certifications. Innovation Norway aided firms by providing Certifying Authorities with necessary information to obtain certifications. The interviews and programme documentations highlighted the obtainment of international certifications such as ISO 14001 environment management system certification, ISO 9001 quality management system, CE health safety and environmental protection in EEA, and OHSA 18001 standard for occupational health and safety management systems.[26]

5.1.3 Access to training

The "Access to training" component of the programme was vital. Innovation Norway arranged specialized workshops and training actives within the area of managing businesses, implementing modern technological solutions, industrial cluster training, and green entrepreneurship in cooperation with both public and private actors from Norway.[27] Also, the programme included training activities within the area of corporate social responsibility (CSR) and occupational health and safety. During organized training sessions and trips to Norway, participants from the Beneficiary countries had the opportunity to get accustomed to the Norwegian perspective on CSR-related issues. The content of the actives was not predefined in the programmes design, allowing POs great freedom to design the public training activities according to the needs in their Beneficiary country— as long as it contributed to the programmes green objectives.[28]

An essential aspect of the programme was that the specialized expertise, knowledge transfer, new skillsets, and need-specific training that local firms obtained from collaborating with their Norwegian partners.[29] This training allowed domestic firms to overcome the barriers of lack of knowledge and know-how in regards to green innovation and technologies. The training provided by the Norwegian praters varied to a large extent within the individual GII-projects. The content of the project agreements reflected this, the amount of project grant obtained per project, and the specific needs of the local firms. The timeline was the same for all projects, and set to five years. Some firms had severe competitiveness constraints which required an extended intervention period, evident by the large number of firms requesting to extend the programme period, 63% of all projects asked for an extension. [30]

The training pillar was strengthened by Innovation Norway's active role as an advisor to the private entities on how to implement the projects and by monitoring their progress.[31] Through participating in the programmes training actives, both local firms and their Norwegian partners reported that they specifically gained new knowledge within the fields of improving production processes (71,1%), international cooperation (62,2%), and international market knowledge (56,8%).[32]

5.1.4 Coordination and Collaboration building

According to the GVC literature, coordination and collaboration-building efforts take place at two levels, horizontal and vertical. Horizontal coordination amongst producers facilitates the formation of producer groups needed to reach economies of scale and provide opportunities to add value to their products. In contrast, vertical coordination and collaboration refer to the interaction between actors in the chain to create linkages, and their collaboration and information sharing to strengthen the performance of the whole value chain. Horizontal coordination and collaboration-building was arranged in Romania and Bulgaria, in the form of cluster training provided by Innovation Norway for projects within energy and waste management sectors.[33] From the in-depth interviews, it emerged that there were too few projects from the furniture industry represented in the programme to arrange organized initiatives or create associations.[34] Some industries had strong representation in the programme such as the energy and waste management sectors, while other industries were represented by only a few projects.[35]

On the other hand, vertical coordination and collaboration-building was present in all three of the Beneficiary countries and was highlighted as an essential aspect of the programme. Projects were encouraged to attract a diverse range of stakeholders in the implementation process, both of whom were directly and indirectly involved with the project firms value chain.[36] Stakeholders ranged from public institutions to the general business community, regional development agencies, research and educational institutions, Norwegian project partners and their professional network. The results show that the programmes led to increased vertical collaboration-building between clients (84%), suppliers (77%), public institutions (61%), and research and educational institutions (42%). To a lesser extent, the programme led to cooperation with non-governmental organizations (NGOs) (38%).[37]

Table 4: Evaluation of the strengths and weaknesses of the programmes "four pillars"

Access to market	Access to finance
⇒ The project helped to partner domestic firms with Norwegian lead firms (potential buyers). ⇒ Programme facilitate linkages with buyers through extensive advertisement in donor countries ⇒ Establishment of a " partner search database" ⇒ Matchmaking events, and smaller travel grants to meet potential partners. ⇒ The programme helped firms to obtain certifications required by buyers.	⇒ Financing covered a " funding gap" in the Beneficiary states ⇒ Local firms received a project grant of approximately 50% of the planned project cost. ⇒ Covered costs of lead firms to conduct location-specific training
⇒ This was a strong pillar in the programme, and no major weaknesses were detected ⇒ Future programmes could strengthen this pillar, by analyzing the power structures of the lead firms prior to matchmaking, to ensure that local firms would enter an inclusive chain	⇒ The practice of grant allocation varied in the three countries ⇒ Remaining project funding had to be acquired by the firms themselves through co-financing. ⇒ Some projects reported slow programme implementation and delayed grant payments

	Coordination and collaboration building	Access to training
Programme strengths	⇒ Local firms belonging to highly represented industries in the programme were introduced to industry-specific clusters. ⇒ Programme focused strongly on the vertical level, as firms were encouraged to engage multiple stakeholder in the projects	⇒ Local firms received targeted training both from Innovation Norway and their Norwegian lead firm partner. ⇒ Innovation Norway provided mainly training within entrepreneurship and CSR, and some technical workshops ⇒ Norwegian lead firm provided specialized expertise, knowledge transfer, new skillsets, and customized training
Programme weaknesses	⇒ Difficulties in horizontal collaboration due to the extensive amount of industries represented in the Programme. ⇒ No records of local firms being introduced to industry associations	⇒ The extent of the training varied in each project and was based on agreements between local-foreign firms. Some lead firms were more engaged in the project than others ⇒ Timeline of the training/intervention was the same for all projects. It did not take into account that certain firms had severe constraints and needed extended time for support

The "Green Industry Innovation" programmes green development objectives coupled with the strong presence of the "four pillars"– proved to be an effective development tool for supporting local furniture suppliers EnvU. In the four projects from the furniture industry, all suppliers accomplished the upgrading in terms of process improvements, product improvements, and organizational improvements. See table 2 for an overview of each firms processes towards achieving EnvU. The following sections describe how the GII-programme supported the EnvU-process of the local furniture suppliers, the environmental upgrading outcomes, and the additional outcomes in terms of economic and social upgrading.

5.2 Government grant programme support to environmental upgrading

5.2.1 The environmental upgrading process of local furniture suppliers

Process improvements

Innovation Norway, in cooperation with the local suppliers and their project partners, identified several competitiveness bottlenecks concerning the suppliers environmental performance prior to the programme.[38] The most critical bottleneck for achieving EnvU was the replacement of obsolete production machinery which consumed large quantities of operational resources and produced toxic emission and waste.[39] The incremental step of the process was the necessary investments made in eco-friendly production machinery. The programme offered financial assistance (co-financing) through the Norway Grant to aid firms in implementing the project and realizing their objectives of process improvements. The need for process improvements varied across the four furniture projects and depended on their predefined competitiveness bottlenecks. The lead firm partners provided advisory to the suppliers regarding the design of the possible technical solutions.[40] Some suppliers invested in new finishing lines to optimize the furniture processing value chain, integrated a CNC-computer: a numerical control machine-able to cut designs according to the buyer's preferences, purchased premium milling tools, or invested in an automatic 3D spraying system.[41]

Product improvements

The new technological investments generated cost and consumption savings while increasing manufacturing capacity and predictability of the production processes.[42] As a result of the process improvement, local suppliers were able to significantly improve the quality of their products, and deliver safe and healthy products to the end-user.[43] The product improvements allowed the firms to extend their product portfolio by adopting new eco-designs provided by their Norwegian partners, and thus specialize in premium-quality furniture.[44]

In Project 4, the local supplier received additional support from the GII-programme in the design segment of the value chain.[45] The Norwegian partner supported the local supplier in the joint development of eco-designs for premium products.[46] Furthermore, the lead firm introduced the supplier to their extensive client and partner network, in particular, a testing centre in Germany and Austria. Innovation Norway introduced the firm to other relevant stakeholders, in this case a local university to support the development of the new designs.[47] In the words of the supplier: "Thanks to the project, we were able to create a regular design team which has been active until now. The project allowed us to become specialized in the design segment".[48]

Organizational improvements

The organizational improvements were made possible through the training initiatives provided by both Innovation Norway and the lead firms. The training consisted of environmental awareness training, technical training on quality improvements, and training of management and employees within CSR.[49] The organizational improvements were carried out in parallel with the process and product improvements, and involved:

(1) Environmental awareness building: an integral part of the projects was to raise local firms environmental awareness.[50] The local personnel received training from Innovation Norway on green entrepreneurship with a particular focus on environment protection and green business practices. The Norwegian partners provided training guided by their COC on environmental standards.[51] One interviewee shared their opinion about the awareness building: "Our management and employees gained

an entirely new attitude towards environmental issues, innovation, and improvement of existing products. The project helped us realize how important the environment is and how it impacts our firm".[52]

(2) Technical training: the use of green production technologies requires new skills in technology application, adaptation, and maintenance. Therefore, local furniture suppliers received professional technical training from their Norwegian partners, which included technical leadership, capacity building workshops, and training of local personnel in the optimal use of the eco-efficient technologies for furniture production.[53]

(3) Development of social and managerial skills: local firms received training from their project partners within CSR, health and safety standards, and quality management systems to create a better and more inclusive work environment.[54] Furthermore, Innovation Norway arranged several workshops related to CSR, both in the Beneficiary countries and through study tours to Norway. Additionally, the programme offered support to domestic firms wanting to obtain necessary certifications such as environmental, health, and managerial certifications.[55]

Table 5: Evaluation of the environmental upgrading process

	Process improvements	Product improvements	Organizational improvements
Project 1	• Investment in a new finishing line for wooden furniture and wood milling tool • Replacement of obsolete machinery	• Capacity to produce under new eco-design • Diversification of the furniture product portfolio • Improved product quality	• Compliance with buyers COC on environmental standards • Training of staff within environmental matters • Training of staff within CSR
Project 2	• Replacement of obsolete machinery • New finishing line for wooden furniture • Introduction of water based lacquers • Integration of new CNC • 3D spray painting robot	• Capacity to produce under new eco-design • Diversification of the furniture product portfolio • Improved product quality	• Compliance with buyers COC on environmental standards • Training of staff within environmental matters • Training of staff within CSR
Project 3	• Integration of waste utilization technologies • Manufacturing of own briquettes for heating • Integration of 8 new eco-friendly production machinery • Specialized software system to control production capacity	• Capacity to produce under new eco-design • Enhanced product portfolio • Increased product quality	• Obtainment of the following certifications: ISO 9001, 14001 and OHSAS 18001 • Training of staff within environmental matters • Training of staff within CSR
Project 4	• New production machinery • Installation of a green chimney and boiler • Utilizing biomass from production processes	• Development of product design capabilities • Design of new eco-friendly products • Diversification of product portfolio	• Compliance with buyers COC on environmental standards • Obtainment of CE certification • Training of staff within environmental matters • Training of staff within CSR

Source: Authors. Based on EEA/Norway Grants results portal (2009-2014) and supplemented with interview data.

5.2.2 Environmental upgrading outcomes

The Investment in cutting-edge technology for the process flow enabled local furniture suppliers to take the incremental step towards the process improvements, followed by acquiring the capabilities of producing premium-furniture products.[56] It is essential to highlight that the EnvU-process was not linear,

as the organizational improvements were present throughout the upgrading process. The outcome of the EnvU was the improvement of both the operational and environmental performance in the furniture finishing lines. Following the implementation of the project, the Bulgarian supplier (project 3) reported 20% increase in production capacity, the reduction of energy consumption per unit by 30%, and decrease of CO2 emissions by 15%, and the Polish supplier (project 4) reported an annual CO2 emission saving of 164 tons.[57]

Apart from furniture suppliers ability to comply with buyers COCs on environmental standards, two projects obtained several internationally recognized certifications.[58] Project 3 obtained the ISO 14001 environment management system certification, ISO 9001 quality management system, and OHSA 18001 standard for occupational health and safety management systems shortly after the programme.[59]. Project 4 also obtained the CE certification, which indicates conformity with health safety, and environmental protection standards in European Economic Area (EEA).[60]

The successful EnvU resulted in new supplier contracts for the interviewed projects, as premium-furniture procurers for the Norwegian lead firms.[61] One lead firm shared the opinion that the achieved outcomes of the EnvU process were essential for the extended contracts.[62] Furthermore, new linkages were established through both regional and global supplier contracts with input providers and buyers, in addition to new business partnerships through the lead firms network.[63]

5.2.3 Outcomes linking environmental upgrading with social and economic upgrading

In addition to the planned environmental achievements of the GII-programme, numerous positive but unintended social and economic outcomes were identified.[64] In terms of the social outcomes, the adoption of new technologies and chain functions required personnel with specialized skills. Several domestic firms reported that they had made new permanent hires through the implementation of the programme.[65] Furthermore, the furniture suppliers received training and skill transfer from their Norwegian project partners and Innovation Norway in awareness building, technical skills, CSR and assistance in the development of social and managerial skills. The knowledge-spillovers resulted in employees increased awareness of health, safety and labour standards. The implementation of the new production machinery improved the working conditions in the factories through reduced wood emission,

leading to a cleaner and healthier work environment and increased work satisfaction.[66] Project 1 and 2, reported that the eco-friendly machinery facilitated women's access to the furniture finishing lines, as they proved to be safer in use.[67] Project 3 also fulfilled the requirements of OHSAS 18001 Occupational health and safety management system.[68] However, there were no records of the EnvU leading to increased incomes for the local employees. The lack of coordination and collaboration building on a horizontal level, resulted in no organized social actives amongst suppliers or the creation of the furniture-specific association.

Following the EnvU, suppliers achieved significant economic outcomes. The investment in eco-friendly production machinery lead to cost savings as the consumption of energy, raw materials for finishing, and waste disposal was reduced.[69] The new production machinery required less maintenance and thus fewer labour hours, which resulted in additional cost savings. Project 1 and 2 reported a capacity increase of 42%, which allowed them to meet the production demands of their Norwegian partner.[70] Project 3 reported a decrease in production cost by 25% following the implementation of the project.[71] The EnvU resulted in the optimization of processes and increased the product quality, which allowed the domestic firms to pass along increased costs to their buyers.[72] Project 4 increased its revenue by "moving up the value chain" and specializing in the design segment.[73] Suppliers from projects 3 and 4 reported that the annual growth of their companies had double since the programme start, and was a direct result of the modernization and increased production capacity in the companies.[74] "The most significant indirect outcome from the project was the turnover growth. Since we joined the programme, our turnover has grown by 65%, which means that we have more than doubled during the project period".[75]

6. Discussion, policy recommendations and conclusion

6. 1 Can government grant programmes support GVC inclusion and environmental upgrading?

The study addressed the research question: **"**How can government grant programmes support local suppliers integration and environmental upgrading within GVCs?" With this purpose, the author studied the case of the Norway Grants funded "Green Industry Innovation" programme, more precisely the

programmes joint partnership projects between local suppliers and Norwegian lead firms. To address the research question, the paper builds on the GVC framework, the "four pillars" model by Fernandez-Stark *et al*. (2012).

It is essential to highlight the limitation of the study. The study focused on one particular industry within the "Green Industry Innovation" programme when assessing its support for EnvU. This might challenge the external validity of the analysis. Further analysis should be concerned with comparing different industries within the programme and other empirical contexts to investigate how government grant programmes can support local firms upgrading and GVC integration. The following section discusses the case study by summarizing the main findings and contributing to the "four pillars" model by integrating the concept of upgrading as a critical component for achieving sustained inclusion in GVCs.

The "Green Industry Innovation" programme is part of a growing trend of new industrial policies that integrate public-private collaboration into the development of effective policies and programmes in emerging countries. The programme had a strong focus on the "access to market" pillar through strategic collaboration, by creating linkages and prioritizing projects with lead firms where their strategies were in line with the local firm's needs and that had the potential of achieving green development. This highlight the importance of industrial policies that go beyond the focus of merely granting local firms access to GVCs, as this might lead to shallow integration (Ponte *et al*., 2019). According to recent GVC literature, governments can play a crucial role in organizing public-private initiatives which ensure that lead firms strategies are enabling upgrading prospects to local firms in their specific GVCs (ibid.).

The programmes "financial pillar" enabled lead firms to engage in the EnvU process at a *deeper* level. They were driven by the benefits of receiving part of the project grant as payment for undertaking the location-specific training as well as strengthening the environmental performance of possible future suppliers. More in-depth strategies to upgrading processes, including EnvU, happens when buyers provide substantial technical support and engage hands-on with their suppliers (Ponte, 2019). The benefits of such support is that it is more likely to result in a substantial reduction in the environmental impact of the final product (De Marchi, 2013). In the case of the GII-programme, local firms received experience-based knowledge from both the lead firms and Innovation Norway in eras

such as manufacturing design, management of cutting-edge technology and systems, and organizational know-how.

The supplier's motivation behind the EnvU-process was ultimately to extract more value within their value chain by becoming competitive and acquire the capabilities needed to comply with buyers COC on environmental standards. This finding is in line with previous studies on environmental upgrading (De Marchi *et al.,* 2019), which highlight that local firms are driven by both *internal* drivers-prospects of increased competitiveness, and *external* -pressure from lead firm demands. Through implementing the environmentally friendly technology, local firms were able to significantly cut the production cost as the consumption of energy and raw materials were reduced. The new production machinery required less maintenance and thus fewer labour hours, which resulted in additional cost savings. However, this might not lead to economic gains for the local firms. Khattak *et al*. (2015) discovered that lower operational cost through EnvU does not automatically lead to higher prices from the buyers. This finding suggests that EnvU by itself is not sufficient to lead to economic benefits and higher added-value for local firms.

The most significant outcome of the EnvU-processes was local suppliers ability to build export capacities and specialize in producing premium-furniture. This outcome can be linked to economic upgrading. The premium products allowed the firms to extend their supplier contracts with their Norwegian partner, pass along increased costs to their buyers and access new regional and international markets. This outcome further suggests that EnvU by itself might not be sufficient to achieve integration within GVCs. It was ultimately the combination of the economic upgrading dimension that resulted in GVC inclusion. The focus on building export capabilities and capacities in a specialized GVC niche is highlighted by Gereffi & Sturgeon (2013) as an effective industrial policy for capturing value from GVC participation. One can argue that apart from attracting eligible lead firms who can provide local industries with the prospect of upgrading, the role of governments as market facilitators should be extended to strategically searching for specialized GVC niches of higher-value-added activities.

Another critical element emerging from the analysis of EnvU in the furniture industry is that government grant programmes cannot view the environmental, economic and social upgrading dimensions separately. This argument is supported by Khattak & Pinto (2018), who highlight that the

future research agenda should additionally integrate and address the three dimensions of upgrading into the GVC analytical framework. The analysis made it evident that integrating green technologies led to opportunities for economic and social development, such as improved health of workers, workplace gender equality, and efficiency in the production. However, the programmes lack of understanding of the synergies between the upgrading dimensions resulted in missed development opportunities. The GII-programme was unable to increase local suppliers incomes or create the foundation for a strong furniture association that could increase the local firm's bargain power in GVCs.

Industrial policies and programmes aimed at supporting the inclusion of local suppliers in GVCs can be strengthened by governments who plays an active role in *strategically facilitating* linkages with eligible lead firms and supporting local firms to access different end-market niches (both regional and global) or moving into higher-value-added activities. The results of the study indicate that integration into specialized GVCs may require certain forms of upgrading dimensions as perquisites. Therefore, integrating *economic, social* and *environmental* upgrading dimensions within the design of business development programs can result in more sustained GVC participation. Governments that understand the synergies and mutual trade-offs between the upgrading dimensions, can magnify sustainable development outcomes and secure more long-standing GVC integration of domestic firms.

6.2 Policy recommendations

Some lessons for future programmes and projects are drawn from the findings of this study and may be amendable to policy recommendations:

6.2.1 Including a GVC-oriented perspectives to industrial development

The GII-programme was unable to offer horizontal coordination and collaboration to all industries. One can assume that this was due to the extensive amount of industries represented in the programme. Adopting a GVC-oriented approach can be beneficial in business development programmes, as it offers targeted support to a few selected industries. Thus it can be easier to coordinate collaborating building

activities, assessing competitiveness constraint of the firms, and measuring the impact of the programme on upgrading and integration in GVCs.

6.2.2 Additional support for the search of co-financing

As revealed in the evaluation of the "access to finance" pillar, several domestic firms, in particular SMEs, faced constraints in finding additional sources of co-financing. The secondary data analysis and interviews indicate that the role of the state was somewhat limited in supporting firms in finding alternative sources of project financing. On that background, a suggestion is the need for programmes that support SMEs access to bank loans through a separate independent funding scheme that guarantees local firms partially grant funding to reduce the obstacles associated with banking procedures.

6.2.3 Include possibilities of firm heterogeneity into the programme design

Government grant programmes must take into account that there are significant variations between local firms, even within the same industries. This has implications for the programme design. Local firms will require different programme timelines to upgrade and integrate within GVCs. Timelines that are based on their firm-specific competitiveness constraints and capabilities. Programmes should take a pragmatic approach and consider extending the final deadlines for completion of projects, as it is likely to increase the potential of impacts considerably.

6.3 Conclusion

This article examined the "Green Industry Innovation" programme funded by the Norway Grants to shed new light on how government grant programmes can support local suppliers environmental upgrading and integration within GVCs. To date, the literature has focused on the influential role of lead firms, with limited attention paid to states as active development actors in GVCs. This case study findings suggests that by addressing the "four pillars" to local firms constraints in combination with strategic public-private collaboration, the "Green Industry Innovation" programme was an effective tool in supporting local furniture suppliers environmental upgrading and integration within GVCs.

The major finding from this study is that governments can strengthen their support to local firms by being more strategic in their role as a *market facilitators*. Governments should ensure that lead firms strategies are enabling upgrading prospects to local firms in their specific GVCs. Additionally, the role of the government must include activities related to seeking out and attracting specialized GVC niches of higher-value-added activities. These findings are supporting the novel theories of GVC-oriented industrial policies by Gereffi & Sturgeon (2013).

Furthermore, the study suggests that integrating into specialized GVCs may require specific forms of upgrading dimensions as perquisites, similar to Pietrobelli & Staritz (2017) findings in their study of upgrading in value chain interventions. The local firms successful regional and global GVC integration was a result of both environmental and economic upgrading. Therefore, governments who understand the synergies and mutual trade-offs between the upgrading dimensions and integrate them within the design of business development programs, stand a higher chance at magnify sustainable development outcomes and securing local firms sustained GVC integration.

This study contributes to the extant literature in several aspects. The knowledge obtained through this research has further shed light on the growing importance of states role in shaping development outcomes in GVCs. The findings in the study may be used to expand the global value chain framework, the "four pillars" model, to include the upgrading dimensions. The importance of incorporating the upgrading dimensions within a framework of business support has been highlighted as essential because the failure of supporting local firms to develop the capacity needed to upgrade, can condemn them to increased economic activity but with declining incomes (Kaplinsky, 2015). Economists and policymakers are incorporating the GVC framework as a significant development paradigm in emerging countries. The author believes that the findings from the study can offer relevant policy lessons for future international business development programs. Both in terms of the success and obstacles discovered in the programme—thus further contributing to the development of new GVC-oriented industrial policies at country, regional and national level.

Acknowledgements

This article is part of my master thesis dissertation on government grant programmes support to local firms environmental upgrading and integration within GVCs, which was carried out at the Department for Marketing Strategy and Management, Nord University Business School. I am especially indebted to my supervisor, Christel Elvestad, for the guidance and helpful comments on earlier versions of this article.

References

Augustyniak, D. & Mínska-Struzik, E.(2018). The competitiveness of Polish furniture exports, *Drewno*, vol. 61, pp. 21-38.

Barrientos, S., Gereffi, G., & Rossi, A. (2011). Economic and social upgrading in global production networks: A new paradigm for a changing world. *International Labour Review*, vol. 150(3-4), pp.319-340.

Behuria, P. (2019). The Domestic Political Economy of Upgrading in Global Value Chains: How politics shapes pathways for upgrading in Rwanda's coffee sector. *Review of International Political Economy,* vol. 27(2), pp.348-376

Cieślik, E. (2014). Post-communist European countries in global value chains, *Ekonomika,* Vol. 93(3), pp. 25-38.

Clarke, T. and M. Boersma. (2015), The governance of global value chains: unresolved human rights, environmental and ethical dilemmas in the Apple supply chain, *Journal of Business Ethics*, vol. 143 (1), pp.111–31.

CSES. (2016). *Mid-term review of the EEA and Norway Grants 2009-14*. Retrieved from https://www.regjeringen.no/contentassets/17c16170595b473ab59c7edc5c0208a7/2009-14-midtveisgjennomgang-februar-2017.pdf

De Marchi, V. , Maria, E., Krishnan, A., Ponte, S., and Barrientos, S.(2019), Environmental upgrading in global value chains, ch. 19, p. 310-323 in *, Handbook on Global Value Chains*, Edward Elgar Publishing

De Marchi, V., Di Maria, E., & Micelli, S. (2013). Environmental Strategies, Upgrading and Competitive Advantage in Global Value Chains. *Business Strategy and the Environment*, vol.22(1).

Economic Bulletin (ECB). (2017). The impact of global value chains on the macroeconomic analysis of the euro area, Issue 8.

ECORYS. (2019). *End review of the EEA and Norway Grants 2009-2014".* Retrieved from https://eeagrants.org/sites/default/files/resources/End%2BReview%2B2009-2014%2BFinal%2BReport_for%2Bpublication.pdf

EEA and Norway Grants. (2011). *Regulation on the implementation of the European Economic Area (EEA),Financial Mechanism 2009-2014.* Retrieved from https://eeagrants.org/resources/regulation-implementation-norway-grants-2009-2014-annex-1-eligible-programme-areas

Fernandez-Stark, K., Bambler, P. and G. Gereffi.(2012). Inclusion of Small- and Medium-Sized Producers in High-Value Agro-Food Value Chains. Duram N.C.: Duke University Center on Globalization, Governance & Competitiveness for the Inter-American Development Bank Multilateral Investment Fund (IBD-MIF).

Gereffi, G. (2019). Global value chains and international development policy: Bringing firms, networks and policy-engaged scholarship back in, *Journal of International Business Policy* vol.2, pp.195-210.

Gereffi, G. and Fernandez-Stark, K. (2016). *Global Value Chain Analysis: A primer* (2nd ed.). Center on Globalization, Governance & Competitiveness. North Carolina, USA: Duke University.

Gereffi, G., and Sturgeon, T. (2013). Global value chain-oriented industrial policy: the role of emerging economies. Chapter 14 in D. Elms & P. Low (Eds.) *Global value chains in a changing world*, WTO Publications: Geneva, pp.329-360.

Gereffi, G. (2005). The global economy: Organization, governance, and development. In Neil J. Smelser and Richard Swedberg (eds.), *The Handbook of Economic Sociology* (pp. 160-182). 2nd edition, Princeton, NJ: Princeton University Press.

Horner, R., and Alford, M.(2019). The roles of the state in global value chains: an update and emerging agenda. Global Development Institute Working Paper Series; No. 2019-036, pp.1-26.

Horner, R.(2017).Beyond facilitator? State roles in global value chains and global production networks, *Geography Compass,* vol. 11 (2).

Humphrey, J. & Schmitz, H. (2002). How Does Insertion in Global Value Chains Affect Upgrading in Industrial Clusters?. *Regional Studies,* 36(9): 1017-1027.

Innovation Norway.(2016). *Green Industry Innovation Programme Romania*. Retrived from https://www.innovasjonnorge.no/

Innovation Norway. (2012). *Key information-Green Industry Innovation Programmes*. Retrieved from https://www.innovasjonnorge.no/globalassets/old/pagefiles/26321/green-industry-innovation.pdf

Kaplinsky, R. (2015). Technological upgrading in global value chains and clusters and their contribution to sustaining economic growth in low and middle income economies, Research, statistics and industrial policy branch working paper 3/2015.

Khattak, A., and Pinto, L. (2018). A Systematic Literature Review of the Environmental Upgrading in Global Value Chains and Future Research Agenda. *Journal of Distribution Science*. vol.16, pp.11-19.

Khattak, A., C. Stringer, M. Benson-Rea and N. Haworth.(2015). Environmental upgrading of apparel firms in global value chains: evidence from Sri Lanka, *Competition and Change*, vol. 19 (4), pp. 317–35.

Larsen, M, N. (2016). Sustaining Upgrading in Agricultural Value Chains? State-Led Value Chain Interventions and Emerging Bifurcation of the South Indian Smallholder Tea Sector, *Journal of Sustainability,* vol.8, pp.1-19.

NCG.(2013). *Baseline study on bilateral relations.* Retrieved from https://eeagrants.org/sites/default/files/resources/2009-2014%20Baseline%20study%20on%20bilateral%20relations.pdf

OECD-UNIDO.(2019).Integrating Southeast Asian SMEs in Global Value Chains: Enabling Linkages with Foreign Investors. Paris: OECD.

Oxford Research. (2018). Tilbake til normalen? Innovasjon Norges Kundeeffektundersøkelse 2017-Førundersøkelsen.

Pietrobelli, C., and Staritz, C. (2017). Upgrading, Interactive Learning, and Innovation Systems in Value Chain Interventions, *European Journal of Development Research.*

Ponte, S. (Eds.). (2019). Business, *Power and Sustainability in a world of Global Value Chains*, Zed Books, London.

Ponte, S., Gereffi, G., and Raj-Reichert, G. (Eds.).(2019). *Handbook on Global Value Chains*. Cheltenham: Edward Elgar Publishing.

Radosevic, S. (2017). Upgrading technology in Central and Eastern European economies, *IZA World of Labor*, issue , number 338.

Taglioni, D. and Winkler, D. (2016). Making Global Value Chains Work for Development. The World Bank: Washington.

Tokatli, N. (2012). Toward a better understanding of the apparel industry: a critique of the upgrading literature. *Journal of Economic Geography*, vol. 3(6),pp. 993-101.

Van Assche, A., and Van Biesebroeck, J. (2018). "Functional upgrading in China's export processing sector." *China Economic Review*, vol.47, pp. 245-262.

Yin, R. K. (2003). *Case study research. Design and Methods* (2nd ed.). Thousand Oaks, CA: Sage Publication.

Notes

[1] EEA Grants 2019, Retrieved March 2020, 2019, from https://eeagrants.org/

[2] EEA/Norway Grants results portal (2009-2014); ECORYS, 2019

[3] EEA Grants 2019, Retrieved March 2020, from https://eeagrants.org/

[4] Innovation Norway, 2019, Retrieved April 2020, from https://www.innovasjonnorge.no/

[5] Interview/March 2020/ Romanian supplier, 1/ Interview/April 2020/

[6] Interview/April 2020/ Norwegian lead firm 2/ Operational Manager

[7] Interview/April 2020/ Polish supplier, 3/ CEO

[8] Interview/March 2020/ Romanian supplier, 1/ Interview/April 2020/ Norwegian lead firm 2/ Operational Manager

[9] Interview/March 2020/ Romanian supplier, 1/ Operational Manager; Interview/April 2020/ Polish supplier, 3/ CEO

[10] EEA-Norway Grants, 2011

[11] ECORYS, 2019

[12] EEA-Norway Grants, 2011

[13] ECORYS, 2019

[14] Oxford Research, 2018

[15] Innovation Norway, 2012; CSES, 2016

[16] EEA Grants 2019, Retrieved March 2020, 2019, from https://eeagrants.org/

[17] CSES,2016

[18] CSES, 2016

[19] Interview/April 2020/ Polish supplier, 3/ CEO

[20] EEA Grants 2019, Retrieved March 2020, 2019, from https://eeagrants.org/

[21] EEA Grants 2019, Retrieved March 2020, from https://eeagrants.org/

[22] EEA-Norway Grants, 2011/ EEA-Norway Grants, 2016

[23] Oxford Research, 2018

[24] NCG, 2013

[25] Innovation Norway, 2019, Retrieved April 2020, from https://www.innovasjonnorge.no/

[26] EEA/Norway Grants results portal (2009-2014)

[27] Personal communication, May 4, 2019

[28] Interview/May 2020/ Innovation Norway, 5/ Senior Advisor

[29] CSES, 2016

[30] CSES, 2016

[31] Interview/May 2020/ Innovation Norway, 5/ Senior Advisor

[32] Oxford Research, 2018

[33] Oxford Research, 2018

[34] Interview/March 2020/ Romanian supplier, 1/ Operational Manager; Interview/April 2020/ Polish supplier, 3/ CEO

[35] EEA/Norway Grants results portal (2009-2014)

[36] Innovation Norway, 2016

[37] Oxford Research, 2018

[38] Interview/March 2020/ Romanian supplier, 1/ Operational Manager;
Interview/April 2020/ Polish supplier, 3/ CEO; Interview/April 2020/ Norwegian lead firm 2/ Operational Manager; Interview/April 2020/ Norwegian lead firm ,4/ CEO

[39]Interview/March 2020/ Romanian supplier, 1/ Operational Manager;
Interview/April 2020/ Polish supplier, 3/ CEO; Interview/April 2020/ Norwegian lead firm 2/ Operational Manager; Interview/April 2020/ Norwegian lead firm ,4/ CEO; EEA/Norway Grants results portal (2009-2014)

[40]Interview/Norwegian lead firm 2/ Operational Manager; Interview/April 2020/ Norwegian lead firm ,4/ CEO; EEA/Norway Grants results portal (2009-2014)

[41] EEA/Norway Grants results portal (2009-2014)

[42] EEA/Norway Grants results portal (2009-2014)

[43] EEA/Norway Grants results portal (2009-2014); Interview/March 2020/ Romanian supplier, 1/ Operational Manager; Interview/April 2020/ Polish supplier, 3/ CEO; Interview/April 2020/ Norwegian lead firm 2/ Operational Manager; Interview/April 2020

[44] Interview/March 2020/ Romanian supplier, 1/ Operational Manager; Interview/April 2020/ Polish supplier, 3/ CEO

[45] EEA/Norway Grants results portal (2009-2014); Interview/April 2020/ Polish supplier, 3/ CEO

[46] Interview/April 2020/ Norwegian lead firm ,4/ CEO

[47] Interview/April 2020/ Polish supplier, 3/ CEO

[48] Interview/April 2020/ Polish supplier, 3/ CEO

[49] Interview/March 2020/ Romanian supplier, 1/ Operational Manager; Interview/April 2020/ Polish supplier, 3/ CEO; Interview/April 2020/ Norwegian lead firm 2/ Operational Manager; Interview/April 2020/ Norwegian lead firm ,4/ CEO; EEA/Norway Grants results portal (2009-2014)

[50] EEA Grants 2019, Retrieved March 2020, 2019, from https://eeagrants.org/

[51] Interview/Norwegian lead firm 2/ Operational Manager; Interview/April 2020/ Norwegian lead firm ,4/ CEO; EEA/Norway Grants results portal (2009-2014)

[52] Interview/March 2020/ Romanian supplier, 1/ Operational Manager

[53] EEA/Norway Grants results portal (2009-2014); Interview/March 2020/ Romanian supplier, 1/ Operational Manager; Interview/April 2020/ Polish supplier, 3

[54] Interview/March 2020/ Romanian supplier, 1/ Operational Manager; Interview/April 2020/ Polish supplier, 3/ CEO

[55] EEA-Norway Grants, 2011

[56] Interview/March 2020/ Romanian supplier, 1/ Operational Manager; Interview/April 2020/ Polish supplier, 3/ CEO

[57] Interview/March 2020/ Romanian supplier, 1/ Operational Manager; Interview/April 2020/ Polish supplier, 3/ CEO; EEA/Norway Grants results portal (2009-2014)

[58] EEA/Norway Grants results portal (2009-2014); Interview/April 2020/ Polish supplier, 3/ CEO

[59] EEA/Norway Grants results portal (2009-2014)

[60] EEA/Norway Grants results portal (2009-2014); Interview/April 2020/ Polish supplier, 3/ CEO

[61] Interview/March 2020/ Romanian supplier, 1/ Operational Manager; Interview/April 2020/ Polish supplier, 3/ CEO

[62] Interview/April 2020/ Norwegian lead firm 2/ Operational Manager

[63] Interview/March 2020/ Romanian supplier, 1/ Operational Manager; Interview/April 2020/ Polish supplier, 3/ CEO

[64] ECORYS, 2019

[65] Interview/March 2020/ Romanian supplier, 1/ Operational Manager; Interview/April 2020/ Polish supplier, 3/ CEO; EEA/Norway Grants results portal (2009-2014)

[66] EEA/Norway Grants results portal (2009-2014); Interview/March 2020/ Romanian supplier, 1/ Operational Manager;

[67] Interview/March 2020/ Romanian supplier, 1/ Operational Manager

[68] EEA/Norway Grants results portal (2009-2014)

[69] EEA/Norway Grants results portal (2009-2014)

[70] EEA/Norway Grants results portal (2009-2014)

[71] EEA/Norway Grants results portal (2009-2014)

[72] EEA/Norway Grants results portal (2009-2014); Interview/March 2020/ Romanian supplier, 1/ Operational Manager; Interview/April 2020/ Polish supplier, 3/ CEO

[73] Interview/April 2020/ Polish supplier, 3/ CEO

[74] Interview/April 2020/ Polish supplier, 3/ CEO; EEA/Norway Grants results portal (2009-2014)

[75] Interview/April 2020/ Polish supplier, 3/ CEO

Appendix A- Semi-structured interview guide

Theme	Questions for local suppliers
Mapping the Global Value Chain	1. What is the structure of your products /services value chain according to the guidelines of the following example ? (*assessing position in value chain)* **Inputs** **Production** **Selection & Packaging** **Processing** **Distribution & Marketing** 2 .What is the geographical spread of your firms activities? *a.* Does your firm have any foreign clients/buyers? *(identification of chain actors)* b. Does your firm import raw materials from foreign firms? *(identification of chin actors)*
Firms constraint to GVC inclusion	3. Before entering the program, what bottlenecks did your company face that affected your competitiveness in the industry? 4. Did you experience challenges in establish relationship with foreign partners due to your competitiveness bottlenecks?
Government grant program- **Government Support**	5. Did your firm receive support to establish project-partnership with Norwegian firm through the program? a. What were the intended effects of partnering up with the Norwegian firm? 6. Did you receive financing from the programme? 7. Did your receive support to find relevant partners ,e.g. public/private stakeholders/ firms, to expand your network within the industry?
Government grant program- **Private Sector Support (MNE)**	8. Did your firm receive specialized training from the Norwegian project-partner to overcome the green competitiveness bottlenecks? a. What specific training did you receive?

Environmental Upgrading (EnvU)	9.What "green outcomes" (environmental upgrading) did your firm experience through participating in the government grant programme? a. Were there green outcomes that improved your firms processes? b. Did you experience improvement in your products as an green outcome of the program? c. Did you experience changes in the organizational performance based on the green outcomes?
GVC integration outcomes **&** **Significance of firms Environmental upgrading on GVC integration**	10. What new business opportunities did your firm experience after the government grant programme? and more specifically: a. How the collaboration with the Norwegian firm evolve after the program ended? (e.g. supplier contracts, or linkages, i.e. joint ventures, acquisitions etc.) b. Did you establish linkages/business relationships to other foreign/domestic firms post programme? c. Did your firm evolve to become a lead firm post programme? (explain lead firm concept) **Measuring firm-level GVC integration (see appendix, table x)** 11. How significant were the "green outcomes" (upgrading) for the competitiveness of your firm and post-program regional/global business opportunities 12. Did your firm engage in new value chain-activities in services as a result of the program? (e.g. R&D or marketing)

Theme	**Questions for lead firm**
Training support	1. What specific competitiveness constraints did the local firm face? 2. How did you support the local firm to overcome their green competitiveness constraints? 3. What joint achievement did you accomplish regarding the greening of the local firms?
GVC integration **&**	3. Do you have any specific qualifications and/or resources expectations that domestic firms need to fulfill in order to engage in business opportunities with your firm?

Significance of firms Environmental upgrading on GVC integration	4. How would you characterize the business relationship you have with the domestic firm today? 5. How significant were the "green outcomes" (upgrading) for the post-program business opportunities with the domestic firm?

Appendix B- Code development

Romanian supplier (Project 1and 2)	**1**
Polish supplier (Project 4)	**2**
Norwegian Lead firm (Project 1and 2)	**3**
Norwegian Lead firm (Project 4)	**4**

Themes	Categories	Relevant Codes
Competitiveness Bottlenecks	**Access to market**	- Poor positioning in the European market **1,2** - lack of exposure **1,2** - Reduced growth in export **1** - Inability to comply with environmental and quality standards **1,2,3,4**
	Production bottlenecks	- Old production machinery **1,3** - Toxic emission and waste **1,3** - Inefficient production flow **1,2,3,4** - poor capacity **1,3** - Lack of new technology **1,2,3,4** - Inability to finance expensive production equipment **1,2,3,4**
	Product bottlenecks	- Lack of eco-innovative product solutions **2,4** - Poor compliance with environmental and quality standards of products **1,2,3,4** - Lack of certifications **1,2,3,4**
	Internal operation	- Unqualified personnel **1,2** - Insufficient environmental knowledge among workers **1,2,3,4** - Lack of training **1,2,3,4** - Lack of workforce **2,4** - Poor labour, health and safety standards **1,2,3,4**
Four Pillars	**Access to Market**	- Public project website **1,2** - Awareness raising campaigns 1,2 - Matchmaking events with Norwegian companies **1,2** - Access to Norwegian market **1,2** - Travel support to meet potential partners **1,2**
	Access to Finance	- Non-repayable grant **1,2** - Co-financing **1,2**

		- Presentation of project budget to receive grant **1,2**
	Access to Coordination & Collaboration Building	- Collaboration with various stakeholders **1,2** - Access to testing centre through lead firm network **2**
	Access to training	- Technical leadership training **1,2,3,4** - Technical expertise **1,2,3,4** - Design of technical solutions**1,2,3,4** - Professional training of company staff **1,2,3,4** - Joined design activities **2,4** - CSR **1,2,3,4**
Environmental Upgrading	**Process improvements**	- Optimization of process flow and production capacity **1,2** - Reduction of CO2 emissions **1,2,3,4** - Waste reduction **1,2,3,4** - Reduction in energy and raw material consumption **1,2** - Cost improvements from increased efficiency **1,2** - New environmentally friendly production machinery **1,2,3,4**
	Product improvements	- Development of eco-products with Norwegian partner **2,4** - Increased product quality **1,2,3,4** - Product diversification **1,2,3,4** - New products in portfolio **1,2,3,4**
	Organizational improvements	- Improved quality of health and labor standards **1,2,3,4** Achievement of certifications: - CE **2** - New hires **1,2** - Increased CSR **1,2,3,4**

GVC Integration	**Supplier Linkages**	- Supplier contracts with Norwegian partner (Forward linkages) **1,2,3,4** - Access to new markets though new supplier contracts (Forward linkages) **1,2** - Regional suppliers contracts **1,2** - Access to new input suppliers (Backward linkages) **1** - Joint R&D activities with partner-firms abroad **2**