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# A Systematic Literature Review of the Environmental Upgrading in Global Value Chains and Future Research Agenda

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## Abstract

**Purpose** - The purpose of this study is to provide a systematic literature review related to environmental upgrading in Global Value Chains (GVCs) and suggest possible future research agendas in advancing environmental upgrading and ultimately GVC boundaries.

**Research design, data, and methodology** - The academic databases such as Science Direct, EBSCO, ProQuest and Google Scholar were explored using a structured keywords searches to identify relevant research in the environmental upgrading area in GVCs. Only relevant papers were selected after reading the abstracts, and analyzed using qualitative content analysis.

**Results** - Overall analysis of the literature review suggests two critical developments in the field of environmental upgrading. The first and foremost major development is an enhanced understanding of environmental upgrading as a concept and phenomenon. The second significant development is that environmental upgrading has been empirically proven to be fundamentally based on relationships and power structures within GVCs.

**Conclusions** - Environmental upgrading in GVCs has been studied individually and not in relation to financial outcomes and social upgrading. Hence, the relationship of environmental upgrading with financial outcomes and social upgrading needs to be investigated. Furthermore, the impact of the interaction of varying institutional structures on environmental upgrading is worthy of future study.

**Keywords:** Governance, Global Value Chains (GVCs), Systematic Literature Review, Environmental Upgrading, Institutions, Future Research Agenda.

**JEL Classifications:** F23, F36, L23, F01, F02.

## 1. Introduction

Significant changes have taken place in the world economy during the last two to three decades and especially in the ways and means of production and international trade among countries and businesses in general. There is no doubt that information technology, the low cost of communication and reduced global trade barriers are a few among many of the primary drivers behind such changes. Similarly, the role of global firms in the form of Multinational Corporations (MNCs) cannot be neglected in

this whole restructuring processes. One such change, is the emergence of functionally integrated but globally dispersed industrial networks which now constitute more than 80% of the world trade (UNCTAD, 2013). This phenomenon of the changing character and geography of the international production and trade has given rise to a whole new field of analysis; Global Value Chain (GVC), in the discipline of political economy (Bair, 2009). The GVC analysis provides an essential analytical and methodological tool to explain the dynamics of economic globalization and international trade (Bair, 2009; Gereffi, Humphrey, & Sturgeon, 2005; Neilson, 2008; Quan, 2008). It has attracted attention from different researchers and research institutions including non-governmental organizations such as the Industrial Performance Centre at Massachusetts Institute of Technology (MIT), the Institute of Development Studies (IDS) in Sussex, the Centre for Development Research in Copenhagen,

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Oxford Committee for Famine Relief (OXFAM) (Plahe, 2005), and Brooks World Poverty Institute, The University of Manchester.

There is extensive research and theory-building taking place around the GVC framework and related constructs, for example, economic and social upgrading. However, we could not find an in-depth review of the environmental upgrading construct, being the most under-investigated area in the GVC literature. Hence, there is a need to systematically review the theoretical progress taken place since the inception of the environmental upgrading in GVC framework and, identify future research directions advancing environmental upgrading and ultimately GVC research boundaries. Economic upgrading means improving product quality, process innovation and garnering marketing skills. Social upgrading encompasses improving the rights and entitlements of workers as social actors and the quality of their employment (Sen, 2000). Whereas, environmental upgrading in GVCs is defined as improving environmental performance through changes in technological, social and organizational processes with the intention of avoiding or reducing overall environmental impacts (Khattak, Stringer, Benson-Rea, & Haworth, 2015). Recently, Hernández and Pedersen (2017) attempted to provide an in-depth review of the GVC approach and a future research agenda. However, there is still some potential for the explanation of updated research, especially related to literature enhancement, with particular reference to environmental upgrading in GVC. Hence, this paper provides an in-depth description of environmental upgrading, at the same time highlighting major theoretical developments around the construct. The paper concludes with the identification of missing elements and possible contributions that could be made. The main contributory value of this paper lies in it being an in-depth, updated and the state-of-the-art literature review of environmental upgrading of GVC, which could be used by researchers and practitioners alike, for potential related future research.

## 2. Methodology

The literature review presented in this paper is based on a systematic analysis of all known research and developments in the environmental upgrading domain from 2009 until the end of 2018 (since the inception of the concept until now). Meredith (1993) reported that a literature review is a summary of the extant literature by identifying the focus of research, trends, and issues from past research. According to Tranfield, Danyer, and Smart (2003), the purposes of the literature review are the consolidation of the intellectual structure of an identified field and identifying the key knowledge gaps and opportunities to address them. Following that rationale, a systematic literature review process has been adopted in this paper. The following steps

recommended for conducting a literature review were followed: (a) identification of sources of information, (b) identification of articles and other research, and (c) identification of reviews of items (Hart, 2011).

The current study focuses on academic peer-reviewed published papers, working papers, and books, including book chapters related to environmental upgrading literature in GVCs. The literature search confined itself only to research published in the English language from 2009 to 2018. The academic databases such as Science Direct, EBSCO, ProQuest and Google Scholar were explored using a structured keywords search to identify relevant research in the environmental upgrading area. For this selection, three criteria were taken into account: (i) researchers in the social and management sciences use these databases most frequently; (ii) the databases can be accessed at the library at the authors' university; (iii) a mix of database types (e.g., citation databases, publisher databases, and subject area databases) was required. Accordingly, the keywords or terms "environmental upgrading" and "environmental upgrading in global value chains" were used for the search processes. The reason for using these keywords came from their adoption and prevalence in previous literature reviews conducted by other researchers; also, additional relevant publications were obtained through references cited in the papers identified through the database search. The reason for that was to ensure that unintended omissions are avoided, and all the relevant papers have been included in the study.

The keyword search across the databases and cross-referencing procedure to collect the literature on environmental upgrading in GVCs resulted in over a hundred papers and other research outputs. According to Jahangirian, Eldabi, Naseer, Stergioulas, and Young (2010), reading the abstracts was adopted to eliminate irrelevant papers from the selection. Many papers that did not match precisely or did not fall under the category of environmental upgrading in the GVCs were removed from the purview of this study. Only relevant papers and research were selected and, hence the number came down to 11 articles and 1 book chapter. There is a theoretical possibility of the existence of some subjectivity involved in deciding which articles actually belong to the domain of environmental upgrading in GVCs, but to avoid that careful segregation and, collection was made.

Further to the above mentioned logical and objective method for the identification of developments in the environmental upgrading area, a subjective way was also employed; alerts were set in Google Scholar since 2009 and every research work including "environmental upgrading" as a keyword was received by email. Each of the papers and research received through alerts was read and reviewed in relation to GVC. In case the paper or research was related to the GVC, it was added to the folder created for this purpose with the title of "environmental upgrading in GVCs".

In this way, a comprehensive list of all papers and other research work was generated. All papers and other research were analyzed using qualitative content analysis and, major themes were generated, which are discussed in-depth in the review section of the paper. All research work and papers were also reviewed for confirmatory findings and main arguments were generated. In this way, a chronological literature review was written in a systematic fashion.

### 3. GVC Framework

GVCs are “the internationalized structures of production, trade and consumption pertaining to specific products” (Palpacuer, Gibbon, & Thomsen, 2005, pp. 411). There are four key structures, or dimensions, that shape GVCs (Gereffi 1994; Gereffi & Fernandez-Stark, 2016). The first of these is the input–output structure, which comprises a set of products and services linked together in a sequence of value-adding economic activities. The second is geography, which examines the spatial dispersion of concentrations of production and distribution networks in order to determine ways in which firms use geographical regions to gain access to resources. The third dimension is governance, which measures authority and power relationships that determine how material, financial and human resources are allocated and coordinated within the chain. Governance refers in particular to the lead firms or channel captains that coordinate the activities along the chain. The final dimension is institutions; this comprises institutional arrangements, both national and international in nature, that shape the globalizing processes (Palpacuer et al., 2005). If viewed in its simplest form, the GVC is a simple model, yet the governance and institutional dimensions transform a potentially simple heuristic model into an analytical tool (Kaplinsky & Morris, 2001; Neilson, 2008).

#### 3.1. Governance

Much of the theoretical and empirical research on global industries from a GVC perspective has focused on governance structures (Bair, 2008; Gibbon, Bair, & Ponte, 2008; Sturgeon, 2009). The concept of governance is central to the GVC framework (Humphrey & Schmitz, 2002). The central contentions of the GVC approach are that there are different types of globalized coordinated networks and, differences among the networks are due to differences in the governance structures.

Governance in GVCs is important for several reasons; access to some markets becomes possible through the lead firms governing the networks; governance is critical in understanding the income distribution along the chain; and firms can, for example, identify those points where entry into the chain will give them higher returns on investments

(Kaplinsky, 2000). Further, governance is critical for learning, knowledge diffusion and upgrading in GVCs. Although lead firms are continuously seeking cost reduction, high quality, increased speed and conformance to other specified codes of conduct, at the same time they also transmit best practices and advice to participating firms (Humphrey & Schmitz, 2001), thus stimulating learning and upgrading along the chain (Gibbon & Ponte, 2005).

#### 3.2. Economic, Social, and Environmental Upgrading

Related to governance is upgrading, which is defined as “the process by which actors (principally firms) seek to reposition themselves along the chain in order to increase the benefits (e.g., security, profits, technology or knowledge transfer) that they receive from participating in it” (Bair, 2008, p.5). Upgrading results in higher profits due to shifting to high value-added activities (Gereffi, 1999). Participation in the GVCs provides supplier firms from developing countries access to resources which they generally lack. These include access to international markets, market intelligence, knowledge, technology, and strategic resources. As a result, participation in GVCs enables supplier firms to improve their productive capacity for achieving economic upgrading through improved product quality, process innovation and garnering marketing skills. There are four types of economic upgrading namely process, product, functional and chain upgrading (Humphrey & Schmitz, 2001). Process upgrading involves transforming inputs into outputs more efficiently or introducing innovative technology. Product upgrading refers to moving into sophisticated product lines with increased unit values, in which production processes may or may not remain the same (Sturgeon, 2006). Functional upgrading involves achieving the ability to undertake new functions in the chain or abandoning existing ones, whereas, chain upgrading occurs when economic actors move into more value adding chains.

There is a well-developed literature on the economic upgrading (Bazan & Navas-Aleman 2004; Cammett, 2006; Gereffi, 1999; Humphrey & Schmitz, 2004; Kishimoto, 2004; Schmitz, 2004, 2006) in GVCs. Recently, the social and environmental dimensions of the globalization of production and trade have started receiving more attention (Barrientos, Gereffi, & Pickles, 2016; Goger, 2013; Khattak & Stringer, 2017; Pinto, Gouveia, & Ferreira, 2014; Pinto, 2017; Poulsen, Ponte, & Lister, 2016). The social upgrading domain has progressed much faster than the environmental upgrading one especially under the umbrella of ‘Capturing the Gains Initiatives’ of The University of Manchester. There is considerable research conducted in this area especially from the perspective of the relationship between social and economic upgrading. Despite this extensive research in the social upgrading area, the relationship between the social and economic upgrading is still a somewhat enigmatic due to different and conflicting findings across various industries

(Khattak, Haworth, Stringer, & Benson-Rea, 2017).

Environmental upgrading could be studied from two perspectives; from economics and management perspectives. From an economics perspective, environmental innovation is the process by which economic actors introduce or modify processes, techniques, practices, systems, and products to avoid or reduce environmental damages (Beise & Rennings, 2005; Rennings, 2000). In the field of management, “environmental upgrading takes place when a company improves its environmental performance through changes in product and process technology, management systems, waste and emission treatment and so on” (Jeppesen & Hansen, 2004, p.263). Khattak et al. (2015) identified the need to include a further component of ‘social processes’ to Jeppesen and Hansen’s (2004) definition of environmental upgrading. Social processes occur when employees are included as key actors in the environmental upgrading process in order to ensure its implementation. Environmental upgrading can be successfully implemented after employees’ mindset change through training and involvement in environmental management policies and strategies (Khattak et al., 2015).

However, a well-defined construct of ‘environmental upgrading’ did not exist in the GVC literature until very recently (Khattak & Stringer, 2017). In the GVC literature, the term was introduced by De Marchi, Di Maria, & Micelli (2010) in a conceptual working paper with an objective to conceptualize a model based on the integration of social and environmental upgrading with economic upgrading. That working paper was presented at Duke-Venice International University (VIU) International Summer Research Workshop in 2009. Later, environmental upgrading was the main focus of the second Duke-VIU International Summer Research Workshop in 2010.

One definition proposed in the second workshop of Duke-VIU of environmental upgrading was that “environmental upgrading is a way of reducing the ‘environmental impact’ along the value chain”. ‘Environmental impact’ refers to harmful effects on the environment, for example; carbon emission, depletion of natural resources, water, energy consumption and after-use effects (waste, pollution and energy consumption). Hence, it covers three areas of any typical GVC, namely inputs, processes, and outputs. Hence, from GVC perspective, “environmental upgrading is conceived as the process of improving the environmental impact of value chain operations – including production, processing, transport, consumption, and waste disposal or recycling” (Poulsen, Ponte, & Sornn-Friese, 2018, p.84).

After paving its way into the GVC literature in 2010, in later years, the majority of the empirical studies found that buyers, also termed as lead firms, play a major role in environmental upgrading by pushing supplier firms to upgrade and providing them with the necessary knowledge (De Marchi, Di Maria, & Micelli, 2013; Khattak et al., 2015; Khattak & Stringer, 2017). Lead firms encourage suppliers to

undertake environmental initiatives by implementing environmental requirements and standards, as well as by offering future contracts. As part of this process, lead firms transmit knowledge to suppliers regarding emerging environmental trends and policies in their home countries, as well as knowledge about certification standards. Importantly, lead firms play a key role in implementing and enforcing environmental strategies across GVCs, at least until formal institutions and regulations actively start setting and enforcing environmental standards. Overall, all studies conclude that participation in GVCs and relationship with lead firms affect upgrading as evident by a recent study which reveals that relationship of supplier and buyer (lead firm) determines the resultant upgrading (economic, social and environmental) (Golini, De Marchi, Boffelli, & Kalchschmidt, 2018). Here it is worth mentioning that lead firms could be any economic actor and not necessarily buyers in GVCs, having power and authority to coordinate globally dispersed but functionally integrated networks. Lead firms decide about value-additions and value-extractions as well, meaning tasks and profits along the GVCs.

An empirical research also identified that the role of suppliers (upgrading firms) could not be neglected (Khattak & Stringer, 2016) in environmental upgrading. The study did not underestimate the importance of the role of buyers or lead firms in the upgrading process but viewed suppliers own strategic intent as being crucial to the process of environmental upgrading. Hamel and Prahalad (2005) conceptualize ‘strategic intent’ as a sizeable stretch for an organization for which current capabilities and resources will not suffice. This forces the organization to be more inventive and to make more of limited resources, and in turn challenges the organization to close the gap by systematically building new advantages. Thus, strategic intent, coupled with firms’ capabilities, can provide a competitive advantage to firms and pave the way toward environmental upgrading.

Traditionally, in GVCs analysis, the upgrading construct is linked to shifting to more rewarding functional positions or by making products with more value-added (Bolwig, Ponte, Du Toit, Riisgaard, & Halberg, 2010). But environmental initiatives do not necessarily yield to higher profits (Goger, 2013) as buyers do not offer higher price but benefits in terms of huge cost savings in the long term are experienced by the environmentally upgraded supplier firms in developing countries (Khattak et al., 2015; Khattak & Park, 2018). Further, the costs of process upgrading including those of environmental upgrading are pushed back to the suppliers (Golini et al., 2018). A study has also found that small firms in a very weak position in GVCs, which embarked upon environmental upgrading on their own and were not pushed by their buyers or lead firms, did not gain financially as well (Khattak & Stringer, 2017). Such firms obtain environmental certifications in an attempt to make themselves competitive for receiving orders. Nevertheless, the absence of the

financial returns can discourage non-upgraded supplier firms from indulging in environmental initiatives as evidenced by the study concluding that due to the absence of financial and technical assistance (costs), the extent of environmental upgrading remains limited in Tunisian olive oil companies (Achabou, Dekhili, & Hamdoun, 2017).

Two recent papers in the environmental upgrading are of Poulsen et al. (2018) and Golini et al. (2018). Poulsen et al. (2018), found that to improve environmental upgrading in ports, which are crucial for promoting environmental upgrading in maritime transport along GVCs, the GVC actors should have a stronger collaboration with stakeholders, for example, cargo owners and regulators. Poulsen et al. (2018) research indicates the importance of institutional actors and regulations in environmental upgrading in GVCs. Whereas, Golini et al. (2018) research suggests that environmental upgrading is positively related to the type of relationship within GVCs, for example, lead firms push their strategic and capable suppliers to upgrade environmentally. Golini et al. (2018) also highlighted that where lead firms have a weak relationship with the suppliers, in that case the

supplier's own role is crucial in environmental upgrading. Table 1 presents details of all research conducted in the area of environmental upgrading with the main findings.

#### 4. Review, Future Research Agenda, and Conclusions

Overall analysis of the literature review suggests two critical developments in the field of environmental upgrading. First is the empirical definition of environmental upgrading which better explains the concept as a phenomenon and that there is a convincing notion of similarity among all definitions. Secondly, scholars working in the environmental upgrading area have empirically proved that the environmental upgrading in any firm is based on its relationship with lead firms in GVCs (Golini et al., 2018). Firms having capabilities and in strategic relationships are pushed by their lead firms. Relationship factor also identifies the role of governance structures of GVCs impacting environmental upgrading.

**Table 1:** Environmental Upgrading Research and Findings

Authors	Environmental Upgrading Research and Findings
De Marchi et al. (2010)	Conceptualization of environmental upgrading and its relationship with economic and social upgrading-conceptual paper
De Marchi et al. (2013)	Environmental upgrading is dependent on the bargaining power and value appropriation within GVCs
Goger (2013)	Environmental initiatives do not necessarily yield to higher profits. Relationships within GVCs and power dynamics decide about the financial outcomes of environmental upgrading
Khattak et al. (2015)	Lead firms (buyers) play a critical role in the environmental upgrading of supplier firms. Environmental upgrading processes include social component as a critical factor which means the environmental upgrading process is incomplete without the involvement of employees
Khattak and Stringer (2016)	The role of suppliers could not be neglected in the environmental upgrading processes. Thus, strategic intent of suppliers, coupled with capabilities, can provide a competitive advantage to firms and pave ways toward environmental upgrading
Poulsen et al. (2016)	Environmental upgrading in GVCs is more likely to occur where the lead firms are consumer-oriented and reputational risks are high
Khattak and Stringer (2017)	Small firms in a very weak position in GVC embark upon environmental upgrading on their own and not pushed by their buyers or lead firms. Such firms obtain environmental certifications in an attempt to make themselves competitive for receiving orders. Financial returns out of self-initiated upgrading are not impressive
Achabou et al. (2017)	Firms have embraced environmental upgrading due to compliance with the environmental standards imposed by buyers in Western countries. The absence of financial returns discourage non-upgraded supplier firms from indulging in environmental initiatives due to the absence of financial and technical assistance (costs) for the environmental upgrading
Poulsen et al. (2018)	To improve environmental upgrading, the GVC stakeholders should have a stronger collaboration and alliances (role of institutional actors)
Golini et al. (2018)	Environmental upgrading is positively related to the type of relationship, for example, lead firms push their strategic and capable partners (suppliers) to upgrade environmentally and where lead firms have a weak relationship with the suppliers, supplier's role is crucial in environmental upgrading
Khattak and Park (2018)	Lead firms play a major role in the environmental upgrading. Main challenges in environmental upgrading are lack of technical and financial support by the local and international organizations; and changing mindset of employees across all the levels of an organization. Major outcomes of the environmental upgrading are cost savings and reputational outcomes

Source: Authors

However, the role of upgrading firms could not be neglected as is evident in the recent studies that in cases where lead firms were not pushing their suppliers (weak suppliers), such firms took environmental initiatives on their own (Khattak & Stringer, 2017; Golini et al., 2018). Among the above mentioned two major developments in the area, secondary findings are the absence of financial returns after firms have been upgraded (Goger, 2013; Khattak et al., 2015; Khattak & Park, 2018) and, not receiving enough attention by buyers in terms of orders and financial returns. Hence, collaboration among stakeholders in financial terms is very important (Achabou et al., 2017).

Now we will move onto the future research agenda. Until recently, both types of upgrading, social and environmental, were studied individually, meaning that one stream of researchers was studying the relationship between social and economic upgrading and another environmental upgrading as a stand alone concept and phenomenon. Although De Marchi et al. (2010) attempted to conceptualize an integration of both the constructs along with the economic upgrading in a working paper, empirical evidence is still not available. Environmental problems have proved to be strictly correlated with poverty and economic conditions in developing countries (Dasgupta, Deichmann, Meisner, & Wheeler, 2005). Climatic conditions of a country as a result of environmental degradation affects the economic and social profile of any country (Cateora, Gilly, & Graham, 2016). From a community/regional perspective (macro level), firms may engage in production or manufacturing processes which do not deplete the natural resources and hence providing sustainable sources of income and place for living to the community. At the micro level, there is a need to study the relationship between environmental and social upgrading “from employees’ perspectives; emphasizing employee’s rewards (entitlements) through involvement in the environmental upgrading processes and improved health and safety conditions at the workplace” (Khattak & Stringer, 2016, pp. 553-554). Hence, there is a gap that could be filled in the literature by studying the relationship between the two types of upgrading at the firm level. The gap once filled will ultimately contribute to upgrading literature of GVC. Further, financial outcomes of environmental upgrading need to be researched to overcome the criticism and confusion associated with financial benefits related to environmental upgrading. In short, ‘does environmental upgrading lead to financial returns?’: needs to be researched. Lack of positive financial outcomes could result in demotivation among other non-upgraded firms even if they are capable of upgrading and have sound financial resources (Khattak & Stringer, 2016).

Another dimension which could add value to the environmental upgrading area is how institutions, both formal and informal, enhance the chances of environmental upgrading in GVCs. Until now, scholars have successfully established the relationship between environmental upgrading

and informal or private governance mechanisms (lead firms) within the chain. However, a typical firm is embedded in a network of institutions and such networks contain actors outside the chains as well. Institutions not only include local but international and regional institutions as well. The rise of regional value chains as a result of preferential trade agreements (PTAs) are found to be more sustainable and competitive value chains as compared to international value chains (Morris, Plank, & Staritz, 2016). Local and regional actors in such or similar regional value chains compete with global lead firms. In addition, institutions could be private and public (Islam, Khattak, & Stringer, 2017; Pritchard, Neilson, & Fold, 2017). There is a need for studies analyzing the interaction of various institutional forces with the private governance within chains impacting firms’ environmental upgrading trajectories. As evident by a recent study about the role of the state becoming more important than the private governance in the upgrading of a sector where entrepreneurs are dispersed, and transaction costs are high (Wong, 2017), signaling the need of more studies targeted at understanding the role of institutions in upgrading in GVCs. In the GVC literature, governance and institutions are considered as two distinct dimensions of GVCs. However, as identified by Sturgeon (2009), integration of governance and institutions can contribute to the robust explanation of why observed inter-firm relationships have evolved in an industry and resultant upgrading. Mayer and Pickles (2014) have merged both concepts and define governance as:

“Institutions that constrain or enable market actor behavior, both public in the form of governmental policies, rules, and regulations and private in the form of social norms, codes of conduct adopted by businesses, consumer demand for social responsibility or other non- governmental institutions and social movements” (Mayer & Pickles, 2014, p.17).

Nevertheless, upgrading including environmental upgrading could be an outcome of the interplay among institutional actors (both within and outside) within a specific industry.

In summary, GVC is a vibrant research area. However, there are a few areas which are not adequately addressed. Environmental upgrading needs more research and unpacking being a highly under-investigated area. Moreover, environmental upgrading in GVC has been studied individually and not in relation to economic and social upgrading. Hence, the relationship between environmental and social upgrading in GVCs needs to be researched. Financial outcomes of environmental upgrading need to be researched to overcome the criticism and confusion related to the financial benefits of environmental upgrading. Furthermore, the impact of the interaction of multiple and varying institutional structures on environmental upgrading is worth studying. Future researchers may contribute to environmental upgrading by investigating all the above mentioned areas worthy of studying.

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