Gaining Competitive Advantage through Strategic Green Supply Chain Management: From a Literature Review towards a Conceptual Model

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Abstract— **The link between green supply chain practices (GSCPs) and competitive advantages (CAs) is a subject of growing interest amongst academics and practitioners. Despite the theoretical arguments that environmentally conscious practices would give competitive advantages for companies, there is no consensus in empirical research concerning the positive impact of GSCPs on CAs. Due to this lack of clarity in the literature, this study undertakes a comprehensive review to evaluate the circumstances necessary for GSCPs to achieve sustainable CAs. Subsequently, a conceptual model is proposed to elaborate on the causal relationship between GSCPs and CAs. This conceptual model proposes the strategic capability as a mediator factor, mediating the linkage between GSCPs and CAs. It also introduces four moderating factors which positively influence the relationship between GSCPs and CAs, namely, internal environmental management, environmental proactivity, strategic alignment, and capability-based management. Future research opportunities are recommended to expand on the proposed conceptual model and to address the shortcomings of the existing literature.**

Keywords— *Competitive Advantage, Environmental Proactivity, Green Supply Chain, Natural-Resource-Based View, Strategic Capabilities.*

1. Introduction

Today, it is no longer surprising that the incorporation of environmentally conscious manufacturing stems from increased pressure from various stakeholders, such as customers, suppliers, regulators, competitors, local and global communities, and non-governmental organizations (NGOs) [1]. Furthermore, there has been a paradigm shift in the nature of competition between companies moving from a firm-to-firm basis to expanding towards their supply chains. Hence, it has become inevitable for manufacturing companies to extend environmentally related practices to their supply chains [2]-[4]. This operational transition in environmental practice provides companies with opportunities for the broader development of sustainability [5].

Adding the term 'green' to supply chain management (SCM) seeks to incorporate environmentally conscious thinking in all processes of the supply chain initiating green supply chain practices (GSCPs), such as green purchasing, green manufacturing, green material management, green distribution, green marketing and reverse logistics [6]-[8]. It also considers waste reduction in all stages and involves cradle-to-grave product management in the supply chain management [6].

Competitive pressure has driven organizations to consider the ultimate outcome of their practices in terms of organizational performance and competitive advantages (CAs) [9], from which green supply chain practices (GSCPs) are not exempt.

Several studies have been conducted in the past to investigate the impact of GSCPs on the overall organizational performance, financial payoffs and competitiveness (e.g. [10]-[19]). However, the conditions necessary for these GSCPs to generate CAs have rarely been discussed. Previous studies did not address the question concerning which of the factors should be considered to achieve optimum competitiveness in the long-term. As seen

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from the review of the current literature on GSCPs, this question has yet to be answered.

To address the concerns raised in the previous paragraph, this study adopts the Natural-Resource-Based View (NRBV) [20]-[21]. This is a well-established theory, which stipulates that differential capabilities developed through implementing environmental strategies are the primary sources of competitive advantage. Thus, the relationships between GSCPs and CAs in the presence of differential capabilities are analysed. Furthermore, the circumstances are investigated under which the capabilities generated by the implementation of GSCPs could result in CAs.

A conceptual model is developed to explain the causal relationship between GSCPs and CAs. By generating a series of propositions, this study provides the groundwork for future case studies and empirical research in this field.

Adopting the concept of strategic social responsibility defined by Porter and Kramer [22], the term strategic green supply chain (SGSC) in this paper refers to a green supply chain that strategically manages environmentally conscious practices to generate competitive advantages when implemented throughout the entire chain. The term 'strategic' reflects the proactive approach as opposed to the responsive approach taken in initiating GSCPs.

The rest of the paper is organized as follows: Section 2 presents the research process adopted for this study. This is followed by a descriptive literature review in Section 3, which discusses the impact of GSCPs on CAs. An exploratory literature review is presented in section 4, which investigates the factors that influence the link between GSCPs and CAs. Section 5 presents a conceptual model and a series of propositions for future research. Finally, the conclusions of this paper and future research implications are given in Section 6.

2. Research Process

A series of logical questions are put forward and the solutions extracted from a comprehensive literature review to analyse the relationship between GSCPs and CAs. Through this method, a better understanding concerning the nature of the relationship between GSCPs and CAs can be obtained and the moderating and mediating factors influencing this relationship can be identified. From this investigation, a conceptual model and a series of propositions are developed detailing the link between GSCPs and CAs. The research questions and the approach to finding the solutions are explained in the remaining part of this section.

Q1. Do GSCPs always lead to CAs?

In order to provide an answer to this question, an extensive literature review was conducted. It was discovered that no consensus exists in the literature concerning the positive impacts of GSCPs on CAs. While most research emphasizes the positive impacts, some studies show no significant relationship or a negative impact. This finding warrants the need for further investigation to uncover the reasons for this inconsistency.

Q2. What are the sources of competitive advantage?

This study refers to the resource-based theory of competitive advantage [23], which has been extensively discussed in the literature of strategic management. This theory states that organizational capabilities are the main sources of competitive advantages. This theory is widely accepted in environmental management via the theory of the Natural-Resource-Based View (NRBV) introduced by Hart [20].

Q3. Under which circumstances might GSCPs develop organizational capabilities as the potential sources of CAs?

Reviewing the literature on business strategy and the environment, the circumstances in which GSCPs might create valuable organizational capabilities have been investigated. This investigation led to two variables influencing the link between GSCPs and organizational capabilities.

Q4. How valuable are the developed capabilities through GSCPs and under which circumstances do these lead to CAs?

This question encourages the evaluation of the capabilities developed through GSCPs, whether or not it is valuable. Furthermore, even if the capabilities are deemed valuable, in which appropriate conditions will it lead to CAs? To answer this question, the authors conducted a comprehensive literature review in the field of green supply chain, strategic management and environmental strategies from which the moderating factors are introduced.

3. The Impact of GSCPs on CSa: A Descriptive Literature Review

Initiating new practices that lead to the development of technologies, new products, and new markets can be considered as a main mechanism for establishing CAs [24]. In this respect, environmentally conscious practices can generate and propose the values to the stakeholders of the supply chains [25]. In fact, GSCPs can be considered as being such initiatives that can improve or generate the firms' CAs. Environmentally conscious practices not only enable the firms to reduce their total costs and risks, but also help in increasing their revenue and intangible values, such as established brand reputation and trust [26]. In fact, the Natural-Resource-Based View (NRBV) developed by Hart [20] is the most well-known theory explaining the role of environmental management practices in generating CAs. The NRBV is an expanded version of the resource-based view (RBV) [23], [27]-[30] relating to the firm's competitive advantages to its capabilities and key resources that facilitate the environmental strategies. According to the NRBV, initiating green practices can lead to CAs in terms of lower costs, reputation, legitimacy, future position, and long-term growth [20], [21], [31].

Recent literature has examined the causal relationship between GSCPs and overall operational performance. It can be seen from the literature that there is no consensus concerning the different aspects of measuring and analysing this relationship. Some research has addressed the exact term 'competitiveness' or 'competitive advantage' (e.g. [10], [12], [18], [32]-[34]), while others included different dimensions of competitive advantages in the constructs of organizational performance (e.g. [11], [13]-[15], [35], [36]). The constructs for measuring competitive outcomes also differ amongst various studies applying the exact term of competiveness. For example, Testa and Iraldo [18] considered profitability as the ultimate outcome of competitiveness, while Rao and Holt [12] took variables, such as improved efficiency, quality improvement, productivity improvement, and cost savings, into account to assess competitiveness. Regarding the methods of analysis, while the prevailing approach in previous research is to utilize quantitative methods including regression analysis (e.g. [11], [13]-[15], [35], [36]) or structural equation modelling (e.g. [10], [12], [33]), some studies (e.g. [9], [37]) utilize qualitative research methods. Furthermore, most of the previous studies were conducted in multi-sector industries while a few studies focused on a specific industry, such as automotive (e.g. [35]) or electronics (e.g. [14]).

Table 1 summarizes the ultimate results obtained by various studies concerning the subject of the link between GSCPs and CAs. As can be seen from Table 1, most of these studies measured the direct relationship between GSCPs and CAs; although there are a few studies that analysed the indirect relationship by involving moderating or mediating variables. In addition, while most of the research indicated a positive relationship between GSPs and CAs, in some studies it was concluded that there was a negative or no significant relationship.

Table 1. The link between GSCPs and CAs

Author	Results
Zhu and Sarkis [11]	• More positive impact of GSCPs on "cost growth" as compared with "cost reduction" • Positive moderating impact of "Quality Management" on relationship between GSCPs and "cost reduction" • No significant moderating impact of "Just-In-Time "on relationship between GSCPs and "cost reduction"
Rao and Holt [12]	• Positive impact of outbound logistics on competitiveness in terms of improved efficiency, quality improvement, productivity improvement, and cost saving
Chien and Shih [14]	• Positive impact of green supply chain practices on financial performance in terms of cost reductions, market share growth, and profit increase
Zhu and Sarkis [15]	• Positive moderating impact of competitive pressure on relationship between GSCPs and "cost reduction" • Positive moderating impact of market and regulation pressures on "cost growth"
Testa and Iraldo [18]	• No significant relationship between GSCPs and profitability

4. Analysing the relationship between GSCPs and CAs: an exploratory literature review

According to the theoretical arguments reviewed in the previous section, it is expected that GSCPs would lead to CAs. However, the inconsistent results of empirical research raise some doubts on this issue. By questioning the link between GSCPs and CAs and providing an exploratory literature review to answer the generated questions, this section discusses the potential reasons explaining this inconsistency.

4.1 What are the sources of competitive advantages?

To analyse the causal relationships between GSCPs and CAs, an insight is required into the sources of competitive advantages. To answer this question, the Resource-Based Theory (RBT) of competitive advantage [28], [23] is used, which implies that the firm's specific resources and organizational capabilities are the sources of CAs. Embarking on the Resource-Based Theory of competitive advantage, Hart [20], Hart et al. [21], and Hart and Dowell [31] expanded the Resource-Based View (RBV) [27] into the Natural-Resource-Based View (NRBV). They identified four interconnected strategic capabilities to address social and environmental drivers, namely, "pollution prevention", "product stewardship", "clean technology", and "base of the pyramid", which can provide sustainable value for shareholders, and, consequently, CA for the firms. The above-mentioned capabilities would respectively create CAs of lower cost, reputation and legitimacy, future position, and embedded innovation [38]. In this respect, Masoumik et al. [39] introduced three kinds of sustainable supply chain (SSC), namely, "Efficient SSC", "Reputed SSC", and "Innovative SSC" generating the core values of "cost and risk reduction", "reputation and legitimacy", and "innovation and future positioning. Since the NRBV was introduced in 1995, several researchers have discussed the role of environmental and green practices in generating key resources and organizational capabilities that can positively affect competitive advantage (e.g. [20], [40]-[42]). For example, Sharma and Vredenburg [40] conducted an exploratory research of the Canadian oil and gas industry to explore the emerging competitively valuable organizational capabilities as a result of undertaking environmentally-friendly practices. They explored three key capabilities, namely, stakeholder integration, continuous higher-order learning, and continuous innovation, which were consistent with the key resources introduced by Hart [20].

4.2 Under which circumstances do GSCPs develop the capabilities?

As stated previously, adopting GSCPs could provide the companies with the capabilities that can be considered as sources of CAs [20], [40]. However, it was also shown that there were inconsistent results in respect to the link between GSCPs and CAs in empirical research (See Table I). Thus, a critical question arises to address the circumstances in which GSCPs develop competitively valuable capabilities. An exploratory literature review was conducted to answer this question and the findings are discussed in the remainder of this section.

- *Internal environmental management*

In order to achieve competitive performance, companies are required to undertake environmental practices over time on a consistent basis [40]. In this respect, internal environmental management to establish an environmental management system (EMS) and organization-wide commitment towards continuous improvement of firm's environmental performance [11] can be considered as a moderating factor that might have a positive influence on the link between GSCPs with organizational capabilities and competitive advantages.

An EMS is a formal procedural system consisting of written policies, plans, objectives, and procedures for implementing, monitoring, and evaluation of environmental practices to achieve continuous improvements in the firm's environmental performance [43]. An EMS can be certified if it conforms to standards, such as ISO 14001 or BS 7750 [43].

Several studies have demonstrated the positive influence of an environmental management system (EMS) on business performance (e.g. [44- [48]). Meanwhile, some authors have argued that for the successful adoption of EMS, companies are required to develop some critical capabilities, such as knowledge-based competencies (e.g. [49], [50]) and continuous improvement capabilities (e.g. [20], [49], [50]). These required competencies and capabilities for implementing and maintaining EMS might assist the companies in establishing a sustainable competitive advantage. In other words, it can be asserted that the establishment of an EMS involves the philosophy of continuous

improvement, which provides companies with the ability to sustain the developed capabilities resulting from implementing GSCPs. These sustained capabilities might provide the companies with the opportunities for creating sustainable CAs.

- *Environmental proactivity*

Approaches to environmental management have the ability to transform companies from being environmentally reactive to environmentally proactive. Companies adopting a reactive approach only attempt to meet the requirements of regulations, while companies adopting a proactive approach are volunteering to implement environmental initiatives beyond the regulatory requirements [51].

As stated by Berry and Rondinelli [52], the approaches to environmental management have evolved dramatically over the last fifty years. According to these authors, between the 1960s and the 1980s, companies were merely reacting to regulatory requirements and even attempted to avoid or minimize the costs of compliance. From the 1990s, companies started to consider the competitive opportunities they could achieve from taking control of their environmental challenges. By building their understanding of the importance of environmental management for improving competitive performance, many business managers adopted a proactive approach to environmental management to address the issue of integration of environmental management and corporate strategy. It can be predicted that environmental proactivity would be imperative for being competitive in the international market in the twenty-first century.

Environmentally proactive companies demonstrate a set of features constituting the constructs of environmental proactivity in the proposed conceptual model, which is discussed in the following statements:

Environmentally proactive companies recognize the competitive opportunities they can achieve from their environmentally conscious practices, so they attempt to integrate their environmental and corporate strategies [53], [3]. In other words, they do not merely undertake the practices that are mandated by regulators or imposed by their competitors, they voluntarily initiate environmental practices by taking a selective approach while considering the ultimate outcome of their practices [52].

Environmentally proactive companies will not simply wait for the regulators and external competitive pressure to force them to act in certain ways, they will attempt to anticipate regulations and prevent future potential negative environmental impacts [54]. They attempt to influence the key stakeholders [55] and even manage their competitors by imposing a set of regulations through leveraging on influential stakeholders [56]. Moreover, they attempt to improve their green image by publicizing their efforts and promoting industrial collaboration [57].

Environmental proactivity requires the companies to consistently implement environmental practices across all activities involved in their value chain [40]. A shared vision should be communicated to everyone in the supply chain, including suppliers and customers, who should also be involved in environmental management initiatives [52], [58].

4.3 Q4. Under which circumstances do developed capabilities lead to CAs?

In the previous section, the discussion was on the role of GSCPs in developing competitively valuable capabilities under the conditions in which the organizations are equipped with internal environmental management and environmental proactivity. A subsequent question would be whether these developed capabilities always lead to CAs. The remainder of this section discusses the circumstances in which developed capabilities lead to CAs.

- *Strategic Alignment*

From the literature of strategic management, the strategic fit or organizational alignment is considered as a main factor in gaining sustainable competitive advantage [59], [60], [61]. According to Porter and Kramer [22], if a company undertakes green practices that are closely tied to its business, the opportunities for reinforcing the firm's capabilities would be greater. With respect to the argument discussed by Porter and Kramer [22], it can be stated that if the developed organizational capabilities resulting from environmental practices reinforce the required organizational capabilities for implementing a firm's competitive strategy, it can then be considered as a source of competitive advantage.

- *Capability-based management*

Adopting a systematic approach for managing and maintaining these capabilities is necessary in order to gain advantages from the developed

organizational capabilities. By referring to Hall [62], it can be stated that the ability to manage the capabilities in terms of recognizing, protecting, exploiting, and enhancing them has a positive influence on the link between organizational capabilities and competitive advantages.

5. Developing a conceptual model for the strategic green supply chain

The conceptual model to explain the link between GSPSs and CAs can be derived from investigation concerning the link and the mediating or moderating factors influencing this link. Figure 1 shows the conceptual model and causal relationships between the variables involved in the link between GSPSs and CAs. The constructs for the variables are given in Table 2 .

To aid potential research in this area, several research propositions are developed, conforming to the causal relationships given in the conceptual model.

Proposition 1: Implementing GSCPs lead to developing differential capabilities.

Proposition 2: Developed differential capabilities due to implementing GSCPs lead to CAs.

Proposition 3: The positive relationship between GSCPs and differential capabilities is stronger in companies establishing internal environmental management.

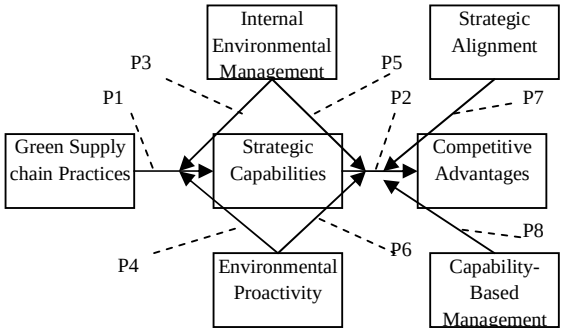
Proposition 4: The positive relationship between GSCPs and differential capabilities is stronger in companies adopting a proactive environmental approach.

Proposition 5: The positive relationship between differential capabilities and CAs is stronger in companies establishing internal environmental management.

Proposition 6: The positive relationship between differential capabilities and CAs is stronger in companies adopting a proactive environmental approach.

Proposition 7: A higher degree of alignment between differential capabilities developed through implementing GSCPs with the capabilities required for supporting the corporate strategy will lead to a stronger positive relationship between differential capabilities and CAs.

Proposition 8: The positive relationship between differential capabilities and CAs is stronger in the companies that have the ability of capability-based management alignment.



Figur 1. The conceptual model explaining the causal relationships between GSCPs and CAs

Table 2. The constructs for the variables of the conceptual model

Variable	Constructs
Green supply chain practices	• Product design for the environment • Greening upstream o Green purchasing o Green supplier management • Greening production • Greening downstream o Green packaging and distribution o Green customer management • Recovery management o Product recovery o Material recovery o Investment recovery
Strategic capabilities	• Pollution prevention • Product stewardship • Clean technology • Base of the pyramid
Competitive advantages	• Industrywide low-cost position • Industrywide uniqueness • Focus low-cost position • Focus uniqueness • First-mover advantage • Future shaping advantage

Table 2. The constructs for the variables of the conceptual model -Continued

Variable	Constructs
Internal environmental management	• Environmental management systems • Commitment form business managers

Environmental proactivity	• Integrating environmental strategy and business strategy • Influential stakeholder management • Supply chain-wide participation
Strategic Alignment	The alignment between the developed capabilities from environmental practices and the required capabilities for implementing firm's competitive strategy
Capability-based management	• Recognition • Protection • Exploitation • Enhancement

6. Discussion

Today's business managers have realised the importance of the effective implementation of environmental strategies and green supply chain practices as a critical factor for continuing to be competitive in the international market in the future. A number of studies have been conducted to investigate the link between GSCPs and CAs and the findings have shown that there have been inconsistencies in terms of the nature of the impact. While past research has attempted to measure the impact of GSCPs on CAs, only a few studies have investigated the reasons for these inconsistencies and the circumstances in which GSCPs might lead to CAs. This study has attempted to address this gap in the literature by developing a conceptual model to highlight the conditions necessary for the strategic green supply chain to provide the required CAs. This model explains the circumstances in which companies can gain more CAs through their GSCPs.

The conceptual model explains that in order for companies to develop potential valuable capabilities and gain CAs through GSCPs, there is a need for them to take a proactive approach, establish EMS and show commitment to implementing those systems. Furthermore, there should be alignment of the organizational capabilities developed through implementing GSCPs with the capabilities required for implementing the competitive strategy of the organization. The ability to manage these competitively valuable capabilities is also emphasized in the conceptual model as a critical factor in strengthening CAs.

A series of research propositions for future research activities has been derived from the conceptual model to measure the causal relationship between GSCPs and CAs. Validation of this conceptual model can be the subject of future research by conducting empirical research and multiple-case studies.

7. Conclusion

By conducting an exploratory literature review, this paper made an attempt to investigate the circumstances necessary for green supply chain practices to create sustainable competitive advantages. The finding of this research can provides new insight into the strategic management of environmental improvement efforts in supply chains. It also presents a set of research propositions future studies on strategic green supply chain management.

There are some opportunities for researchers to explore this conceptual model in more detail:

- The offered propositions simplified the relationships by taking a one-dimensional relationship into account. However, further propositions can be offered by considering a multi-dimensional relationship including the multi- relationships between different categories of practices, capabilities, and CAs.
- The various factors affecting the link between GSCPs and CAs can be explored in detail by conducting qualitative research and investigating the opinions of the practitioners and academic experts on this matter.
- Future research can also explore the organizational capabilities that are expected to emerge from implementing GSCPs.
- This research aims to provide a practical framework for levelling the companies based on their ability to establish a strategic green supply chain, which can assist practitioners to strategically manage their environmentally conscious initiatives to gain more CAs.
- By considering the factors involved in the link between GSCPs and CAs, developing the decision making models and tools for selecting competitively valuable GSCPs can be a worthy tool to assist business managers.

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