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The effects of green supply chain management on firms' financial and extra-financial performance : A case study on the agro-food sector.

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Mémoire de 4ème année, filière Economie Finance

Sous la direction de Anaïs Hamelin

2022-2023

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Remerciements

J'avais envie d'adresser mes sincères remerciements à toutes les personnes qui ont contribuées à l'élaboration de mon mémoire.

En premier lieu, je n'aurais pu mener ce travail sans l'encadrement et les conseils de ma directrice de mémoire Anaïs Hamelin. Elle m'a fait découvrir les enjeux de la recherche et m'a permis de travailler sur un sujet qui me plaisait. Je tiens à remercier également Anne-France Delannay pour sa participation au jury de soutenance.

Je souhaite aussi remercier de leur collaboration à ce mémoire les dirigeants des entreprises qui ont pris de leur temps précieux pour participer aux entretiens.

Il y a enfin celles et ceux que je voudrais remercier sur un plan plus personnel pour leur aide. Je remercie mes ami.es pour la relecture de ce mémoire. Merci à mes camarades de Sciences Po Strasbourg pour leur soutien moral et les longs moments passés à la bibliothèque durant toute l'année. Pour terminer, merci à mes parents pour leur soutien tout au long de mes études.

Contents

List of abbreviations and acronyms

AFSCM : Agro-food supply chain management

BSc: Balanced Scorecard

CSCM: Conventional supply chain management

CSR: Corporate social responsibility

GSCM: Green supply chain management

RBV : Resource-based view

RDT: Resource dependency theory

SC: Supply chain

SCM: Supply chain management

SSCM : Sustainable supply chain management

TBL: Triple bottom line

1. Introduction

Climate change is already having a detrimental impact on agricultural production (Godde et al., 2021). The regions that are currently experiencing the most severe consequences, such as water scarcity, are the primary victims of climate change. If no solutions are found, declining crop yields, particularly in the world's most food-insecure regions, are projected to push approximately 43 million people in Africa below the poverty line by 2030.[1]

The effects of climate change are already evident worldwide. To illustrate, the mustard shortage in France in 2022 can be attributed to significantly low mustard production in 2021. Canada, the world's second-largest producer of mustard seeds, witnessed a 28% decrease in yields during the latest growing season due to droughts. In France, the situation was even worse, with harvests plummeting by 50% in 2021 due to unfavorable climate conditions[2]. As the supply chain for a majority of agro-food products operates globally, local climatic events also have a global impact.

However, the challenge lies in the fact that the agro-food sector was responsible for 31% of total greenhouse gas emissions in 2019[3]. Consequently, a vicious cycle is emerging. The food industry is among the sectors most affected by climate change, yet it is also a major contributor to climate change. When considering shortages and sources of pollution, it becomes necessary to analyze the various stages that a food product undergoes, from production to sale. This is where the concept of the supply chain comes into play (defined later). Therefore, taking action on this issue is imperative.

[1] World Bank. (2022, October 17). What You Need to Know About Food Security and Climate Change. Retrieved from https://www.worldbank.org/en/news/feature/2022/10/17/what-you-need-to-know-about-food-security-and-climate-change

[2] Wilson, R. (2022, May 19). French dijon mustard supply hit by climate and rising costs, say producers. The Guardian. https://www.theguardian.com/business/2022/may/19/french-dijon-mustard-supply-hit-by-climate-and-rising-costs-say-producers

[3] World Bank. (2022, October 17). What You Need to Know About Food Security and Climate Change. Retrieved from https://www.worldbank.org/en/news/feature/2022/10/17/what-you-need-to-know-about-food-security-and-climate-change

In recent years, several measures have been implemented, particularly in Western countries. However, more recently, both Germany and the European Union have taken up this matter. For instance, in January 2023, Germany passed the Supply Chain Act, which aims to promote fairness and environmental protection throughout the entire supply chain, regardless of an individual's position.

Governments increasingly require the implementation of environmentally responsible practices. Consequently, a growing number of companies have been adopting these practices under the term of green supply chain management. Hence, the agro-food sector appears to be one of the key areas where action is needed.

1.1 Supply chain management

The term supply chain management (SCM) has been rising to prominence for 20 years. In recent years, supply chain management and other similar terms, such as network sourcing, supply pipeline management, value chain management, and value stream management have emerged as topics of rising concern, for scholars, consultants, and corporate managers (Croom et al., 2000). The globalization of supply is a factor that explains that popularity. The company's outflows and inflows of material henceforth need to be coordinated. Globalization has the disadvantage to increase market uncertainty. This phenomenon requires a company a large flexibility. Moreover, customers and suppliers give more and more importance to the product and service quality. Society demands that companies maximize time savings in their supply chain. There is an increasing pressure on firms. The stakeholder's requirements become more and more challenging.

A single definition of the SCM cannot be found. The failure to define supply chain management universally is in part because of its multidisciplinary background and development, which is illustrated by the lack of strong theoretical frameworks for the construction of supply chain management doctrine. (Croom et al., 2000) On one hand, the SCM is described as an operational term, sometimes as a management philosophy or even as a management process. Our paper will prefer an operational perspective to describe and explain SCM. Lee et al., 1995 state that SCM incorporates the integration of

activities taking place among facilities network that acquires raw materials, transforms them into intermediate products and then final goods, and delivers goods to customers through a system of distribution. Kaminsky et al., 2003 also highlight the significance of the coordination between suppliers, producers, depots, and stores. This would permit that commodity to be produced and distributed in the correct quantities, to the appropriate locations, and at the right time, in order to reduce system costs while satisfying service-level requirements. Finally, Li, et al.,2006 described five dimensions of SCM practice which are the following: strategic supplier partnership, customer relationship, level of information sharing, quality of information sharing, and postponement. Besides, SCM practices can have an impact on competitive advantage and organizational performance. Indeed, SCM practices create a competitive advantage, (Li, et al., 2006), which in turn enhances organizational performance.

1.2 Distinction between supply chain management and green supply chain management: Thinking about business from a different perspective

In 1987, the Brundtland report popularized the concept of sustainable development. In 1983, the World Commission on Environment and Development (WCED) organized by the United Nations was created to address issues concerning the consequences of the accelerating deterioration of the planet. This commission led to the report “Our Common Future”. This report marks the birth of the sustainable development concept. The traditional and classical views of the capitalist and liberal economy began to be questioned. Scientists started to look for ways to continue economic activities more responsibly. Therefore, the sustainable development of supply chain management has become a major subject of study.

There is a concept of sustainable supply chain management (SSCM). The definition (Akono, Fernandes, 2009) summarizes the various definitions presented in the literature: SSCM consists of "the planning and management of all purchasing, supply, processing and logistics activities, as well as the management of relations with the actors in the chain (suppliers, logistics service providers, customers) with a view to respecting environmental and social standards in order to create sustainable value for the various

stakeholders". This sustainable management implies a global and process-based approach to track down waste and improving environmental, social, and economic efficiency. In this vision, the environmental, social, and economic aspects are taken into account. In this study, the focus will be on the green supply chain, which places particular emphasis on the environmental aspect.

It is possible to explain green supply chain management (GSCM) on the basis of the above definition of the supply chain. According to Ho et al., 2009, when the objective and value of a conventional SCM (CSCM) is economic, the one of the GSCM are economic and ecological. Concerning ecological optimization, CSCM has high ecological impacts and on the other hand, GSCM has a more integrated approach which tends to have a low ecological impact. Moreover, supplier selection is also a distinctive criterion. The price is a key element in a CSCM, therefore suppliers can change very quickly. Firm-supplier relationships are mainly in a short-term dimension. In GSCM, on the other hand, although the price is always taken into consideration, it is above all the ecological aspect that is decisive. Long-term relationships are hence favored. CSCM practices high-cost pressures and low prices while schematically the GSCM does the opposite with high-cost pressure and high prices. The speed and flexibility are higher in a CSCM than in a GSCM.

1.3 Green supply chain management

1.3.1 Definition

According to Hervani et al., 2005, GSCM can be defined as the sum of different components: green purchasing, green manufacturing (or materials management), green distribution (or green marketing), and reverse logistics. GSCM can also be understood as integrating environmental thinking into supply-chain management, including product design, procurement and selection of materials, manufacturing processes, delivery of the final product to consumers as well as the management of the end of life of the product after its useful life (Srivastava, 2007).

This is also the approach of the Supply Chain Observatory (Aberre et al., 2008), which defines the green supply chain as "aiming to minimize the ecological footprint of a product throughout its life cycle". It is clear that life cycle analysis is at the heart of the green supply chain approach and that it must "be understood as a whole and as a set of equally important stages, as each phase can be a source of negative impacts on the company. The linear model of the traditional supply chain is therefore giving way to a cyclical model" (Aberre & al., 2008).

1.3.2 The strategic posture of implementing GSCM

GSCM can be executed for different reasons. A taxonomy of three main green supply chain (GSC) approaches has been classified in the literature (Bentahar et al., 2023; Handfield, 1999; Walker et al., 2008; Zhu, Sarkis, 2007). The classifications embody the proactive approach, the reactive approach, and the receptive approach.

The first one, the proactive green approach, highlights the fact that the GSCM can be implemented as a business strategy. As we will see, the GSCM can improve a company's competitiveness. Luthra et al., 2016, applied it to the Indian automobile industry. They have shown the stake of integrating Indian automobile industry business practices in the manufacturing and service sector with sustainability and cutting supply chain expenses to attain a competitive edge over others. Additionally, GSCM also has the advantage of risk management according to Cruz, 2008. Environmental issues are not only part of a firm's strategy. GSC concerns different areas like purchasing, production, and waste management. In this approach, GSCM is supported by the certification and commitment of all actors (Handfield, 1997; Walker et al., 2008).

The second approach is the reactive one. From this point of view, GSCM is adopted mainly to respect regulations and avoid sanctions. According to Bentahar et al., 2023 it is mostly centered on "end-of-pipe" practices such as waste reduction.

Finally, the responsive green approach is a voluntary process that recognizes the added value of green activities incorporated into the organization's strategy (Handfield et al., 1999).

Most of the time, the firm's main goal is to make some profit. The environmental dimension given by the GSCM, to become a sustainable model for the firm, should be suitable for the financial side of the company. We, therefore, turn to the literature that has examined the effects of GSCM on company performance. A literature is empirical, while other part is only theoretical. We can distinguish financial performance and extra-financial performance, which includes social, organizational, and above all in our study, environmental aspects. Sometimes, the primary objective of companies is to reduce their environmental impact. Other times, the environmental component is only an effect of a practice that tries to reduce costs.

1.3.3 Tools to implement GSCM

These different theories allow us to understand the functioning and the challenges of the GSCM. But in practice, models can be applied.
We can focus for a moment on the triple bottom line (TBL) tool. For example, Tate et al., 2010, use this instrument in their study to observe the overall societies' performance measured by environmental, social, and economic sustainability. First, it permits to highlight specific criteria for progress in each of the three domains. The TBL framework brings to the fore the relationships among the three main elements. The TBL also reveals some tensions and trade-offs among competing goals, where choices have to be made at a higher level of systems thinking, with business decisions taken in a broader context (Hudson, Rogers, 2011).

1.3.4 Tools to measure GSCM performance

To measure the effects of these practices, there is hardly any single model. Indeed, the very composite nature of GSCM requires the aggregation of different indicators. We

can note the existence of the life cycle assessment (Kogg, 2003). It is a technique for evaluating the potential environmental impacts of a product during its full physical life cycle, i.e. from raw material extraction to final disposal (Heiskanen, 2002).

Otherwise, there are common models of firm performance measurement. One of the traditional tools is the Balanced Scorecard (BSc) developed by Robert Kaplan and Avid Norton in the 1990s. This tool aims to describe, elaborate and implement the firm's vision and strategy into fixed objectives and a clear set of financial and non-financial indicators. Organizational performance is measured through four perspectives, financial, customer, innovation and learning, and internal processes. (Horvath et al., 2004)

Additionally, the Malcom Baldrige Model can also be relevant in the GSCM measurement. The model involves looking at seven critical aspects of managing organizational performance, to create and add value to the organization and increase competitiveness. This framework assesses seven categories of performance including (1) leadership, (2) strategy, (3) customers, (4) measurement, analysis, and knowledge management, (5) workforce; (6) operations; and (7) results. It was not only built in order to encourage organizations to practice an efficient control of quality for products and services and to evaluate quality improvement, but also developed to highlight the efforts of organizations. (Garvin, 1991)

Finally, we can consider the Performance Pyramid model, proposed by Cross and Lynch in 1992. According to Tangen, 2004, this model has the role to link the firm's strategy with its operation by "translating objectives from the top down (based on customer priorities) and measuring from the bottom up".

Several empirical papers studied the effects of GSMC on financial and extra-financial performance before we did. A literature review of this topic allows us to understand the main results of earlier studies.

1.4 Purpose of the study

GSCM is a topic that has been growing in the literature over the last decade. The concept is derived from the supply chain literature. Nevertheless, in view of the acceleration of climate change, the environmental variable has taken on an increasing role in society and ultimately in the literature. Thus, many researchers have worked on the supply chain by integrating this new environmental constraint. Several subjects are addressed in this area.

In the literature, there is first of all a part on a conceptual and theory development of the subject. Other authors are interested in drivers and barriers. In addition, another part of the literature focuses on collaboration with supply chain partners. Some papers also present mathematical and other optimization models. Finally, part of the literature tries to evaluate GSCM practices and performances (Afrin et al., 2019). It is in this last part of the literature review that our study belongs.

Nevertheless, in this same field researchers have opted for different perspectives. Different types of performance are studied. Some of the literature focuses on the drivers of financial performance, while some of the literature focuses on environmental performance. A small part of the literature also looks at the social and organizational performance of GSCM practices. In our research, the effects of the green supply chain on financial and extra-financial (environmental, organizational, social) performance will be observe. There are several studies on this topic. However, these studies are mainly focused on companies operating on the Asian continent. Moreover, it is often heavy industries that are studied. On this point, a distance is established with the pre-existing literature.

Indeed, part of our study focuses on the specific case of the agro-food industry. On the subject of the effects of GSCM in the agro-food industry, the literature is almost non-existent. This study is particularly dedicated to the food industry because of the environmental issues that make it a particularly sensitive sector to climate change. Our case study will be based on two small French companies in the dairy dessert sector.

In concrete terms, this study aims to examine the extent to which the green supply chain can achieve financial and non-financial performance.

First of all, it is necessary to conduct a review of the literature on the green supply chain. In this context, the different ways in which GSCM can be defined and which theories allow it to be defined will be studied. In order to answer our question, a review of the empirical literature on the effects of green supply chain management on financial and extra-financial management is conducted. Our study aims to investigate the effects of green supply chain management on the performance of agro-food companies. In order to answer this question, a review of the empirical literature on this subject is presented. Finally, to compare with the literature, a case study on two agro-food companies is conducted to observe the effects of GSC on financial and extra-financial performance.

2. Green supply chain management: a literature review

As social and environmental issues have become central, literature on GSCM has grown significantly in the 2000s. However, literature on GSCM faces a lack of uniformity. Depending on the author, the GSCM is defined differently. Even the concept of green practice is subject to divergent interpretations. In order to understand the issues surrounding GSCM, a review of the theoretical literature on this subject is conducted.

LITERATURE REVIEW METHOD

In order to conduct the literature review, a certain approach was adopted. Searches were conducted only online. A large part of the search was done using Google Scholar but also with Business Source Premier. Several keywords were used to obtain different results. The searches started with the simple mention of Green Supply Chain Management. The first articles that came up provided an understanding of the different definitions and dimensions that this literature encompassed. Most of the articles were scientific journal articles. Some specialized journals appeared regularly in the results, such as Supply Chain Management: An International Journal or Journal of Cleaner Production. Also, some dissertations or theses on subjects related to GSCM were sources for this paper. To specify my results, different keywords were entered such as “financial performance”, “environmental performance”, “definition”, “effects”... Also, when articles were relevant in the literature review, it was interesting to see which bibliographic references has been used by the authors. Sometimes this led to articles that could be included in the literature review. In addition, one of the difficulties was that sometimes the articles were not freely available. It was therefore impossible to consult certain articles that could have enriched this literature review. In concrete terms, when an article seemed pertinent, the first step was to read the abstract, then the introduction. This gave an overview of the theory used, the empirical or theoretical nature of the article, and the definitional issues. For the empirical literature, a quick look was given at the method and especially the results of the study. When a paper seemed complete and interesting, the references were entered in the following excel table. The latter is structured quite simply; the article, the subject of the study, the method used are retained elements. But also, the results on the effect of GSCM on financial and extra-financial performance as well as the different theories and channels explaining these performances were some interesting data.

2.1 Issue of definition and classification

In the theoretical literature, the green supply chain has been defined in various ways. We can distinguish two elements that come into consideration in the definition of the latter: the length of the chain but also its thickness.

2.1.1 Length of the green supply chain

There are three main ways to see GSCM from a more or less broad view.

The green supply chain includes all activities from product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumers as well as end-of-life management of the product after its useful life.
This is the most complete and common vision. This definition can be found in the work of Rivastava, 2007. With the same inspiration Feng et al., 2018; Hervani et al., 2005 as well Lai, et al., 2012 as have taken up this complete version of the green supply chain ranging from the search for eco-responsible design to consideration of the used product.

The green supply chain can also simply take into account manufacturing, distribution, and retailing activities. The chain is shorter upstream and downstream. Here, for example, the research of raw materials or the life of the product after the purchase are not taken into account. This perception is for instance adopted by Cruz, Wakolbinger, 2008 as well as by Cruz, Matsypura, 2009.

Finally, some papers focus on a specific point of the green supply chain. In this case, one or two of the previously mentioned segments are taken into consideration in the study. Although this option is less common, it can be found, for example, in Carter, Jennings, 2002, who are interested only in the upstream supply chain and more particularly in the purchasing stage.

2.1.2 Thickness of the green supply chain

Furthermore, the green supply chain can be defined and managed in several ways, meaning that depending on the situation it is more or less thick.

The first way to perceive the GSC is intra-organizational. This is mainly done through management policies, corporate culture, human resources, and internal orientations. Nowadays, such a vision is becoming increasingly rare. In our review of the theoretical literature, only one paper seems to fit this vision. Indeed, the study by Rivastava, 2007, only considers issues related to CSM from an internal point of view.

On the other hand, an overwhelming part of the literature takes into account an inter-organizational view of SCM. External practices are often added to the internal GSCM. Upstream suppliers are considered, and downstream consumers are examined (Feng et al., 2018). Indeed, for example, Cruz, Matsypura, 2009 mention that GSCM can be done on a business-to-business scale but also a business to consumers scale. Thus, manufacturers, retailers, and consumers are taken into consideration. This external vision is also adopted by Carter, Jennings, 2002 as well as by Cruz, Wakolbinger, 2008 who emphasize the importance of the link between the company's supplier and the company. Finally, Lai, Sarkis, 2012 use the coordination theory to show the importance of the link between an internal GSCM integrated with external practices. Nowadays, the GSCM mostly depends on the interaction between the organization and its external environment. This evolution goes hand in hand with an entrepreneurial culture that relied on long-term and closer intra and inter-organizational relationships, mutual competitive advantage, share learning, greater transparency, and trust (Jones et al.,2007).

The study of Zang et al., 2016, shows that whether a GSC is internal or external its impact is different on the performance of that supply chain. Specifically, internal chains require additional investments in integration practices to help improve supply chain performance. While external chains lead to greater supply chain integration, which in turn improves performance.

Table 2.1: Table summarizing the definition issues of our theoretical review of the GSCM.

PAPER	Length of the GSC	Thickness of the GSC
Carter, Jennings, 2002	Focus on the upstream supply chain : the purchasing	Link between the supplier of the firm and the firm
Cruz, Matsypura, 2009	Production/manufacture, distribution, retailing	> Business-to-business (B2B) and business-to- consumer (B2C) > The manufacturers, the retailers, the consumers
Cruz, Wakolbinger, 2008	Manufacturing, retailing, consumer demand	Link with external actors
Feng, Liu, Sarkis, Zhu, 2018	Green purchasing, eco-design or design for the environment, IEM, customer cooperation for environmental concerns, and investment recovery	Includes internal environmental management (IEM), external environmental management from supplier (upstream) and customer (downstream), and reverse logistics dimensions
Helms, Hervani, Sarkis, 2005	Sourcing raw materials and parts, manufacturing and assembling products, storage, order entry and tracking, distribution through the various channels and finally delivery to the customer	Link with external suppliers, internal functions of the company, and external distributors, as well as customers
Rivastava, 2007	Product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumers as well as end-of-life management of the product after its useful life	Studied alone
Zhu, Sarkis, Lai, 2012	The supply chain includes activities associated with the transformation and flow of goods or services from materials sources to the end consumers including the integration of those activities, internal and external to the firm.	Integrates internal GSCM with external GSCM practices (coordination theory)

2.2 Theories and GSCM

As a matter of fact, the GSCM practices can be theorized by different paradigms. We can identify four main models highlighted by the GSCM literature.

2.2.1 The resource-based view

The first one is the resource-based view. This theory postulates that companies develop abilities from their base of existing resources and competencies and thereby form a path of capabilities development — the so-called path-dependence (Cool, Dierickx, 1989). Resources can be described as the inputs to the production process such as capital equipment, skills of individual employees, finance… Capabilities were identified as the ability of a group of resources to accomplish some task or activity (Grant, 1991).

Through the use of the resource-based view, the studies mainly highlight the effects of these resources on performance. These inputs, and especially the capabilities, can be acknowledged as sources of sustainable competitive advantage because they are harder to buy or copy than the resources on which they are based (Collis, Montgomery, 1995). For example, there are residual products that are process wastes, like emissions in the atmosphere, soil, and water. Those have a negative value meaning that there must be an actor who has to pay for the disposal of these materials. This negative resource thanks to the competence of the company, as inter-organizational learning, can increase the value produced by the firm such as in the case of composting or methane production (Zhu et al., 2004). On the other hand, the improvement of reputation and image is a significant resource (Barney, 1991). Considering a GSC, the competitive advantage is more in the downstream stages. The fact of having a GSCM is an element that is highlighted by the company, especially during its marketing. Appearing to be more respectful of people and the planet contributes to the brand image. Indeed, consumers tend to value these behaviors. GSCM is well perceived by customers thanks to the green marketing capabilities and resources of firms (Shang et al, 2010).

2.2.2 The institutional theory

Also, the institutional theory examines how external pressures influence organizational actions (Hirsch, 1975). According to Kilbourne et al., 2002, the strongest pressures mostly come from governments, which are the key drivers for environmental management practices.

This theory does not examine the effects of these institutional factors on performance. It rather tends to explain why such a strategy was chosen in the first place. As far as effects are concerned, it can be said that they have a tendency to avoid negative effects at the outset rather than to encourage positive effects on performance. Indeed, political institutions such as the government or economic integration as the EU have considerably strengthened their legislation related to social and environmental issues. For example, the European Union publishes a wide range of environmental regulations, including -but not limited to- restrictions on hazardous substances, electrical and electronic equipment waste, which aim to reduce the negative environmental effects of manufacturing activities (Yu et al., 2006; Ramanathan, Yu, 2015) These -coercive- regulatory pressures are forcing organizations to improve their internal environmental management and eco-design practices, which should improve environmental performance (Esfahbodi et al., 2017). Furthermore, companies sometimes adapt their supply chain strategy to avoid legal sanctions. Also, there is normative pressure from consumers (Ball, Craig, 2010). Ultimately, imitation plays a role for companies in developed countries to implement GSCM behavior (Aerts et al., 2006).

2.2.3 The resource dependency theory

Moreover, the resource dependency theory (RDT) is also very common in literature. RDT can be seen as normative and giving recommendations. RDT assumes that firm members should depend on each other and collaborate to seek better performance gains in the long run instead of pursuing short-term benefits at the expense of its competitors. From the RDT perspective, companies are not fully self-sufficient and need others' resources (Sarkis et al, 2011).

RDT provides an angle of thinking that helps explain why a company adopts SCM upstream. Nowadays, it seems difficult for a single company to possess all the resources needed to achieve a sustainable competitive advantage (Handfield, 1994). Thus, to access the necessary knowledge and resources, companies can form alliances and joint ventures. (Fynes et al., 2008). In other words, firms that lack specific resources may be able to acquire these resources by establishing external relationships. RDT suggests that firms become highly dependent on each other to develop such complementary assets (Lee, Kim,

2012). For example, in GSCM, product eco-design and materials recovery is an organizational resource that requires a partner in the SC to effectuate performance benefits (Sarkis, Zhu, 2004; Shang et al., 2010; Zhu et al., 2005). Firms are interdependent in the SC. Because of that, the quality and the effectiveness of their collaboration are one of the keys of the success of their GSCM. This collaboration between firms allows the spreading of GSCM practices over several firms. As Gonzalez et al., 2008, have shown, larger firms, given their power over smaller firms, will require environmentally sound practices to be adopted by small supplier firms.

RDT can also be an element that explains the effects on the performance of the GSCM. For instance, Kim, Lee, 2020, following the logic of RDT, shows that it promotes logistics integration through trust, commitment, and satisfaction. The integration of logistics activities across organizational boundaries helps the customer company to reduce inefficiencies in planning, manufacturing, and distribution activities (Alam et al., 2014). In this way, logistics integration leads to a well-coordinated supply chain, promoting mutual benefits (e.g., large market share, operational efficiency, effective governance, and a satisfactory amount of profit) (Ataseven, Nair, 2017). Logistics integration can therefore be seen as a key factor in improving supply chain performance.

2.2.4 The Stakeholder theory

Ultimately, the Stakeholder theory makes the hypothesis that companies produce externalities that affect many parties. A stakeholder can be defined as “any group or individual who can affect or is affected by the achievement of an organization’s objectives’’ (Freeman, 1984). Stakeholders are both internal and external to the firm. As a stakeholder, we can include, in a non-exhaustive way, employees, suppliers, NGOs or even customers. Customer requirements are increasingly high. Consumers have taken a certain amount of power in society. And, nowadays, their choice between two products can be based on social and environmental considerations. Also, in Western societies, many citizens do not hesitate to boycott certain companies known for their impact on the planet. From another point of view, more than a constraint, this expressed attachment to environmental issues can help to seduce consumers. Beamon, 1999, showed that an estimated 75% of the consumers claimed that their purchase power was influenced by the

company's environmental reputation and that 80% would be willing to pay more for environmentally friendly goods.

We can see that part of the pressure comes from the collaborators in the chain. Indeed, companies also trade their products with other companies and organisms. In this case, this theory explains why GSCM is implemented. Those also have some social and environmental requirements. As a matter of fact, companies that want to obtain a GSC must have suppliers that also follow corporate social responsibility (CSR) principles. Hall, 2001 spotlights that governance of buyer-supplier relations depends on the need to rely on trust between parties and on the level of risk associated with the relationship. Surely, this could be a good reason -for smaller firms that lack reason- to invest in environmental innovation. Externalities often cause stakeholders to increase pressures on companies to reduce negative impacts and increase positive ones (Delmas, 2002). The stakeholder perspective is a way to understand that not all GSCM practices are conducted for generative competitive advantage but because they are perceived as necessary in view of stakeholder pressures.

But also this theory can help to understand the effects of the implementation of a GSCM. In this case, we may see that adopting a GSCM could give the company a competitive advantage. According to Power et al., 2007, suppliers are more responsive to their customers' environmental performance requirements when increasing levels of relationship-specific investment occurred. As the level of investment in the customer-supplier relationship increases, suppliers become less likely to believe that they would not be penalized for non-compliance with the customer's environmental performance requirements. Indeed, it is a question of reputation that must be taken care of to have a satisfactory brand image. (Cruz, Wakolbinger, 2008).

Table 2.2: Table summarizing the theories issues in our theoretical review of the GSCM.

Theories	Definition	Antecedents	Effects on performance
Ressource Based view	Companies develop abilities from their base of existing resources and competences and thereby form a path of capabilities development.	x	> Resources : capital equipment, skills of individual employees, finance... > Capabilities : Transform transformed resources that could be negative (waste) to the environment into resources. Becomes a source of competitive advantage.
Institutional theory	External pressures influence organizational actions.	Pressure : regulation, consumer, imitation.	Performance is encouraged because risks are limited.
Resource dependency theory	Firm members should depend on and collaborate to seek better performance gains in the long-run.	Firms that lack specific resources may be able to acquire these resources by establishing external relationships.	Well-coordinated supply chain, promoting mutual benefits, reduce risk.
Stakeholder theory	Companies produce externalities that affect stakeholders (employees, suppliers, customers…)	Pressure which comes from the collaborators in the chain.	Better relationship with more trust and values in line with stakeholders: allows better economic performance.

3. The effects of green supply chain management on financial and extra-financial performance

3.1 Introduction

Having seen the different dimensions of GSCM, we can now look at its impact on company performance. Performance is a concept that can be understood in several ways. Indeed, performance refers to different visions of a company. The concept of performance (Vernoncu, Zalman, 2005) is the result of a particular management which leads to competitiveness, efficiency, and effectiveness in the organization. A firm is performant when it is at the same time efficient and effective (Siminica, 2008). Performance is very broad because it may be understood differently according to the person involved in its assessment (Euske, Lebans, 2006). To report a firm's performance level, quantitative measures and items (Bartoli, Blatrix, 2015) are required.

3.2 Theories used in the GSCM

Table 3.1: Table summarizing the number of occurrences of the theories applied to our empirical review of the GSCM.

Theory used	Number of occurrences
Institutional theory	2
Resource based view	3
Resource dependency theory	1
Stakeholder theory	4
Others	3
Nothing clear	4

Different theories are used to explain the introduction of a GSCM and its effects on performance. We have seen previously that the theoretical literature highlights several channels to analyze the GSCM. We can find some of them in our empirical literature review.

Firstly, institutional theory is used in many papers to explain the GSCM. It is the case of the electrical and electronic industry in Taiwan, but also for the textile firms in Pakistan. The authors of those studies underline the pressure of the state and international or economic institutions on the GSCM. If it is a success in Taiwan, it appears that the textile industry does not benefit from this strategy. The authors showed that if the SC strategy changed it was just to complain about government pressure, but that the core of the company was not convinced by this approach. This finally leads to the achievement of the environmental and social goals, but the financial impact is negative.

In addition, the resource-based view can also explain the GSCM. The Chinese sugar complex and the tourism business in Vietnam GSCM are explained through this theory. Related to this, the study on South Korean manufacturers specifies that the theory used is based on the natural resource-based view. This theory highlights even more than the RBV that the environment, and its components, can be seen as a resource.

Moreover, the stakeholder theory is quite dominant in the empirical literature. The influence of stakeholders seems determinant in the implementation of the GSCM. Also, their impact on the performance is really important. Both the financial and the extra financial are determined by the stakeholder's vision of the firm. The result is similar to the institutional theory's one. Sometimes the GSCM is a success for the financial performance (De Brito et al,. 2008) but it is far from being always the case. For example, in the Chinese manufacturers and the Korean business, the financial result is negative. In these cases, the authors show that the GSCM was implemented mainly to agree with the stakeholders. However, the stakeholders, including the shareholders, are mainly interested in non-financial issues. Thus, when the firm tries to adapt to their demands, sometimes the financial stake suffers.

Other theories are used. For example, the ecological modernization and diffusion of innovation theory aim to explain the GSCM according to Zhu et al., 2012. From this perspective, GSCM is an emergent environmentally sustainable, organizational, and technological innovation. Furthermore, Zang et al., 2019 use the social exchange theory.

They examine the extent to which the social control mechanism impacts the GSCM-performance relationship. The social control mechanism is perceived as the mechanism by which supply chain partners utilize trust to induce desirable behaviors.

Finally, some papers we retained in our review do not claim to have a theory and do not seem to adhere to those we have already gone through. In these cases, the authors seem to be simply describing the functioning and impact of supply chain practices on performance without bringing forward certain channels. Also, the explanation of green supply chain management does not come to end with the factors put forward by these theories. There are also contingency factors that moderate the effects of the implementation of the green supply chain.

3.3 Data

The empirical studies were conducted between the years 2000 and 2020. They concern companies mainly from Asian countries. Six studies were carried out in China, two in India, two in South Korea, and one each in Japan and Taiwan. These are therefore companies located in developing countries. Studies were also carried out in countries that are considered as less developed, such as Pakistan and Vietnam. Also, two studies were conducted in the United Kingdom (UK), one study in Europe in general, and one study was conducted in the United States (US). The sample of companies therefore gives us cases of companies that have very different regulatory and commercial frameworks. Strong differences in culture, organization, and consumption habits prevail between the different papers. These differences will not be particularly taken into account in our analysis.

Table 3.2: Table summarizing the number of occurrences of the countries studied in our empirical review of the GSCM.

Countries	China	Europe	India	Japan	Pakistan	South Korea	Taiwan	UK	US	Vietnam	Total
Frequency	6	1	2	1	1	2	1	2	1	1	18

There happen to be differences in sectors. The majority of the companies we studied are in the manufacturing sector. There are as well two studies about the textile sector and two studies about the food retail sector. Also, the automotive sector is over-represented. A few isolated cases reside, such as a sugar complex and the tourism business. In concrete terms, a large majority of the companies do not seem to be in a sector particularly known for its environmental awareness. Most of these actors are inserted in the field of heavy industry. These are areas in which the costs of transport, energy expenditure during production, or the use of polluting materials are very high. So it could be interesting to see -in these areas- how greener practices are implemented in the supply chain and what their effects are on performance.

3.4 Methods used in the studies

We can first discuss the different methods of obtaining results from the literature that we have chosen. All the studies selected introduce a quantitative point of view. Indeed, questionnaires and surveys are always one of the first steps of their investigation. It is easily comprehensible. To understand the GSC strategy of a company, an overall view of the firm DNA in every step of the supply chain is necessary. Indeed, it is important to grasp which strategy is adopted in product design, raw materials research, manufacturing, and distribution. Most of the time, the survey targets different people in the firm. The GSC is not often managed by one person or service. GSCM is divided according to its different steps. Employees can explain how they perceive the product design for example, but this very person is far from the distribution issue. Interviews are sometimes conducted to complete the surveys. For example, in the study Environmental Supply Chain Innovations, to gain a full understanding of Sainsbury's GSCM, interviews were carried out. Open interviews were conducted with the managers of the company. Interviews with industry experts, trade association officials, and environmental advocates were also carried out. For the same purpose, visiting the company is also one of the investigation methods. In their study, De Brito et al., 2018, visited several fashion retailers in Europe to understand their SC. However, most of the time, these quantitative tools allow searchers to convert these data into figures. Sampling techniques are exploited, and then factor analysis is conducted. The regression analysis methodology is used, as in the

Mitra, Datta, 2014, paper about Indian manufacturing firms. Other papers use more specific techniques. For example, Wang and Sarkis's paper bases the study on pre-existing data from two databases: Bloomberg environmental, social, and governance and COMPUTED. Finally, specific tools are sometimes employed to analyze the collected data. For example, Kalyar et al., 2019, highlight that Hayes' PROCESS macro was exploited to analyze the hypotheses. On the other hand, Kim and Rhee in their empirical study on Korean GSCM use the balanced scorecard to access performance.

3.5 Explained variables

Most studies focus on two variables: financial performance and non-financial performance. Through the term "financial performance", the production costs, competitiveness, profitability, market share, profit rate, and investment yield... of the company are often considered. Regarding "non-financial performance", several elements are taken into account. Performance can be environmental. Environmental performance refers to how well an organization achieves its environmental goals. In this case, harmful materials, greenhouse gas emissions, consumed energy, the amount of produced waste, compliance with standards, and the use of recycled materials are elements that can be used to determine whether the company is performing well. In addition, organizational performance can be taken into consideration, with smoother management, better communication, and gains in terms of transaction costs being taken into account. Finally, social performance can be achieved for example through well-being at work, a feeling of working following certain values, and fair remuneration of employees. Some of the most common social performance measures are the turnover rate, safety, loyalty, accident rate training rate…

The vast majority of our literature review integrates these two aspects in the analysis of the company's performance through the implementation of a GSC.

However, we also have a study that only looks at the extra-financial performance of the company (Hall, 2006). In contrast, the study on companies already considered by the database as green from the US only considers financial performance.

3.6 Control variables for performance

The effects of the implementation of the green supply chain have been observed. Nevertheless, the different variables explaining such performance remain to be studied.

First of all, we can recall that there are factors independent of the supply chain which influence the company's performance. This study has already shown that these are causes that push the company to undertake a GSCM. However, there are as well factors that influence its performance. Firstly, institutional pressure and the environmental regulations that accompany it can favor performance (Chien, Shih, 2007). It is conceivable that compliance with standards can improve social and environmental performance. These elements can lead to improved financial performance too. In addition, there is pressure from stakeholders and in particular from customers as well (Chien, Shih, 2007; Kalyar et al., 2019). In fact, by responding to consumer pressure, companies can increase their reputation and thus their sales... as we have seen above.

Likewise, performance depends on the internal organization of the company. This overall result emerges in most empirical studies on GSCM. It consists of several elements. Studies have highlighted the importance of top management (Zhu et al., 2012) but of harmony between top and mid-level managers too (Kim, Rhee, 2012). Strategic decisions must be driven by a convinced and qualified management team. This is also stressed by De Brito et al., 2010: highly qualified workforces and teams with multidisciplinary employees boost performance. Having a broad knowledge in many areas allows one to understand and manage the supply chain from A to Z. This means that even the most complex points can be optimized and the head of the team must also have a global view of how the chain works. This can be achieved by accumulating knowledge in food science, quality control, and new product development for instance (Hall, 2006). Indeed, in addition to these managerial and strategic skills, in order to be as efficient as possible, it is necessary for the supply chain to boost innovation within it. It is, therefore, necessary to increase investments and capabilities to lead to both technical and organizational innovations and ultimately to performance (Hall, 2000). Performance is enabled through innovation development and application of technology (Nguyen et al., 2020).

Furthermore, it has been found that the development of new technologies and their implementation gives a competitive advantage. It has been proven that early adopters of a technology have a strong advantage (Zhu et al., 2012). Thus, all these internal factors bring together all the elements to optimize the performance of the GSCM.

In addition to these internal factors, there are also external organizational variables. Many studies show that inter-organizational links are very important for the success of GSCM. This is primarily through collaboration (Choi, Hwang, 2015). In the chain to improve performance, companies implement programs of comprehensive collaboration across functional departments, suppliers, and customers to implement GSCM practices (Feng et al., 2018). Performance is promoted through the implementation of coordination and control of common supply and demand. Moreover, it is important to pay attention to the collaboration with the partners to enable trust in the relationships that these players have (Kim, Rhee, 2012). Since the actors are independent of each other, transparency is key to ensuring that SC is efficient and respects specific human and environmental requirements. Also, Hall, 2006 in his study demonstrates that the performance of GSC is improved through the pressure of less intermediate wholesalers. In this research, there is a domination of the company in its supply chain. For the few partners that the company contracts, especially with its suppliers, these relationships are really "hand in hand". Besides, some studies have highlighted certain strategies on specific points of the supply chain. It may be important to have an effectively managed GSC for a sustainable logistics and transport solution to boost performance (De Brito et al., 2008). In the same article, they highlight logistics integration and information sharing along the GSC as key elements of success.

The objective is to enable not only financial but also social and environmental performance. The eco-design of products seems to be an indispensable factor in the performance of the company (Choi, 2015; Geng, 2005; Kalyar et al., 2020; Lai et al., 2012). The second strategy mentioned is investment recovery such as investment recovery (sale) of excess inventories/materials, sale of scrap and used materials, sale of excess capital equipment (Geng et al., 2005; Choi, Hwang, 2015). Again, Sarkis, Zhu, 2004 mention the fact that this strategy does not improve financial efficiency. Finally,

concrete and specific environmental advances can be applied on a case-by-case basis. Several elements favoring performance are mentioned, based on the research of Nguyen et al., 2020 on tourism companies. These include green investment in tourism-related infrastructure, working with cities to reduce carbon emissions sustainably, and the design of green buildings. There are therefore many variables as outlined above that influence the performance of the GSCM.

3.7 Results

3.7.1 Effects of GSCM on financial performance

One of the main purposes of these empirical studies is to understand the impact of GSCM on the financial performance of the sector or firm studied. When only financial performance is considered, the results are shaded. Literature fails to reach a consensus. (Muller, Seuring, 2008). We quickly understand that the impact of GSCM is often positive for the company. Indeed, in the vast majority of papers we read, the results were positive in terms of financial performance. This is the case for manufacturing companies in China and South Korea. Also, the Indian and Chinese automotive industry appears to benefit from the GSCM. The same is true for the tourism sector in Vietnam and the top 500 green companies in the US. It is the case for the sugar complex in China and the electronics industry in Taiwan too.

However, we can qualify these results. There are gains and costs and sometimes the balance is tipped more to one side than to the other. Indeed, through examination, Bowen et al., 2001 suggest economic performance is clearly not being reaped in short-term profitability and sales performance but only in the long term. Nonetheless, the main result is still a positive impact on the overall performance of the firm.

Several papers do not corroborate the positive results stated above. Some of them do not express an opinion because the results obtained are not clear enough. Indeed, there are positive elements of performance that appear, but also negative elements. It is therefore difficult to draw a general conclusion on the final impact. For example, in

fashion retail in Europe, the result is mostly positive, but De Brito et al., 2008, point out that this result is not a strong conclusion to be drawn from their study. Kim and Rhee in their study of Korean companies show that negative financial results seem to dominate but that depending on the company the result could also be neutral, so a general conclusion cannot be drawn either.

Finally, some studies -which are part of the minority- point to a negative result of the GSCM on financial performance. This is for example the case of textile companies in Pakistan or Chinese factories studied by Geng et al., 2016

3.7.2 Effects of GSCM on extra-financial performance

In addition to the effects on financial performance, there are also consequences on extra-financial performance. As we have already mentioned, this includes social, environmental, and organizational performance. This time the results are unanimous. All the results are positive. Companies that already had a positive financial performance also managed to achieve a satisfactory extra-financial performance. Hence it seems possible to combine these two performances by using GSCM. Understandably, the extra-financial performance is positive since it is often the primary reason for implementing a GSCM before the improvement of the financial performance. Admittedly, some papers on GSCM do not analyze extra-financial results, such as Wang, Sarkis, 2013. However, in their cases, they already evaluate US companies that are recognized as green, so having a GSCM is more likely. We can therefore establish from this review of the empirical literature that the influence of GSCM is positive for the environmental, social, or operational performance of companies.

Table 3.3: Table summarizing the results and the control variables of our empirical review of the GSCM.

Paper	Echantillon & method	Financial performance	Extra-financial performance	Theories	Control variables
Blanquart, Carbone, De Brito 2008	>fashion retail in Europe (2010) >informal discussions, visits, interviews	Mostly positive but not clear	Positive	stakeholder theory	> internal organization : recent technological developments + high-skilled labour + Multi-disciplinary teams >external organization : SC inter-organisational links: effectively managed for a sustainable logistics and transport solution + logistics integration along the supply chain and information sharing
Chien, Shih, 2007	> 2007 >interviews and questionnaire surveys >datas and statistical modelling	Positive	Positive	institutional theory	>Environemental regulations factors (domestic environmental, regulations, government environmental policy and international environmental agreements) > Customers and community stakeholders of external stakeholders have a larger effect on enterprises' adoption of green supply chain management practices than suppliers.
Choi, Hwang, 2015	>230 South Korean manufacturers (2015) >survey, hierarchical regression	Positive	Positive	natural ressource based view	>Eco-design and investment recovery + collaboration
Feng, Yu, Wang, Wong, Xu, Xiao, 2018	>126 automobile manufacturers in China >survey + two-step approach (measurement model and structural model) and structural equation modelling	Positive	Positive	resource dependency theory (RDT)	> Programme of comprehensive collaboration across functional departments, suppliers and customers to implement GSCM practices > Complementarity effects between different internal and external GSCM
Hall, 2000	multiple case study : >UK supermarket industry, UK aerospace industry, Japanese food retail industry	Positive & negative (without pressure)	Positive	stakeholder theory	>Buyer–supplier relationships, cost savings and increased capabilities : lead to both technical and organizational innovations (and performance)
Hall, 2006	>UK supermarket retailer J Sainsbury Plc and five of their suppliers (1995-1998) >Interviews + publications	No information	Positive	stakeholder theory	>Accumulation of capabilities in food sciences, quality control, new product development. >Less intermediate wholesalers : domination of their supply chain > Collaborative 'hands on' relationships with their suppliers
Kalyar, Shoukat,Shafique, 2020	>238 textile firms in the province of Punjab, Pakistan (2019) >Questionnaire,convenience sampling technique, Hayes' PROCESS macro	Negative	Positive	institutional theory	>Institutionnal pressure, eco design, customer pressure
Kim, Rhee, 2012	>249 firms respondents involved in national GSCM business in Korea(2011) >survey + analytical techniques >use of the balanced scorecard performance	Negative or neutral	Positive	stakeholder theory	>Top and mid-level managers, planning, organisation, co-ordination and control of common supply and demand, production, marketing and inventory with the supply chain partners, integration of intrastructure, collaboration with partners and trust,

Luthra, Garg, Haleem, 2016	>123 automobile organizations (2014) Inde > Literature review, questionnaire based survey, descriptive statistics and multiple regression analysis methodology - Through critical Success Factors tools	Positive	Positive	nothing clear	>Internal Management and competitiveness
Mitra, Datta, 2014	>Indian manufacturing firms (2013) >survey + analytical techniques	Positive	Positive	nothing clear	>Larger firms have access to more resources and therefore are more likely to adopt environmental sustainability practices compared with smaller firms. Collaboration with suppliers, product design, logistics (environmental performance)
Nguyen, Pham, Phan, Than, 2020	>150 businesses in the tourism business directory of the Vietnam Tourism Association.(2020) >survey + analytical techniques	Positive	Positive	not clear maybe close to RBV theory	>Innovation, development and application of technology. Job creation. Green investment in tourism-related infrastructure, cities to reduce carbon emissions sustainably, the design of green building.
Wang, Sarkis, 2013	> sample from the top 500 US companies based on Newsweek's green ranking >Data from the Bloomberg environmental, social and governance (ESG) and COMPUSTAT financial database are used for an empirical analysis	Positive	No information	nothing clear	x
Zhang, Tse, Dai, Chan, 2017	>185 Chinese manufacturers >survey + analytical techniques	Positive	Positive	social exchange theory	>Upstream monitoring downstream cooperation in order to achieve greater financial performance, social control, dynamic manufacturing environment
Zhu, Cote, 2004	>Guitang group (sugar complex) China >case study	Positive	Positive	resource based view	> Close relationships with their main suppliers > Larger market share through competition with other domestic sugar refineries by improving product quality and reducing costs > Ensuring the sustainability of their operations including reducing the environmental impacts.
Zhu, Sarkis, 2004	>186 Chinese Manufacturers (2004) >review, questionnaire, survey, factor analysis	Positive	Positive	nothing clear	>Internal environementla management external GSCM, investment recovery (no for the financial performance), eco design (no for the financial performance)
Zhu, Sarkis, Geng, 2005	>Chinese manufacturers (2005) >Literature review, empirical study survey, questionnaire, exploratory factor analysis	Negative	Positive	stakeholder theory	> internal environmental management, eco-design of product and investment recovery,
Zhu, Sarkis,Lai, 2012	>245 Chinese Manufacturers (2011) >review, questionnaire, survey, factor analysis	Positive	Positive	ecological modernization theory/diffusion of innovation theory	>Eco-design and external GSCM under high level of internal environmental management : importance of top management. >Early adopters have a strong advantage

3.8 Contingency factors

Several elements moderate the impact of GSCM on the financial and non-financial performance of companies. Indeed, as GSCM is only one part of a company's strategy, it is in all cases difficult to say that any progress is due to the implementation of such a strategy.

While the empirical studies previously reviewed focus - through their analytical regressions for example - on examining the precise link between GSCM and performance, other elements alter the result. It foremost depends largely on the geographical area of the firms and thus on the institutional context surrounding them. For instance, the priorities given to CSR policies are much higher in the West. We can therefore imagine that the aid granted by the State is higher in the Organisation for Economic Co-operation and Development (OECD) countries. However very often, external pressures resulting from regulations in the European Union foreign government push enterprises suppliers to improve their environmental performance (Kim, Rhee, 2012). This is the case in South Korea, where the government emphasizes collaboration across the supply chain by encouraging large manufacturers to share their environmental management know-how with supply chain partners through assistance programs (Choi, Hwang, 2015). In Taiwan too, car manufacturers are changing their behavior in order to comply with European legislation (Chien, Shih, 2007). This can be seen as a contingency criterion since government support programs go some way to improving the financial performance of those companies that implement GSCM.

Indeed, even though setting up a GSCM policy can sometimes be costly, there may be available subsidies.

Furthermore, it is found that in many studies the managerial impact is a very important factor. In many cases, a company that successfully implements a GSCM will have a general management policy that is acceptable from a CSR perspective. Employees must be convinced of the benefits and understand the company's approach (Lai, Sarkis et

al., 2012). Management quality may be a factor that influences performance even if it is not linked with the implementation of a GSCM (Sarkis, Zhu 2004)

Cooperation with other companies is also key. We find that when companies are in a network with partners with similar approaches, they can take advantage of the benefits of GSCM. Indeed, if the company is linked to responsible suppliers and customers, taking into account the green dimension of the SCM allows it to have solid partners upstream and downstream. We can take the example of the study by Carter, Jennings, 2000 in connection with what we mentioned about the importance of managers in the performance of a GSCM. They show that the involvement of purchasing managers in socially responsible activities affects positively the supply chain regarding buyer-supplier relationships. Also, the empirical paper by Chien, Shih, 2007 -that we have already discussed- mentions the fact that cooperation with upstream suppliers on green production technology, for example by exchanging information, improves performance. Being part of a whole is an advantage for performance. For example, the sugar complex benefits from a synergy by having actors who evolve around and probably in the same process of greening their SC (Cote, Zhu, 2004).

Finally, we can mention factors that are more intrinsic to the company. One of the contingency factors can be the size of the company. Sometimes, it is more expensive for a large company to change its entire GSCM process. Besides, sometimes small companies have less freedom to innovate and fewer resources to make these changes. In general, it can be said that companies that adopt a GSCM put this element in their marketing strategy, hoping to reach their stakeholders and thus convert it into a competitive advantage. Depending on the size of the company, the conversion may be more or less easy. Concretely, big companies are under pressure from a wide range of stakeholders to improve their environmental performance. In contrast, small supplier firms endure less pressure (Hall, 2006). Indeed, smaller firms lack incentives to change their model (Hall, 2000). Furthermore, large firms are more likely to adopt GSCM practices because they have a greater amount of resources (Choi, Hwang, 2015).

However, in addition to the size, there is also the sector of activity criterion. Several things should be noted. Firstly, the empirical studies mainly concern industrial companies, and manufacturing companies which are not traditionally known for their compliance with environmental objectives. Therefore, seeing that GSCMs are implemented in such companies is largely understandable, since these are the industries which need to reduce their environmental impact the most. This is, for example, the case with the manufacturers or the automobile industry (De Brito et al., 2008; Feng et al., 2018). Therefore, environmental but also social performances achieved by a firm with a GSC are easily better compared to their competitors without GSCM.

The position of the company within its sector is as well a contingency factor. Indeed, a company that is present in the market in a leading position can afford to change. For example, being one of the original market leaders gives Sainsbury an advantage (Hall, 2006). The experience effect allows the company to have a higher performance. A position as market leader gives the company some market power *vis-à-vis* its partners. It is also easier to find new employees. In addition, it already has a loyal customer base that will follow it in this process.

Eventually, the length of time a GSC has been in place also influences performance about its place in the market. If we take the case of Sainsbury, the firm has been able to build its strategy over time. As such, the effects of performance are often measured in the long term.

Table 3.4: Table summarizing the results and contingency factors of our empirical review of the GSCM.

Paper	Financial performance	Extra-financial performance	Contingency
Blanquart, Carbone, De Brito, 2008	Mostly positive but not clear	Positive	>Environmental regulations in Europe. >Business sector particularly sensitive to environmental issues.
Chien, Shih, 2007	Positive	Positive	>For car sales in Europe, Taiwan must comply with two European directives: waste electrical and electronic equipment. Requires reduction of environmental damage by reusing and recycling electrical and electronic equipment, by which the volume of waste electrical and electronic equipment. >Business sector particularly sensitive to environmental issues.
Choi, Hwang, 2015	Positive	Positive	>Korean government emphasis on collaboration across the supply chain by encouraging large manufacturers to share their environmental management know-how with supply chain partners : assistance programs. >Size : Large firms are more likely to adopt GSCM practices because they have a greater amount of resources and typically face higher environmental pressure than small or medium sized firms. >Industry type
Feng, Yu, Wang, Wong, Xu, Xiao, 2018	Positive	Positive	>China is a special case with regulations arriving late. >Business sector particularly sensitive to environmental issues.
Hall, 2000	Positive & negative (without pressure)	Positive	Size : smaller firms have a lack of incentives to change their model.
Hall, 2006	No information	Positive	>Size of the company : high profile companies are under pressure from a wide range of stakeholders to improve their environmental performance. In contrast, small supplier firms are under less pressure, but are highly influenced by the demands of their customers. >Long-standing: Sainsburry has been able to build its strategy over time. >Original position in the market: Being one of the original market leaders gives Sainsburry an advantage.
Kalyar, Shoukat, Shafique, 2020	Negative	Positive	Institutionnal pressure
Kim, Rhee, 2012	Negative or neutral	Positive	>External pressures resulting from regulations in the European Union, such as the RoHS, WEEE and REACH. Korean government new policy to encourage small and medium size enterprises suppliers to improve their environmental performance. >Short time analysis : but GSCM has often long term benefits.
Luthra, Garg, Haleem, 2016	Positive	Positive	>Business sector particularly sensitive to environmental issues.
Mitra, Datta, 2014	Positive	Positive	x
Nguyen, Pham,Phan, Than, 2020	Positive	Positive	>In the case of tourism companies, this is not an industrial case, so the implementation of the GSC is different: less polluting activities, perhaps easier to find green alternatives.
Wang, Sarkis, 2013	Positive	No information	>Short time analysis : but GSCM has often long term benefits.
Zhang, Tse, Dai, Chan, 2017	Positive	Positive	>Industry sector >Firm size >Region
Zhu, Cote, 2004	Positive	Positive	>size : huge complex : easier to improve performance with a GSC >cooperation : better in the frame of a complex
Zhu, Sarkis, 2004	Positive	Positive	>Size :Since large organizations may be more likely than small ones to have well-developed GSCM and other practices. >Quality management. >Chinese entreprises : only a recently practice (difference with mature firms).
Zhu, Sarkis, Geng, 2005	Negative	Positive	>Impact of foreign legislation: Meeting standards to export products.
Zhu, Sarkis, Lai, 2012	Positive	Positive	>Risk aversion. >Size : small firms :lacking the financial and knowledge resources to implement proactive environmental management practices. >Managerial beliefs.

3.9 Confrontation between the empirical literature and theory

The main result of the empirical literature is that financial performance is not always achieved through a GSCM. However, the non-financial performance benefits from this strategy. If we compare our results to the theoretical review we have done before, several observations can be made.

It is noteworthy that much of the empirical literature links GSCM to the actors surrounding the company. Indeed, stakeholder theory- but also institutional theory- often links practice change to external pressures. The outcome concerning extra-financial performance show that the influence from these actors is rather positive. Indeed, as the theory and the results demonstrate, GSCM leads to collaboration between actors. Companies always try to keep a very close link with their partners. This ends up with significant cost savings, which in a sense are also gains. In their study, Cote, Zhu, 2004, highlight that firms with GSCM try to maintain close relationships with their main suppliers. Actually, there are indeed earnings in transaction costs. For example, Vachon, 2007 in his study found a positive and significant link between environmental collaboration with suppliers and the implementation of pollution prevention technologies. The cooperation between suppliers and customers allows the firm to minimize waste. (Cruz, 2008; Cruz, Matsypura, 2009). Firms can collaborate to enhance product design and performance, which can lead to better overall waste reduction. For illustrative purposes, a recent survey of 212 US manufacturing companies discovered that over 75% of companies considered pollution prevention to be a critical component of their overall corporate performance. Over 49% of these respondents also identified suppliers as a factor in minimizing pollution (Holt, Rao, 2005). Besides, the study about the electrical and electronic industry in Taiwan shows that the sector has been highly successful to introduce innovative and effective supplier-manufacturer environmental management processes. This achievement is credited to the strong relationships that manufacturing companies have built with their suppliers. According to Sarkis, Zhu, 2012, the coordination of international and external GSCM practices is required when the goal of a firm is to obtain multiple benefits. As a matter of fact, in line with the theory, cooperation

between suppliers and customers enables the company to minimize waste as Sarkis, Zhu, 2011 have illustrated with the case of Chinese companies.

The empirical study also highlighted the fact that GSCM encourages the rapid development and absorption of innovation in environmental technologies. According to Sarkis et al., 2012, internal and external issues and relationships come into play in this type of innovation development. All these dynamics allow firms to understand better the environmental impact of their supply chains. (Cruz, 2008). For example, De Brito et al., 2008 asked in their study how the sustainability movement is impacting the fashion retail supply chain organization and its performance. One of the answers is the adoption of innovative logistic strategies. For instance, this can be achieved by paying particular attention to packaging. Indeed, according to Sarkis, 2003: "packaging has a strong relationship with the other components of the operational life cycle". Packaging features, such as size, shape, and materials, affect retailing due to their effect on the transport properties of the commodity. Improved packaging, as well as reorganized loading patterns, can decrease the use of materials, improve the storing and trailer capacity, and limit the quantity of handling needed (Dunn, Wu, 1995). One of the main points in the packaging issue is the use of green packaging materials such as bioplastics. (Ho et al., 2009). To sum up, increasing the environmental responsibility of a firm leads to better innovation and environmental policy. As we have seen before, this permits to lessen production inefficiencies and waste.

This progress is a way to reduce environmental impact and future environmental risk. Therefore, we have a strong corporate social responsibility, risk, and profit relationship. Taking into account the environmental and social aspects of the SC may reduce production inefficiencies, and reduce cost and risk. More than just discounts at the same time, this leads to a growth in sales, easier access to capital, new markets, and brand recognition for the company. As a result of inferior cost, lower risk, and increase in sales, companies become more profitable.

We have also seen with theory, and in particular through the resource-based view, that the GSCM allows actors to develop their abilities. This was, for example, the fact of

using negative basic resources or using one's commitment to improve one's image. The empirical literature allows us to validate these foundations. Making the effort to reduce one's environmental impact is linked to the development of innovation. Yet, these specific skills can also be a means of distinguishing themselves. In other words, competitiveness can be improved. As it is shown by Cote, Zhu, 2004, in the empirical study of a sugar complex, GSCM supports the conquest of a larger market share through competition by improving product quality and reducing costs. This performance can be reached by a differentiation strategy as it is the case for sustainable fashion retail (De Brito et al., 2008). By the way of a differentiation strategy -which can be a process or production innovation- the firm differs itself from its competitors.

Furthermore, proactive GSCM methods, with investments, and a constant search for innovation, suggest the possibility for a company to attain a superior longer-term performance. We find here the idea developed by the resource dependency theory, which puts forward the interest of collaborating in the long term rather than seeking short-term profit. This would be through an improved management of environmental risks and the development of capabilities for continuous environmental improvement (Sarkis, Zhu, 2004). Gil et al., 2001 indicated that environmental management such as GSCM has a positive relationship with an organization’s economic performance.

We can also underline that the empirical literature shows a first-mover advantage. This notion in the theoretical literature is not really put forward with the advantages of GSCM, and yet it seems to be one. Actually, by taking action before its competitors, the first adopter of GSCM may establish pioneer cost and service improvements. This allows him to win larger performance gains. Those profits could be technological leadership, pre-emption of scarce assets, and high switching costs by customers. Other advantages can be mentioned: cost advantages such as continued productivity and a shield from operational disruption in anticipation of future regulatory policy. It is also very interesting to gain the ability to develop and implement solutions that will help organizations influence future legislation (Christmann, 2000; Ramírez-Alesón et al., 2007). Early adopters have initiated proactive investment recovery as well as planned to implement eco-design and external GSCM under the high level of internal environmental

management. According to Sarkis et al., 2012, being a pioneer of GSCM in a sector makes it possible to economize environmental efforts by reducing energy and resource consumption of the firm which would lead to decreased costs and improved financial gains.

Also, we had seen in the theoretical literature that the results on financial performance were not clear. This has indeed been confirmed. After examined the elements explaining the positivity of GSCM we can quickly highlight the contribution of literature on the negative impacts. In the GSCM, some dimensions are quite negative-economic performances. GSCM causes an increase in investment, the growth of operational costs, the expansion of training costs, and the rise of costs for purchasing environmentally friendly materials. (Sarkis, Zhu, 2004). For example in the study about green supply-chain management practices in China (Sarkis et al., 2005), Chinese enterprises have increased their environmental awareness due to regulatory, competitive, and marketing pressures and drivers. However, this awareness has not been translated into strong GSCM practice adoption, let alone into improvements in some areas of performance, where it was expected. This is an example of the failure of the implementation of the GSCM, which has only resulted in higher financial costs and has not led to positive non-financial results. According to Cruz, Wakolbinger, 2008 in some activities (in their study: Chinese manufacturing enterprises), when the investment in CSR activities goes up, the return on investment goes down. The issue at stake is to find the optimal level of investment in CSR activities.

3.10 The limits

We can point to several limitations to the review of existing empirical literature that we have conducted.

First, the vast majority of the cases studied are large companies, often located in Asia. We, therefore, have little information on what is being done in Europe, Africa, and Latin America. We also lack information about what is happening in smaller companies.

Indeed, their model is often simpler, and their GSCM can sometimes be managed by a handful of people. In this literature review, we face companies that were defending their GSCM; so they were fully aware of the concept, of the strategy they were pursuing. This has the advantage of showing that GSCM can be carried out to achieve a certain performance objective. However, we have not come across any companies here that choose this practice out of a normative commitment, a notable ecological and social awareness.

Also, most of the companies in the review are highly industrial companies, in sectors that are quite energy intensive and where working conditions are sometimes questioned. It is therefore interesting to see how green practices can be implemented in these structures. As a matter of fact, it is these structures which -if the positive effects of the GSCM are indeed positive- have the most interest in modifying their model and therefore in observing notable changes. However, we can express some reservations on this subject.

In fact, we can think that the concept of a green supply chain can be understood in a rather broad sense and encompassing a large number of practices. We actually know that the environmental advances, and the required standards are still more flexible in Asian countries. Thus, even if these companies are making efforts on the green side, these efforts are possibly relative if we compare them with the changes initiated by some in Europe. Perhaps all these companies have made a profound change. We do not have enough information on individual cases to conclude. Yet reservations can be expressed, so we must remain vigilant about these results.

It might therefore be intriguing to observe the result of more Western companies. In this way, a comparison of concrete practices could help to understand the real degree of involvement in the GSCM of each company. It would also be enriching for our study to investigate these strategies at the level of smaller companies. Indeed, the majority of companies are small. Perhaps the GSCM model is not relevant at this scale or it is possibly more important. Besides, it could be interesting to see the implementation of GSCM in areas that are not only industrial but also tertiary. In fact, even in the services some steps

of GSCM could be found and applied. Again, there may or may not be differences in financial and/or overall performance.

Finally, in Western countries, corporate social responsibility standards are multiplying. We have seen through the institutional theory that companies would tend to comply with them. It is therefore necessary to study the impact of these policies. It is doubtful to know if changes implemented by firms are tangible. On the contrary, sometimes a company orientates its marketing and communication towards an ecological positioning. However, this same company often develops activities that excessively pollute nature and environment. This is also known as greenwashing.

4. Green supply chain management in the agro-food sector: an empirical literature review

4.1 Introduction

To pursue our study in a more specific sector, the agro-industry one, a literature review is necessary to give us an overall view of this field.

It is estimated that population growth and increasing per capita consumption of animal products will double global food demand by 2050 (Koning, Van Ittersum, 2009). This increase in demand for food puts pressure on the entire agro-food supply chain (AFSC). On the other hand, food standards have increased. The supply chain has become increasingly complex due to the industrialization of agriculture and globalization. Also, the health considerations of consumers and governments have increased the constraints in this SC (Luthra et al., 2019)

The way food is produced, processed, transported, and consumed has a significant impact on sustainability along the supply chain. Awareness of food consumption and production and their effects on the natural ecosystem, as well as sensitivity to ecological, ethical, and social concerns, has risen considerably in recent years. Society is increasingly conscious that the wastage of perishable food leads to a loss of huge natural resources and should be avoided (Li et al., 2014; Russo, Sgarbossa, 2017). In addition, food security and safety are also crucial issues in developing economies (Gustavsson et al., 2015). Developing a sustainable agro-food supply chain has always been a global challenge for the industry. In addition, AFSC also face several other challenges, such as climate change, consumption patterns, oil dependency, fair trade and localism, social and environmental concerns (Grimm et al., 2014; Li et al., 2014). Managers should not only consider the growing and processing segments but also assess efficiency, environmentally friendly packaging, appropriate storage facilities, efficient distribution channels, and waste management practices (Accorsi et al., 2016; Ruggieri et al., 2009). In addition, agro-food SCM actors should focus more on balancing the economic dimension with environmental

and social aspects (Mangla et al., 2018). Agro-food companies are focusing on greening their value chains and are extremely interested in recognizing drivers or performance determinants for implementing green supply chain management (Barth, Melin, 2018). Therefore, this new part of this research will attempt to understand whether the implementation of GSCM in agro-food is a driver of performance or not.

As we have already studied supply chain management, and green supply chain management earlier, this literature review is only focused on papers that treated case studies in the agro-food sector. Concretely, the same method as before has been made. Searches were mostly made on Google Scholar and Business Premier. Nevertheless, on this topic, the literature is far less plentiful. That is why the bibliography mentioned by the most interesting papers was also a very useful source of literature. One of the main problems in this literature research was that the performance was very poorly studied. Most of the studies about supply chain management in the agro-industry provided very technical, scientifical results.

4.2 Theory

One of the main limits of this research is that, contrary to our earlier literature review, a theoretical framework was not highlighted during these studies. This literature review is indeed not able to show the contribution of a particular theory in this field. Indeed, almost none of these papers claim to follow a precise theoretical approach. And by observing the papers, nothing allows us to attach a theory to them. We can nevertheless mention that one of the studies claims to belong to the Shapley value of the game theory approach (Alfonso-Lizarazo et al., 2013). Also, the RBV theory is used to explain the effect of internal supply chain practices on SC performance. The Stakeholder theory in the same paper is used to describe the effect of external supply chain practices on SC performance (Kuwornu et al., 2023)

4.3 Data

Table 4.1 :Table summarizing the number of occurrences of the countries studied in our empirical review of the agro-food GSCM.

Countries	Brazil	Greece	India	Italy	Norway	Overall	Spain	Thailande	Turkey	Total
Frequency	2	1	1	1	1	3	1	1	1	12

First of all, this literature review provided us case studies or literature reviews from a lot of different countries. Indeed, there are some case studies on developing countries such as Brazil and India, which are beginning to take social and environmental issues into account but which are not yet a priority. We also have several studies on so-called southern European countries such as Italy, Spain, and Greece. Also, Turkey, a developing country, has been studied. Finally, Norway, which defends a strong social and environmental policy, is also the subject of a study. To complete this, three studies are based on data from global literature and therefore take into account several regions of the world. This is very interesting because sometimes some results could be limited to one region. A comparison would be possible to conduct and will allow us to see if the region could be a contingency factor to the GSCM performance in the agro-industry.

4.4 Method

As far as the method is concerned, all the studies, except Oliveira, Sehnem, 2016, use a quantitative method. In several studies, questionnaires were sent out and interviews were also conducted and supplemented by statistical analysis. In addition, many studies used mathematical models after collecting data from the companies studied.

4.5 Explained variables

The empirical literature on the subject studies financial and non-financial performance overwhelmingly. These two variables are discussed in a similar way to our previous review of the literature. Once again, financial performance takes into account factors such as growth in market share, turnover, the price of the company's shares, and the balance between the gains and costs of such an approach. Extra-financial performance

again relies heavily on environmental performance, but also on the organizational and social performance of implementing GSCM in the food industry. Most of the studies, therefore, focus on these two dimensions. Nevertheless, one of the papers only studies the financial and non-financial performance of GSCM (Alfonso-Lizarazo et al., 2013). In addition, two of the papers study only non-financial performance (Ruggieri et al., 2009, Luthra, et al., 2019).

4.6 Control variables for performance

Several control variables help explain the very positive results of the introduction of a GSCM in the agro-food sector.

There are internal factors. For example, the work environment allows for the development of such projects and also improves social performance (Gotzamani, Mastos, 2022). Indeed, as Gardas et al., 2019, point out, one of the key elements of performance is the management environment. This result is also shared by Kuwornu et al, 2023 about food companies in Bangkok and by Bhardwaj et al., 2017. In the management environment, it can also have a culture of innovation. Being open to new trends, production techniques, and distribution can be decisive (Oliveira, Sehnem, 2016)
In management, it is also possible to internalize environmental variables that measure how the value produced is created (Oliveira, Sehnem, 2016). Indeed, several indicators can be put together in dashboards. They allow us to compare the different possible solutions regarding SCM. Thus, the company can choose for example the less expensive strategy if it is its objective (Accorsi et al., 2016).

Moreover, cooperation remains here a key factor of performance in a GSCM. It is important to have joint efforts (Luthra et al., 2018). Collaboration through privileged relationships and constant dialogue is crucial between these partners. Nonetheless, it can also involve monitoring and evaluation of supply chain members (Kuwornu et al., 2023).

Also, efforts in each GSC can sometimes be made at the level of a specific point in the chain. Some studies have highlighted the beneficial effects of green practices in the SC of agro-food companies. For example, it has been shown that for salmon, maritime transport is preferable because it reduces total costs, i.e. both the financial costs of energy, fuel oil, and CO2 emissions (De et al., 2022). The same is true for the agro-food sector in India, where green and collaborative transport methods have improved performance. On the other hand, the study on the dairy supply chain in Turkey showed that its focus on avoiding losses and preventing them through, for example, collection centers that improved performance (Kazancoglu et al., 2018). In this logic of avoiding dry losses, in the wine industry in Spain it was shown that composting organic waste was an interesting performance vector.

We can see that the concrete implementation of green elements in the SCM of the agro-food sector can be done in different ways. Management that encourages the implementation of green techniques, collaboration with supply chain stakeholders, evaluation techniques, and specific environmental efforts represent a sum of factors that allow reaching a satisfactory financial and extra-financial performance.

It is also worth noting that several studies have shown the impact of pressure from actors outside the company in the implementation of greener behaviors. This can be pressure from the government, notably through regulation (Sharma et al., 2017). It can also be pressure from competitors since a GSC is sometimes a decisive advantage in the partition of market shares in a sector.

4.7 Results

Now we can look at the impact of the implementation of a GSCM in the agro-food sector on both financial and non-financial performance. As a reminder, in general, GSCM had a positive impact on the overall performance of companies. However, concerning its influence on financial performance, it was difficult to identify a single trend, although the positive effect seemed to dominate.

4.7.1 Effects of GSCM on financial performance

In our literature review, it appears that implementing a green supply chain in the food industry has, most of the time, a positive impact on financial performance. However sometimes, as Gotzaman, Mastos, 2022 indicates, financial performance is negatively impacted. There are several reasons for this. Occasionally, GSCM requires higher costs in terms of finding partners, special production techniques, and more expensive human resource management, which explains these negative effects. But these consequences tend to be compensated. Financial performance often improves through cost reduction, for example, energy costs are avoided. Also, financial performance improves through better quality products that are therefore easier to sell. This is particularly the case in the food industry. The competitive advantage (Gardas et al., 2019) is certainly based on price but also on product quality (Kuwornu et al., 2023). Thus, if the raw materials comply with certain environmental standards right from the start of the supply chain, the products will sell more easily.

4.7.2 Effects of GSCM on extra-financial performance

From now on, extra-financial performance, i.e. mainly environmental and social performance, can be studied. It seems that extra-financial performance is always positive when it comes to the implementation of a GSCM in the agro-food sector. Indeed, again, this result is consistent with the previous literature. In addition, we can note that environmental and social performance are important factors in the agro-food industry. When these products are intended for the final consumer, the company must certainly be able to highlight these elements in its marketing policy. Consumers are more and more attentive to what goes on their plates. This includes the origin of the products, which sometimes implies that products that have undergone a long and polluting transport are diverted. There is also a growing preference for national or local products. Thus, in the framework of the supply chain, sourcing products close to home but also selling them in a relatively short circuit is a form of competitive advantage. Production techniques are also sometimes put forward by companies. The freshness of a product and its naturalness are more and more important. For example, the discussion around Nutriscore, which may

become mandatory, while taking into account additives, the origin of products… are elements that are taken into account in the SCM. Moreover, if the products are intended for the consumer as an individual, the supply chain must take into account all the issues of recycling the product. We understand that the supply chain determines many characteristics of the product that will be visible to the consumer. The agro-food sector is particularly sensitive because it affects the values and health of consumers who will have a real choice. It is therefore essential that a so-called green supply chain produces positive effects on the environmental and social performance of a product, as these are often the first elements put forward in the marketing campaign of a food brand.

Table 4.2: Table summarizing the results and control variables of our empirical review of the agro-food GSCM

Paper	Echantillon & method	Theories	Financial performance	Extra-financial performance	Control variable
Alfonso-Lizarazo, Montoya-Torres, Gutierrez-Franco, 2013	data collection and comparison between theory of Shapley value and Bi-Level Programming Model	Shapley value of game theory approach	positive	x	x
Accorsi, Cholette, Manzini, Pini, Penazzi, 2016	muctifactorial data analysis with case study : regional potato supply chain	nothing clear	positive	positive	Combining multiple indicators in a dashboard to summarize and compare large amounts of economic and environmental data related to the SC. Allows comparison and identification of the most cost-effective strategies to achieve environmental goals. Minimizes infrastructure and ultimately operational costs of the agri-food supply chain, and distributes responsibility for environmental impacts among producers, processors, transporters and consumers. These attitudes are enabled by models such as the LN model.
De, Gorton, Hubbard, Aditjandra, 2022	mathematical formulations and models	nothing clear	positive	positive	Maritime transport mode reduce total cost, fuel cost, and CO2 emissions.
Gardas, Raut, Jagtap, Narkhede, 2019	literature survey and opinions of field experts + Interpretive structural modelling approach	nothing clear	positive	positive	Environmental management, regulatory pressure and competitive pressure.
Kazancoglu, Ozkan-Ozen, Ozbiltekin, 2018	Grey Method + use of the tripple bottom line	nothing clear	positive	positive	Extending the scope of collection centers : focusing on losses and preventing it.
Kuwornu, Khaipetch, Gunawan, Bannor, 2023	Questionnaires (126 food companies in Bangkok) Tools : Seemingly Unrelated and The Ordinary Least Squares Regression	RBV theory : to explain the effect of internal supply chain practices on SC performance + Stakeholder theory : to explain the effect of external supply chain practices on SC performance	positive	positive	Environmental management, socially responsible management, supply chain member monitoring and assessment, supply chain collaboration, better food products that are safe and healthy for customers.
Mangla, Luthra, Rich, Kumar, Rana, Dwivedi, 2018	combined ISM and fuzzy DEMATEL research methodology	nothing clear	positive	positive	Joint efforts, planning and capacity building for delivering sustainability focused products are required to achieve competitive advantages as well as cost effectiveness and improvements in overall SC performance.
Mastos, Gotzamani, 2022	Case study : greek food industry. Interviews + data analysis (financial reports, CSR reports, website material and company records)	nothing clear	both negative and positive	positive	Increased direct costs, reduced energy costs, productivity, delivery time, product quality, sales and market share, added value for customers, increased customer loyalty, flexibility, profit rates, investment yield, minimization of hazardous/harmful/toxic materials, energy savings, water savings, CO2 emissions, waste production, use of recycled materials, improved product safety, improved employee welfare, employee accident rate, employee training rate, health and safety, employment contribution, employee benefits, employee loyalty, employee turnover rate, corporate image, human rights screening (suppliers and contractors), community support.
Raut, Luthra, Narkhede, Mangla, Gardas, Priyadarshinee, 2019	Set of agro sector actors, survey	nothing clear	x	positive	Collaborative green transportation and cold storages.
Ruggieri, Cadena, Martínez-Blanco, GasolRieradevall, Gabarrell, Sánchez,2009	collection and analysis of data after experiments	nothing clear	x	positive	Composting organic wastes.
Sehnem, Oliveira, 2016	interview, descriptive analysis	nothing clear	positive	both negative and positive	>Open innovations, new trends and opportunities for evaluating their practices and propose new tools, models and systems, internalization of environmental variable for the generation of value. >Lack of implementation of a Green strategy at a large scale. Focus only on the upstream GSC.
Sharma, Chandna, Bhardwaj, 2017	discussions with experts from the industry, questionnaire, quantitative analysis	nothing clear	positive	positive	Internal environmental management, environmental design, government regulatory pressure.

4.8 Contingency factors

Several elements besides the control variables studied above help explain and influence the companies' performance.

First of all, there are contingency factors specific to the companies studied. In many cases, it seems that the small size of the organizations in our literature review had an advantage. For example, companies that interact with each other in a fairly small area lead to lower transaction costs, time savings, and better coordination (Accorsi et al., 2016). Companies that are also in a small industry and that are at first sight a green leader attract around them a virtuous circle (Gotzamani, 2022).

Also, the size of the green supply chain and its stage of development are contingency factors. According to Oliveira, Sehnem, 2016 the company's performance is positive financially and mixed regarding the environmental performance. Nevertheless, the company is just starting to implement green practices. In addition, it is not yet deployed in its entire chain. The industry is still in transition. These practices are only done on a small scale, but the advantages or disadvantages may differ depending on the age and size of the chain that can be considered green.

Moreover, we can think that an important contingency factor is the product studied. Indeed, supply chains are above all adapted to the goods (sometimes services) that are sourced, produced, distributed, and consumed. Thus, in the agro-food sector, some goods may be more sensitive than others. For example, the performance of transport by boat is better for salmon, which in all cases is caught at sea and therefore ready to be transported through the latter (De et al., 2022). Also in the food industry, some products require special sanitary requirements. Again, the case of salmon, which is very fragile, is subject to the cold chain. Thus, the performance of a green supply chain also takes into account these constraints. The example of wine also shows us that certain practices are more efficient because of the product marketed. Compost is highlighted in the study by (Ruggieri et al., 2009). But the product is particularly well suited to this and in this

particular case, the compost can be directly reused as an input in the vineyard. In this way, a virtuous circle is created and allows for financial and extra-financial performance.

It also emerges from the studies that, in relation to the company's internal management, its level of qualification and sensitivity to environmental issues is important. According to Kazancoglu, et al., 2018, sometimes the performance in milk collection centers would be diminished because of "a very low level of education of farmers". From a broader empirical perspective, it appears that the level of training of managers influences the performance of the enterprise (Oliveira, Sehnem, 2016).

In addition, the use of particular technologies is also a determinant of performance. There is evidence that technology development improves firm performance (Luthra et al., 2018; Kuwornu et al., 2023). The level of investment in general also is a factor of performance, quite obvious but well highlighted in the literature (Kazancoglu, et al., 2018). This element is sometimes linked to the country in which the industry under study operates. It seems that in more developed countries there are more agricultural technologies available which already allows the green supply chain to have better performance (Accorsi et al., 2016).

This element is often paralleled by government pressure. As found with GSCM in general, the government tends to put pressure on these actors to implement greener practices. Often there is a desire to comply with national standards or even those of the country to which the industries are exported. For example, the government intervenes in India to help the food industry (Gardas et al., 2019). Therefore, those contingency factors are quite independent of the studied companies GSCM but those are factors that influence the performance of this last one.

Table 4.3: Table summarizing the results and contingency factors of our empirical review of the agro-food GSCM.

Paper	Financial perfor-mance	Extra-financial perfor-mance	Contingency factor
Alfonso-Lizarazo, Montoya-Torres, Gutierrez-Franco, 2013	positive	x	x
Accorsi, Cholette, Manzini, Pini, Penazzi, 2016	positive	positive	>Size : local scale : allows scale economies >Developed country : agriculture technologies
De, Gorton, Hubbard, Aditjandra, 2022	positive	positive	>Product studied : salmon : particularly sensitive in the dowstream supply chain
Gardas, Raut, Jagtap, Narkhede, 2019	positive	positive	>goverment help in India
Kazancoglu, Ozkan-Ozen, Ozbiltekin, 2018	positive	positive	>education : "education level of farmers is very low" >level of investment
Kuwornu, Khaipetch, Gunawan, Bannor, 2023	positive	positive	>technology adoption and development
Mangla, Luthra, Rich, Kumar, Rana, Dwivedi, 2018	positive	positive	>Pressure from the governement >Technology development
Mastos, Gotzamani, 2022	both negative and positive	positive	>food sustainibility leader : small industry
Raut, Luthra, Narkhede, Mangla, Gardas, Priyadarshinee, 2019	x	positive	x
Ruggieri, Cadena, Martínez-Blanco, GasolRieradevall, Gabarrell, Sánchez,2009	x	positive	>Wine sector with good margins and can afford technological investments. Industry where compost is not so expensive as it is directly reused for vineyards. >Sector where usually a lot of pesticides are used so compost necessarily improves the environmental performance.
Sehnem, Oliveira, 2016	positive	both negative and positive	>Company in transition: practices still on a small scale: enable performance gains. >Influence in the training of managers
Sharma, Chandna, Bhardwaj, 2017	positive	positive	x

4.9 The limits

Several limitations can be identified in this review of the literature. Firstly, we have just seen that the products studied were a contingency factor in performance. It may therefore seem difficult to generalize about the impact of a green supply chain on performance in the agro-food sector. Practices are completely different and vary from one product to another. There are many specific constraints. Thus, it seems that the results of the implementation of a green supply chain on financial and non-financial performance are positive. Nevertheless, it is difficult to generalize the vectors of this performance.

Also, the present literature does not always allow us to study the green supply chain in its entirety. For example, some supply chains have gone green only in part of the chain (Oliveira, Sehnem, 2016). Or even if the SC is green everywhere, only a part is studied (De et al., 2022). Perhaps only those elements that provide satisfactory performance have been highlighted in these studies.

Finally, the empirical literature on the issue of SCM performance in the food industry remains limited. Some of the literature has been drawn from papers that do not directly study the performance of GSCM. Some results were found on extra-financial and financial performance. However, the literature needs to be expanded to provide more generalizable results.

Thus, after having seen that the green supply chain was a vector of performance in the agro-food sector, we will try to see if these results also apply to our case study.

5. Empirical study

In order to compare our research with the pre-existing literature, a case study will be conducted on two companies in the agro-food sector. The main objective is to understand the impact of the implementation of a green supply chain on their performance. Thus, several hypotheses are developed and will be observed to understand the financial and extra-financial performance of these two case studies.

5.1 Hypotheses development

The first step in green supply chain management is sourcing raw materials.

The financial performance of product sourcing has not been extensively addressed in literature. It can be assumed that financial performance is positive due to privileged relationships with suppliers, economies of scale, and more local products. Also, having products of natural origin can be a marketing argument and a factor of competitive advantage that increases sales.

Extra-financial performance can be positive in this case for several reasons. Privileged interactions with suppliers improve organizational performance. Also learning effects and lower transaction costs can occur. As far as environmental performance is concerned, sourcing products that meet certain environmental criteria can improve it.

These elements allow us to formulate the following hypothesis:

H1: Raw material sourcing and supplier interactions in a GSCM positively impact financial and non-financial performance

The way inputs are produced may be subject to green measures.

The company's financial performance in the context of production can be improved by saving energy and reducing waste. Also, some greener techniques can increase productivity, which is positive. In addition, trying to develop cleaner production technologies can lead to innovation and ultimately to better financial performance. Also,

some technologies can improve the quality of the product, which again allows it to be competitive.

Extra-financial performance in the context of production can be improved, particularly in terms of environment, by reducing energy use, reducing waste, and using biodegradable or recyclable materials. Social performance can also be improved by taking into account the criteria of arduousness for workers.

These elements allow us to formulate the following hypothesis:

H2: Output production techniques in a GSCM positively impact financial and non-financial performance.

The design and packaging of the products can be questioned.

Financial performance can be improved because the packaging is a strong communication tool for the company. Thus, from a marketing point of view, greener packaging can lead to more sales. It can also be an element of differentiation. Through packaging, the image of the brand can be improved and market shares can be gained. Also, green packaging could be financially advantageous as it is less expensive.

The extra-financial performance can be improved, particularly in terms of environment, since the packaging can be recyclable or biodegradable.

These elements allow us to formulate the following hypothesis:

H3: The design and packaging of outputs in a GSCM positively impact financial and non-financial performance.

Transport is a very important issue in the GSCM.

Financial performance can improve the use of transport techniques that are cheaper and/or faster.

On the subject of extra-financial performance, it can also be positive. For instance, environmental performance may improve through the use of more energy-efficient means

of transport. Social organizational performance can be improved by working in short circuits.

These elements allow us to formulate the following hypothesis:
H4: The distribution of outputs in a GSCM positively impacts financial and non-financial performance

From a global point of view, the financial and extra-financial performance of the company is improved by all the techniques put in place in the GSCM. Synergies are created and allow for savings and improved financial, environmental, social, and organizational performance.

These elements allow us to formulate the following hypothesis:
H5: Implementing GSCM in the food industry positively impacts financial and non-financial performance.

5.2 Method

A qualitative empirical study is carried out to answer the study's hypotheses. Interviews were conducted with agro-food companies.

At the beginning of this study, the aim was to carry out a comparative study between a food company that defends a green range and a company that does not defend a green approach. To do this, it was necessary to find the relevant companies. Personal contacts made it possible to find the first company. At first sight, this company did not particularly advocate a green approach to its entire product range. However, during the interview, it turned out that the company had a green approach without communicating much about it. Indeed, on their website, for example, very few marketing elements related to the environment are put forward. The second company was found by searching on social networks (especially LinkedIn) for food companies with a green vision. Approaching the company was complicated. There were very few responses from the people contacted.

This may be due to a lack of time for these companies, but it may also be that their approach was not as green as communicated. Finally, one company leader agreed to participate in this study.

The two companies selected have a similar activity since they both produce dairy and refrigerated desserts.
The first company is located in the Vosges in France (firm 1). It is a small company with 18 employees. It conventionally produces yogurts and *fromage blanc*. The company also has an organic range.
The second company is located in the Bouches du Rhone in France (firm 2). It is a small company with 8 employees. It produces vegetarian desserts as an alternative to yogurts and cream desserts, which are lactose-free, gluten-free, soy-free, preservative-free, and Vegan.

Both interviews were conducted by telephone with the managers of these companies. An interview guide was prepared to observe the study's hypotheses (Annex 1). A partial transcript of these interviews, which will remain confidential, was made in order to extract the results.

5.3 Results

H1: Raw material sourcing and supplier interactions in a GSCM positively impact financial and non-financial performance

About the raw materials used, it appears that firm 1 and firm 2 have a majority of raw materials that meet the organic criteria.

For firm 1, the milk purchased comes from organic milk producers. Also, all five milk suppliers are located within 50 km of Firm 1. The first choice of the milk producer was made according to its proximity. Quality is also a primary criterion and is necessary for the production of yogurts. The environmental performance thus seems to be positive overall. Also, a particular contact is established between Firm 1 and the suppliers. For

example, adjustments in the quantity of milk purchased are often made. The objective is always to find a balance between the quantity of milk supplied and the quantity that can be processed and sold. Thus, the geographical proximity and the reduced number of suppliers allow a certain proximity to be established. Organizational gains are seen at this stage. As for the other raw materials used, such as fruit, Firm 1 tries to source as much local fruit as possible. For example, the company has created a strawberry chain in Alsace with local producers. A raspberry chain in Alsace is currently being built. Nevertheless, some fruit is imported from Eastern Europe because it is not necessarily available locally. These fruits are also not organic because the economic costs would not be affordable. Also, glass is an important issue for Firm 1. In this respect, firm 1 works with a German supplier, which is not far away geographically. The relationship is long-term, as Firm 1 has been working with the glass supplier for almost 10 years.

The extra-financial performance, therefore, appears to be positive about raw material sourcing. Nevertheless, it could be even better if more environmentally friendly raw materials were more economically accessible. Indeed, the financial outcome is more mitigated. The price of organic milk remains higher than the price of conventional milk. Nevertheless, sourcing from small local producers allows the company to remain within the market price range. The economic performance in this respect seems to be worse than if the company sourced products that did not meet all environmental criteria.

Firm 2 tries to source raw materials that are already inherently environmentally friendly. The raw materials are mostly cereals sourced in the south of France. The choice of raw materials implies that they are producers who work in an environmentally friendly way. Company 2 works with cooperatives in France. Also, some products are sourced in Africa. Firm 2 works with fair trade cooperatives. The relationship with suppliers is carefully studied. Firm 2 tries to understand the supply chain of these goods and to check, for example, the route that these goods take. Moreover, firm 2 tries to understand what the supplier's practices are. It is done from an environmental point of view, but the social practices of suppliers are also examined. According to firm 2, it would be ideal to be able to encourage companies that do not meet their requirements to change. Nevertheless, the size of firm 2 does not allow it to have a strong enough incentive.

Since the company bases its products on their natural, organic, fair trade side, the company's strong extra-financial performance subsequently enables it to have a satisfactory financial performance. But at this stage of raw material sourcing the priority is not on financial performance.

H2: Output production techniques in a GSCM positively impact financial and non-financial performance.

As far as production techniques are concerned, firm 1 is mechanized but still very manual. For example, there are filling machines that put yogurts into pots. But there are still a lot of people who handle the pots. Keeping a manual part is a choice for the quality of the product that needs to be textured. Since certain additives and texturizers are not used in production, some of the work has to be done by hand and cannot be automated. Having employees on site is also a guarantee of quality for the company since the staff can continuously check the quality of the product and react in case of anomalies. Thus, the product quality criterion that improves its environmental performance adds constraints to production. We can therefore imagine that the company may lose productivity because of the heavy weight of the manual. On this point, social and environmental performance seem hardly compatible.

Nevertheless, firm 1 does not develop automated production because of its economic cost. The company has chosen not to invest in production lines for the time being because of their cost. Thus, financial performance is based on a fragile equilibrium and firm 1 seems to have found a way to keep satisfactory extra-financial and financial performance. Also, certain techniques are implemented to reduce the environmental footprint. For example, water recovery projects are implemented. This kind of project takes quite a long time to set up. It is not very expensive. Although savings can be made, the projects are time-consuming and require some investments.

Nonetheless, even if the financial benefits are not impressive, they are still there. At the end of the day, these initiatives are implemented with an environmental rather than a financial focus. The company is just trying to put these investments to good use financially and non-financially.

As far as firm 2 is concerned, part of the production is mechanized. These machines are energy-intensive. However, monitoring indicators for the consumption of water, electricity, etc. are implemented. In addition, the company tries to reduce its waste as much as possible. There are workshops to sort and limit waste.

These elements are beneficial both for environmental performance and for financial performance since cost savings are made.

H3: The design and packaging of outputs in a GSCM positively impact financial and non-financial performance.

As far as Firm 1 is concerned, all product packaging is made of glass. The choice of this material was mainly made for environmental reasons. Even though glass is more expensive than plastic or carton jars, glass is recyclable. Glass also has the advantage of being inert. There are no interactions between the packaging and the product. The product packaging is also designed for the life of the product after consumption. In this respect, the glass can be recovered and cleaned. Indeed, since the yogurts locally distributed could be recovered by firm 1. However, there is still no satisfactory solution for the treatment of glass. Firm 1 no longer reprocesses glass jars. Social considerations came into play in this decision. This processing work was arduous and required a lot of handling for workers. In addition, the environmental performance was not satisfactory as the processing required a lot of water, cleaning products, etc. In the end, the investment was not worth it. Finally, the investment was not satisfactory for the extra-financial and financial performance. Company 1 entered the glass industry. Company 1 collaborates with a German company that recycles glass. Due to strong consumer demand, the project to reuse glass jars remains on the table. In this respect, company 1 works with several local start-ups. Firm 1 is working on the circular economy to try to find a solution to this problem. The objective is to find a solution that is both profitable and safe. Indeed, hygiene standards come into play in the design of packaging. Thus, for the moment, the company has chosen to use glass packaging, the recycling of which is outsourced.

This solution gives the company satisfactory extra-financial and financial performance, but the company is tending to improve.

Firm 2 strives to minimize its packaging as much as possible. In choosing its packaging, the company asked itself what recycling companies can sort and process today. Company 2 chose to stay with a plastic pot surrounded by cardboard. The company would like to introduce glass, but it is distributed nationally. It is therefore too complicated for the glass jars to be taken back to the manufacturing plant. As glass recycling is very energy-intensive, glass packaging was not chosen. The plastic jar was chosen over the cardboard jar because it is easier to recycle.

Thus, the extra financial performance is not very satisfactory. Company 1 defends its desire to seek the most environmentally friendly solution. Financially speaking, this solution is the cheapest and therefore the most efficient.

H4: The distribution of outputs in a GSCM positively impacts financial and non-financial performance

As far as Firm 1 is concerned, distribution is done in classic refrigerated trucks. This solution is not the best one as the environmental aspect is concerned. At this level, there is a real difference between the organic and non-organic ranges. According to Company 1, there is real listening and discussion between the company and the distributors in the organic network. In this later, the human relationship is stronger. The organizational and social performance seems to be better in the organic network than in the more conventional network. The financial performance in this respect is only improved because the organizational performance ultimately prevents losses.

In the case of firm 2, distribution is also done in conventional refrigerated trucks. The product itself presents some constraints. Indeed, the use-by dates are short and require transport to be carried out as quickly as possible. According to firm 2, the best solution would be to transport the product by train, but the rail system does not allow for shipping everywhere at the moment. Therefore this part of the supply chain is not particularly green. The environmental performance is not very positive, and the financial performance does not seem to be particularly affected.

It is questionable whether for these two companies this part of the supply chain can be considered green or not, as it does not deviate from the conventional SCM.

H5: Implementing GSCM in the food industry positively impacts financial and non-financial performance.

For Firm 1, the very essence of its products is a qualitative approach. Thus, there is no question of cutting back on the quality of the product to have a more economically efficient product. These choices imply that certain inputs present in conventional foodstuffs are not used. This represents greater constraints. Nevertheless, the company is forced to be financially profitable. Thus, sometimes the company does not go as far as the product from an ecological point of view. Some elements are put in place because they enable extra-financial performance to be achieved, but also financial performance. This is the case, for example, with photovoltaic panels. They provide greener and cheaper energy.

Also, part of the financial performance is enabled by positive extra-financial performance. On the negative side, the products are more expensive than conventional products. The products are also more costly because of the weight of labor, expensive raw materials… The company makes a margin that does not allow it to adjust the price but still allows it to be profitable. Thus, according to the company's director, certain environmental constraints also allow a return on investment that enables good financial performance. Thus, the benefits in the short term can be a brand image.

Also, economies of scale can be achieved in the long run, as is the case with water recovery or solar energy projects. Some stages of production are not very profitable but are necessary to achieve this product quality. Thus, some steps compensate for each other.

It seems that the organic network has more constraints. However, these constraints are also a stimulus for change in the company. At the company level, there is an organic range and a non-organic range. The costs of organic products are higher, but the awareness and target audience are not the same. Thus, the prices charged are higher. It is also important to note that the company defends a rather horizontal management, with little hierarchy. Multitasking is something intrinsic to the firm 1. Also, it seems that

commitment to the social and environmental requirements of the company is necessary for the company to function well.

As far as financial performance is concerned, there is no real difference between organic and non-organic ranges. It cannot, therefore, be said that the company's financial performance is superior in either range. The only difference in performance seems to be in the extra-financial performance, which is better when the supply gain is greener.

As far as firm 2 is concerned, according to its manager, organic products are not much more expensive than conventional products on the market. But this is possible because of the lower margins. Indeed, the company's margins are lower than those of conventional competitors, since otherwise, the company would not find the demand. Having a green supply chain contributes to the company's positioning, but does not necessarily give it an advantage.

The internal organization of the company is very important. Employees must be affected by environmental issues for the company to function at its best. Environmental and social performance are the major considerations of the company. These help to define the business and the segment of the company. Again they are satisfactory but could still be improved. The challenge is to reconcile economic value and environmental value without getting lost in one or the other.

The company is economically viable, but the existing balance is fragile. The problem is that economic performance is difficult to achieve if extra-financial performance is prioritized. However, extra-financial performance can only be improved through investments that allow for practical changes.

Thus, it can be said that extra-financial performance is globally positive and better in a GSCM than in a conventional SCM. As for financial performance, it is positive but seems less satisfactory than with conventional SCM, which would allow more profit.

Table 4.3: Table summarizing the results of our case study

	Firm 1		Firm 2	
	Effect on financial performance	**Effect on extra-financial performance**	**Effect on financial performance**	**Effect on extra-financial performance**
H1	Negative	Positive	Negative	Positive
H2	Positive	Positive	Positive	Positive
H3	Positive	Positive	Positive	Neutral
H4	Neutral	Positive	Positive	Negative
H5	Neutral	Positive	Negative	Positive

5.4 Discussion

5.4.1 External pressures to implement a GSCM

Taking into account the contributions of the literature that we have seen above, it is now possible to study the pressures that push companies to change. In concrete terms, and rather contrary to what the literature has shown, we observe that these steps are purely voluntary on the part of the two companies studied. They simply respond to the personal convictions of managers who want a product of quality that respects nature. The financial criterion is taken into account because it is essential for the company's survival, but profit is sought above all to invest more in the green aspect of the company's supply chain. The companies did not initiate change as a result of government pressure. On the contrary, according to them, the government's demands are rather unambitious in terms of the environment. They do not expect instructions to comply with environmental standards, which they already respect. As far as competitors are concerned, companies do not necessarily feel threatened as they remain in a growing niche market. Thus, on pressure from the government and legislation, these results are not in line with the literature.

On the other hand, the literature has largely emphasized consumer pressure. As far as the consumer is concerned, things are more complex. Consumer expectations are increasingly high. For example, consumers are pushing for returnable glass packaging.

However, in reality, according to firm 1 and firm 2, the will of consumers does not always match their actions. Also, consumers still see these green products as more expensive products, and some are reluctant to pay the difference with a conventional product. Hence, the role of the consumer as a vector of change is partly true but to be limited compared to what the literature supports.

5.4.2 Effects of GSCM on financial and non-financial performance

In terms of raw material sourcing, the extra financial performance is positive. Since the products sold are intrinsically based on their components, both companies have to source products that meet certain criteria. For example, the majority of the products meet the organic criteria and are sourced from a short distance. The link with the suppliers is a link of proximity and the actors exchange on the basis of common values. This relationship has been highlighted during our literature review.

As far as financial performance is concerned, it is not particularly positive. In general, financial performance is hardly negative since companies know that they must meet the requirement of profitability. The priority is not on financial profitability, which can be obtained at other stages of the supply chain. Indeed, these raw materials are generally more expensive for the company. Our study on the subject of raw materials differs from the literature. The concrete effects of sourcing a particular type of raw material were not highlighted. Sourcing a green raw material in the food industry and its effect on financial or extra-financial performance is a result that we have tried to observe with this case study but which cannot be compared with the existing literature.

As far as production techniques are concerned, the benefit is on the financial and extra-financial performance. In fact, efforts to improve non-financial performance usually lead to energy savings and therefore ultimately to savings. This improves the company's financial performance. However, it can be seen that financial performance is not the primary criterion in the choice of the production chain either.

Very practical criteria are taken into account, but also social criteria. Also, production is often an energy-intensive stage. Thus, the efforts often made make it possible to improve environmental performance but still require significant financial investment. This brings us back to the real dilemma between financial investment and improving extra-financial performance. It has been well documented in the literature that production techniques have a major role to play in the effectiveness of financial and non-financial performance. On this point, our observations are therefore in line with the previously studied literature.

As far as product packaging is concerned, this seems to be one of the most complex problems.

With regard to the financial performance, the choice of greener materials for packaging is often more expensive. However, packaging has the advantage of being a very important marketing tool that contributes to brand image. Thus, green packaging can allows the company to have a green image and therefore the market shares and prices that go with it, which ultimately allow the company to have a positive financial performance. Packaging is an element often discussed in the GSCM literature. In the case of the food industry, few papers have discussed it in detail. The literature often focused on the marketing element of packaging. This element did not come up much in our interviews - especially with firm 1, for whom marketing is not a priority at the moment -. In any case, none of the papers in the literature was based on products similar to those studied ("milk desserts"). We can therefore imagine that, at this point, packaging is also adapted to the product according to very specific production, transport and conservation logics.

In concrete terms, it is difficult to achieve real environmental performance. The environmental aspect is well taken into account in the decision-making process, but in any case, there doesn't seem to be a fully satisfactory solution that enables positive extra-financial performance.

Finally, in the cases studied, the distribution method does not specifically meet green criteria. The constraint of refrigerated food products weighs heavily on this result.

As far as financial performance is concerned, it seems positive, but again it is difficult via this case study to consider this part of the supply chain as green. On the other hand, once distributed, the green characteristics of the product allow it to be sold at a higher price than conventional products. The product is more expensive to produce, which has an impact on the cost, but the margin tends to be lower. Thus, the financial performance of these companies with a green supply chain seems to be slightly poorer, but it remains positive and, above all, allows for a better environmental performance than in a SC, which is therefore positive. The issue of transportation has been extensively studied in the literature. The literature highlights the environmental costs associated with certain modes of transportation.. But, in line with our case study, the literature also showed that few green solutions exist at the moment for the transport of fresh produce.

On the whole, it can be seen that at this stage it is difficult to have, for the two companies studied, a supply chain that can be considered green in all respects.

Thus, from a global point of view, social performance is positive since the employees are taken into consideration in the company's choices at many stages. Also, the management always tends to have a team that is convinced by the company's green commitments.

From an organizational point of view, the relationship with the company's upstream and downstream partners is simplified. Transaction costs are lower, there are learning effects between the players... This is in line with the existing literature. The balance sheet in this respect is therefore positive.

From an environmental point of view, the balance is rather positive. Once again, it is not positive at all stages of the supply chain. There is still room for improvement on certain points, but this often requires significant investments.

However, to invest in new processes, it is necessary to achieve a positive financial performance. This is the case for both companies. Nevertheless, the balance is often fragile. Sometimes, environmental efforts can improve financial performance (higher

sales prices, energy savings, etc.). But very often, the desire to have certain particularly green steps is done at the expense of financial performance. It is, therefore, difficult to have a one-way assessment of the relationship between financial and non-financial performance in the context of a GSC. Virtuous circles may emerge on certain points, but on others, rather vicious circles may being developed between these two indicators.

It should be noted that, compared to the literature, this study has the advantage of presenting the SCM of two companies from sourcing to selling the products. Indeed, in the literature, very few papers study the end-to-end GSCM. It can be seen that often only certain points, and probably the greenest ones, are studied. Thus, it may be difficult to compare these results with the literature in general, since for each food industry the focus is on a specific point. Our study has highlighted the fact that it is difficult to consider the supply chain of these companies as green on all points. We can therefore imagine that this observation is present for a majority of companies since, until proven otherwise, no paper has allowed us to observe a totally green supply chain in the food sector. A first conclusion could therefore suggest that it is difficult, if not impossible, for the moment to achieve a very positive environmental performance in all areas while at the same time having a positive financial performance.

5.5 The limits

With regard to the limitations of our empirical study, several elements can be highlighted.

Firstly, our study is based solely on qualitative elements. Indeed, the interviews allowed us to understand the functioning of the green supply chain and to understand its impact on financial and extra-financial performance. Nevertheless, no quantitative indicators were used to measure the latter. Indeed, the companies surveyed do not even have indicators that allow them to objectively evaluate their performance. Thus, the results are based more on impressions and general trends. If the financial performance is positive, no precise figures have been provided. As regards extra-financial performance, a number of practices were mentioned. However, firstly, there is no way to verify them.

Secondly, even if these practices are put in place, we know that sometimes green practices on paper are not always green in reality. Very concretely on this subject the two companies do not have the same vision of glass packaging, so it is difficult to say whether in the end this practice is more or less environmental than another. Thus, if we have formulated hypotheses, we cannot claim to test them and obtain results that are general truth. This paper adds to the literature about the extra-financial and financial performance of an AFGSCM through empirical observations, but these observations should be manipulated with caution.

Also, the companies studied are small. Their size does not allow them to put forward certain practices that are too costly. On the other hand, their size also gives them advantages that could disappear on a larger scale.

The case study also examined the effects of the green supply chain on the responsible desserts market. However, each company still offers very different products. Between products made from natural milk and vegan products, the difference lies in the raw materials of the product. Thus, the comparison can sometimes be limited. While the results are similar for both companies regarding the performance of their GSCM, they may not be generalizable. We have seen that sanitary constraints play an important role depending on the product. Also, location, size and marketing are elements that vary from one company to another and that can influence the performance of the company. These control variables should perhaps be developed further.

5.6 Discussion for future research

In future empirical research on this topic, there are several elements that could be used to deepen and refine the results. First, the study could incorporate quantitative performance measures. Performance indicators to measure the environmental behavior of companies (e.g. carbon footprint) could be integrated. Also, financial performance indicators (e.g. access to accounting documents) could be relevant. Interviews could be conducted again, but discussing with the company's employees could be interesting as well. Discussions with the different supply chain partners such as suppliers, distributors

or even customers could help to better understand the reciprocal effects of the financial and non-financial performance of the implementation of this GSC.

In addition, the case study carried out focused on the field of “milk-based” desserts in the food industry. These products must meet specific production, transport and sales requirements. Thus, it might be interesting to study products that could not be kept in a cold place, which might have an influence on performance. Moreover, companies that are not French but foreign could be interesting. Indeed, in the literature, the influence of the government was often put forward. However, these phenomena were often observed in so-called developing countries. Perhaps, the institutional framework could lead to different results.

CONCLUSION

To conclude, it is appropriate to summarize the contributions of our study. Firstly, concerning the green supply chain, it seems that in general, it has a mixed impact on financial performance. There is no consensus in the theoretical literature on this subject. Our review of the empirical literature did not allow us to identify a clearly positive or negative result. Divergent effects are observed although financial performance is usually positive. Nevertheless, sometimes, GSCM has a negative impact on financial performance. As far as extra-financial performance is concerned, the green supply chain has a clearly positive balance. Environmental performance is actually improved by these practices. Social performance and organizational performance are also positive because they are considered and improved by a GSCM strategy.

In the particular case of the agro-food industry, the results are similar. In most cases, GSCM has a positive impact on financial performance. Thus, even if certain variables influence the performance negatively, the positive and negative effects offset each other. Concerning the extra-financial performance, the effect of GSCM has a clear positive effect.

In the empirical case study, the results are more or less in line with previous research. The financial performance of companies is positive, but the GSCM represents a constraint that can sometimes negatively impact performance. The balance is difficult to find. As far as extra-financial performance is concerned, it is globally positive, even if, once again, many constraints mean that environmental performance is not as positive as desired on certain points.

Our study shows that, in some areas, financial and non-financial performance are antinomic. Although the implementation of green techniques allows for savings on certain costs, sometimes this requires an investment that penalizes financial performance. In reality, companies often implement a GSCM when it is financially advantageous. Furthermore, it is very rare to see a "complete" GSCM. Indeed, depending on the case, qualifying a behavior as green can only be applied to certain stages of the GSC. The GSCM is therefore a complex issue.

The contribution of this paper is to complete the still thin literature about the performance of the GSCM in the agro-food sector. Also, from this work, we can infer contributions about the size of the studied structures. Few studies focus on small companies. However, it is these companies that are in fact the most numerous and that are now taking up the issue of corporate social responsibility. Also few studies observe all stages of the SC.

At the end of this study, several research perspectives are possible. Although our study focused on the green supply chain, it could be interesting to examine what practices are implemented in the context of a responsible supply chain that takes equal interest in the environmental, financial and social variables. Furthermore, conducting a similar study with quantitative data could improve the scientific reliability of the results.

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ANNEX

Guide d'entretien

1. **Rappel du mémoire, demande enregistrement.**

2. **Est-ce que vous pourriez présenter votre entreprise ?**

3. **Diriez-vous que vous définissez votre entreprise comme étant dans une démarche green ?**

4. **Est-ce que vous considérez votre entreprise comme performante ?**

Si oui quelle forme de performance ?
Comment mesurez-vous la performance de l'entreprise ?
Quelle est la forme de performance que vous valorisez le plus ?
Quelle est celle que vous souhaiteriez valoriser le plus ?

5. **Dans quelle démarche avez-vous adopté une green supply chain ?**

Dans quelle mesure était-ce volontaire ?
Dans quelle mesure était-ce pour être en accord avec la législation ?
Dans quelle mesure était-ce sous la pression des consommateurs ?
Dans quelle mesure était-ce sous la pression de vos compétiteurs ?

6. **Qui sont vos fournisseurs, quels sont vos rapports avec eux ?**

Diriez-vous que vous éduquez mutuellement ?
Est-ce que vous vous aidez mutuellement à mettre en place des pratiques favorables à l'environnement ?
Est-ce que vous leur demander de vous fournir des matériaux responsables ?
Est-ce que vos fournisseurs sont choisis selon des critères environnementaux ?

Pensez-vous que parmi ces éléments certains améliorent votre performance ou la détériorent ?

7. **Quand vous pensez le packaging de vos produits quels éléments prenez-vous en considération ?**

Les matériaux bio dégradables ?
Les produits avec des matériaux recyclables ?
La réduction de l'énergie pendant la production ?
Quelles sources d'énergie utilisez-vous ?
Quelles sont vos pratiques concernant la réduction des déchets et du gâchis pendant la production ?

Pensez-vous que parmi ces éléments certains améliorent votre performance ou la détériorent ?

8. **Dans le packaging, le stockage, le transport, la distribution de matériaux quels éléments vous prenez en compte ?**

L'utilisation de packaging responsables ? Recyclables ?
Comment sont transportés les produits ? Avec vous pensé à l'utilisation de moyens de transports alternatifs ? Ou peut-être à faire des économies d'échelle dans les transports ?

Pensez-vous que parmi ces éléments certains améliorent votre performance ou la détériorent ?

9. **Concernant la vie de vos produits après leur utilisation selon vous, comment cela se passe ?**

Est-ce que les produits et emballages sont jetables ? Sont-ils récupérés et renvoyés après utilisation ? Avez-vous par exemple des points de collectes prévus ?
Pensez-vous que vos consommateurs ont une conscience environnementale ?

10. Concrètement quelles sont les éléments qu'a permis la mise en œuvre d'une supply chain en partie green ?

D'améliorer la qualité du produit ?
D'améliorer l'efficience et la productivité ?
D'améliorer l'innovation dans la conception du produit et de son design ?
Une réduction des coûts dans la production et la distribution ?
Une augmentation des volumes de vente ?
Une augmentation des parts de marchés ?
Est-ce que vous avez réussi à pénétrer de nouveaux marchés ? A conquérir de nouveaux consommateurs ?
Est-ce qu'une GSC a permis d'améliorer en interne l'organisation de l'entreprise ?
Est-ce qu'une GSC améliore l'image de marque ?
Pensez-vous qu'il y a un avantage à être le premier à opter pour une telle stratégie ? Vous considérez-vous comme précurseur ?
Est-ce que vous pensez que cela peut conduire à des bénéfices à long terme ?

Est-ce qu'il y a aussi des impacts plus négative sur la performance économique ?
Des coûts d'investissement ? Le coût d'acheter des produits respectueux de l'environnement ?

Pourriez-vous me parler de l'organisation interne , qui sont vos employés, leur niveau de qualification etc ?
Pensez-vous qu'être touché par les sujets environnementaux est nécessaire pour la bonne mise en œuvre de la GSC ?

Quelles sont les difficultés et obstacles auxquels sont confrontés votre entreprise ?

Si vous deviez résumer les avantages d'une GSC à votre échelle ? Et ses inconvénients ?

Est-ce qu'il y a autre chose que vous souhaitez ajouter ?

Remerciements, FIN

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SUMMARY

This study deals with the topic of Green Supply Chain Management (GSCM). Its primary objective is to understand the impact of implementing GSCM on both the financial performance and non-financial performance of companies. In the first part of the study, a theoretical and subsequently empirical literature review on the subject is carried out. The second part of the study focuses on the agro-food sector. A review of the literature on the subject is also conducted. This part is accompanied by a case study of two French companies in the refrigerated desserts industry. In this study, we observe that the introduction of GSCM leads to positive extra-financial performance. However, if the financial performance is often positive, it tends to suffer from these practices within the framework of GSCM. This observation shows that it is difficult to achieve a satisfactory balance between these two types of performance.

Key words : Green Supply Chain Management, extra-financial performance, financial performance, sustainability, agro-food industry

RESUME

Ce travail porte sur le green supply chain management (GSCM). L'objectif principal est de comprendre les effets de l'instauration d'un GSCM sur la performance financière mais également sur la performance extra financière des entreprises. Dans une première partie, une revue de la littérature théorique puis empirique sur le sujet est effectuée. La seconde partie de l'étude se concentre sur le secteur de l'agroalimentaire. Une revue de la littérature sur le sujet est également menée. Cette partie s'accompagne d'une étude de cas portant sur deux entreprises françaises dans l'industrie des desserts réfrigérés. Finalement, dans cette étude on observe que l'instauration de la GSCM permet une performance extra financière positive. Néanmoins si la performance financière est souvent positive, elle tend à pâtir de cette stratégie ce qui montre qu'il est difficile d'obtenir un équilibre satisfaisant entre ces deux types de performance.

Mots-clefs: Chaîne logistique verte, performance extra-financière, performance financière, durabilité, industrie agro-alimentaire