



Green Supply Chain Management: a case study of Brazilian cosmetic firms

Master degree in International Business

Adélia Cristina Evangelista Silva de Araújo

Leiria, November of 2020



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cosmetic firms**

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Dissertation under the supervision of Professor Paula Marisa Nunes Simões

Leiria, November of 2020

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Dedication

To my parents, for their tireless examples of love, perseverance and strength.

To my brother Carlos, who taught me to turn the boat over the horizon.

To Davi, for everything I would never be able to put into words.

To my grandparents, for all their trajectory of courage and resilience.

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Abstract

The increasing environmental concern can be seen as a challenge and a strategic issue for firms nowadays. Within this context, green supply chain management (GSCM) can provide a solution to this problem, as it is a way to achieve competitive advantage while enhancing the environmental sustainability. This dissertation attempts to bridge a gap in GSCM theory by analysing it in the context of the cosmetic sector in a developing country from South America. By doing so, we intend to analyse GSCM in Brazilian cosmetic sector. The aim of this dissertation is threefold: to examine the pressures for the adoption of green practices in SC in Brazil, to estimate the effect on its operation and to understand the way the central firm induces GSCM practices on its suppliers. Thus, three research questions (RQ) guide the study: **RQ1**: What are the main institutional pressures that have influenced the adoption of GSCM practices in Brazilian cosmetic firms?; **RQ2**: What is the effect (economic and environmental) of GSCM practices implementation for the cosmetic firm?; **RQ3**: In what ways does the central firm act to induce sustainable procedures in its supply chain (SC)? A multiple case study was conducted with two Brazilian cosmetic firms, AymaraUna and Bio Extratus. The results indicate: (1) internal guidelines as major drivers in GSCM adoption; (2) positive relation between the adoption of green practices and performance (both environmental and economic), only in the case of Bio Extratus; and (3) it was not possible to determine the extension of influence the focal firms might have in GSCM adoption by its suppliers. To our knowledge, this is the first multiple case study relating GSCM from Brazilian cosmetic firms.

Keywords: Green Supply Chain Management, Green Drivers, Green Practices, Performance, Cosmetic Firms, Developing Country

Contents

Originality and Copyright	iii
Dedication.....	iv
Acknowledgments.....	v
Abstract	vii
List of Figures	x
List of Tables.....	xi
List of Abbreviations and Acronyms.....	xii
1. Introduction	1
2. Literature Review	5
2.1. Supply Chain Management	5
2.2. Green Supply Chain Management.....	10
2.2.1. Green Drivers	14
2.2.2. Green Practices	16
2.2.3. Green Performance	17
2.2.4. Interaction between Green Performance and Economic Performance	21
2.2.5. Theoretical lenses applied to Green Supply Chain Management.....	24
2.3. Conclusion	25
3. Research Methodology	27
3.1. Research strategy.....	27
3.2. Sector and firms selected	31
AymaraUna	33
Bio Extratus	34
3.3. Research questions and hypotheses development	34
3.4. Questionnaire design and data collection.....	37
4. Data Analysis and Discussion of Results	41
4.1 Case-study AymaraUna	41
4.1.1. The firm	41
4.1.2. Suppliers	44

4.2	Case-study Bio Extratus	44
4.2.1	Firm	44
4.2.2	Suppliers	48
4.2.3	External pressures	49
	Cross-Case Analysis	49
5.	Conclusion	65
	Bibliographic References	68
	Appendix	87

List of Figures

Figure 1 - An inter-business SC	5
Figure 2 - A generic supply chain network	6
Figure 3 - Supply Chains and Sustainability	10
Figure 4 - GSCM network	12
Figure 5 - Brazilian HPPC Market Evolution	32
Figure 6 - Hypotheses on Drivers	36
Figure 7 - Hypotheses on Performance	37

List of Tables

Table 1 - Environmental Performance _____	20
Table 2 - Economic Performance _____	23
Table 3 - Rationalization of the questions _____	39
Table 4 – Hypotheses Check _____	50
Table 5 - Summary of firms' answers _____	61
Table 6 – Suggested indicators _____	63

List of Abbreviations and Acronyms

ABIHPEC	Associação Brasileira da Indústria de Higiene Pessoal, Perfumaria e Cosméticos
ABNT	Associação Brasileira de Normas Técnicas
ANOVA	Analysis of Variance
ANVISA	Agência Nacional de Vigilância Sanitária
CE	Circular Economy
CETESB	Companhia Ambiental do Estado de São Paulo
EMS	Environmental Management System
ESTG	Escola Superior de Tecnologia e Gestão
EU	European Union
HPPC	Higiene Pessoal, Perfumaria e Cosméticos
IB	International Business
GSCM	Green Supply Chain Management
LED	Light-emitting Diode
NGO	Non-governmental Organizations
RBV	Resource-based view
RL	Reverse Logistics
ROI	Return on Investments
RQ	Research Question
TOPSIS	Technique for Order of Preference by Similarity to Ideal Solution
SABESP	Companhia de Saneamento Básico do Estado de São Paulo
SC	Supply Chain
SCM	Supply Chain Management
SGA	Sistema de Gestão Ambiental

1. Introduction

This first chapter briefly introduces the dissertation. It discusses of the movements that led to the rising importance of supply chain management (SCM) within firms, and the rising concern regarding environmental issues that led to green supply chain management (GSCM) adoption. It brings the research questions, highlights the importance of the study and presents the structure of this dissertation.

Multinational firms are dealing with a global demand that is completely different from the registered in beginning of the century. Due to globalization, firms are able to outsource their production as a way to lower costs. The search for suppliers and buyers that crossed national borders has intensified, as a result of the international trade growth and global competition. Firms look for goods around the globe, seeking places that have slashed salaries, better land price, low energy costs, etc. In the last decades, developing countries have also become global centres for several industrial sectors, software development and financial services. The boom of firms outsourcing/offshoring has been unparallel (Mangan & Lalwani, 2016, pp. 56).

The reduction of trade barriers between countries and regions also appears in the list of factors that promoted the increase of international trade. Throughout the time, firms have been readjusting their operations to meet higher demands. Thus, pursuing global strategies, but acting locally, conscious of subtle but relevant cultural differences (Mangan & Lalwani, 2016, pp. 22).

A growing tendency to create or consolidate regional supply chains (SC) to attend markets in a more efficient way has emerged (Manyika & Lund, 2019). Therefore SCM increasingly became one of the most essential parts of international business (Lummus & Vokurka, 1999; Lummus, Vokurka, & Krumwiede, 2001). Some researchers have proposed that nowadays the competitive struggle is concerning SC versus SC, rather than between firms (Lambert & Cooper, 2000).

The SCM makes it possible for the firms to reduce costs while enable firms to negotiate with suppliers around the world in order to achieve the best cost-benefit. This diversification with new production and service centres directly impacted firms by allowing what started previously as local SC to go global by stimulating and making SCM

more complex. SC global perspective acts not only on business relations, but also on consumers who have access to cheaper and more diversified products and services. According to Lambert and Cooper (2000), SCM has been indicated as the management of multiple relationships across the SC. When dealing with the whole business process with excellence level, serve as a unique way of managing the business and relationships among the SC members. In this sense, SCM takes over a strategic position by coordinating all stages of production and commercialization of goods to the final customer. In the eyes of the customer, the whole SC become responsible for competitiveness not just the focal firm (Stadtler & Kilger, 2005, pp. 10).

Over time, society has become more aware about the importance of sustainable development. Due to an attention towards environmental issues, people's perception is changing. The rise of global warming and loss of biodiversity has proven to be important issues to the world which sets sustainability in danger (Tseng, Islam, Karia, Fauzi, & Afrin, 2019). Movements of environmental activism, plastic consumption reduction, conscious consumption, reduction of emission of polluting gases are being more frequent. A growing demand for sustainable goods and responsible firms emerged. As a result, social responsible consumers prefer to purchase goods from firms that are known from not harming society (Mohr, Webb, & Harris, 2001). The public takes into consideration what firms buy and who they buy from (New, Green, & Morton, 2000).

Firms are being influenced by the worldwide shift towards a more effective environmental management. In this sense, the concern with the environment and therefore with sustainability started to guide firms' decisions, especially in relation to its operations and brand's image. Responsible firms seek to minimize environmental impact, or at the best scenario, have zero impact, while maximizing return to shareholders and performing a positive social impact.¹ Sustainable practices can be seen as generating competitive advantage, since using natural resources efficiently, reducing environmental impact and decreasing the loss of material are sources of cost reduction (Porter, 1980).

A growing necessity for incorporation of environmental alternatives into SCM research and practices has emerged (Srivastava, 2007). Turn the SC greener is increasingly a concern for many firms and a challenge for logistics management nowadays (Diabat & Govindan, 2011). Innovation in the SC is inherent to this process,

¹ Source: <https://observador.pt/opiniao/a-nova-economia-do-impacto/>

which leads to GSCM implementation. Progressively, firms are realizing that environmental management is a key strategic matter with a promising continuing impact on firm performance (Diabat & Govindan, 2011), eventually to be ahead of the curve in this new structure of consumption. Thus, GSCM is perceived to improve the image of the firms, and in many cases, to reduce costs by increasing performance. Hence, GSCM gains prominence and progressively becomes more important in the routine of the firms.

This relationship is found in various industries being a transversal trend verified in a wide variety of sectors, for instance, in the food sector (Emamisaleh & Rahmani, 2017), in automotive firms (Vanalle, Ganga, Godinho Filho, & Lucato, 2017) and in the cosmetic industry (Borges & Herreros, 2011).

The cosmetic sector was chosen for this dissertation for several reasons. This sector has a significant impact on global economy. Allison and Martinez (2010) and Schaefer (2008) have argued that one class of products – beauty products – have done well even during the 2008's recession². In 2017, the global cosmetic products market was valued at USD 532.43 billion, and forecasts point that it will reach a market value of USD 805.61 billion by 2023. This means a compound annual growth rate of 7.14% during 2018-2023.³ Cosmetic use has a striking influence on human's social lives. Thus, the influence of globalization on the cosmetic industry is still an important matter to analyse (Kumar, 2005). Moreover, the complexity of the cosmetic sector has been known to have significant impact on the environment⁴. Furthermore, there are not many studies about GSCM in the cosmetic sector, to the best of our knowledge, thus reinforcing the importance of studying this sector.

Most of the studies focus on developed countries and scarce research has been carried out in developing countries. As per Fahimnia, Sarkis and Davarzani (2015), it is essential to understand more about GSCM in South America, which is one of the world's least-studied areas, accounting for only 2.1% of the available literature. Consequently,

² Source: <https://www.seattletimes.com/business/local-business/beauty-products-sales-bright-spot-during-recession/> viewed on 08/11/20 and

https://www.nytimes.com/2008/05/01/fashion/01SKIN.html?pagewanted_all viewed on 08/11/20

³ Source: <https://www.reuters.com/brandfeatures/venture-capital/article?id=30351> viewed on 08/11/20

⁴ Sources: https://www.independent.co.uk/news/long_reads/beauty-industry-plastic-pollution-environment-climate-change-cosmetics-a8697951.html viewed on 08/11/20 and

<https://exame.abril.com.br/marketing/residuos-plasticos-o-lado-feio-do-setor-de-cosmeticos/> viewed on 08/11/20

leaving important issues involving particularities of GSCM in contexts such as Brazil unaddressed. In this sense, this dissertation attempts to bridge a significant knowledge gap in GSCM theory by analysing it in the cosmetic sector in a developing country.

Brazil is one of the most significant countries when it comes to cosmetic sector. According to the Brazilian Association of the Personal Hygiene, Perfumery and Cosmetics Industry (Associação Brasileira da Indústria de Higiene Pessoal, Perfumaria e Cosméticos – ABIHPEC), it ranked as one of the ten largest consumers of Personal Hygiene, Perfumery and Cosmetics products in the world and represented about half of the sector's production in Latin America in 2018.

This study aims to analyse the operation of GSCM concerning Brazilian cosmetic sector. Therefore, three research questions (RQ) guide the study:

RQ₁: What are the main institutional pressures that have influenced the adoption of GSCM practices in Brazilian cosmetic firms?

RQ₂: What is the effect (economic and environmental) of GSCM practices implementation for the cosmetic firm?

RQ₃: In what ways does the central firm act to induce sustainable procedures in its SC?

In order to answer these questions, two case studies are analysed. The findings are used to provide insight to the analysis, discussion and conclusion. Therefore, this dissertation has three major objectives: to examine the pressures for GSCM adoption in Brazilian cosmetic sector, to analyse the effect of GSCM practices on performance, and to understand the way the central firm induces GSCM practices on suppliers.

The remainder of this dissertation is structured as follows: chapter two offers the literature review; chapter three presents the methodology; in chapter four data analysis and discussion of results are shown; and chapter five presents the final conclusion and discussion.

2. Literature Review

This second chapter presents the literature review, and it is structured in three main sections. In the first section SCM concept is discussed; in the second section GSCM is examined as well as important concepts and relations, namely green drivers, green practices, green performance, interaction between green performance and economic performance, theoretical lenses applied to GSCM; finally, the last section presents the main conclusions of the chapter.

2.1. Supply Chain Management

In a broad sense, SC consists of two or more legally separated organizations, linked by material, information, and financial flows (Stadtler, Kilger, & Meyr, 2015, pp. 9). In a SC goods and information are exchanged within the logistical process that goes from crude raw materials up to distribution of goods to the final customer. During this process, the good must pass through many stages of transformation in order to gain value. SC is composed by suppliers, manufacturers and/or service providers, distributors, wholesalers, and retailers who deliver the good to the ultimate customer (Cox, Sanderson, & Watson, 2001; CSCMP, 2013; Ellram, 1991; Heizer & Render, 2014). There are two main perspectives of SC broadly accepted. One is more classical and simpler, while the other one is more current and complex.

The first perspective, more classical, conceives SC as a chain with the members represented horizontally, as in Figure 1. Within this definition, elements are separated and independent (Harland, 1996). Also, there is a more limited number of actors along the SC.

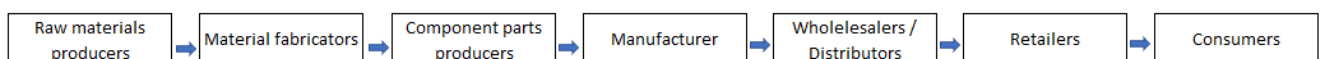


Figure 1 - An inter-business SC
Source: Harland (1996)

According to the second perspective, SC has a network configuration. It is constituted by several nodes representing legally independent firms who make

autonomous decisions, and a set of relations that connect these units to develop new goods (Cox et al., 2001). In Figure 2, a generic SC network is illustrated comprehending both forward and reverse processes. It shows a feasible flow of goods in a given SC. For general purposes, this dissertation will use the definition of SC as a network.

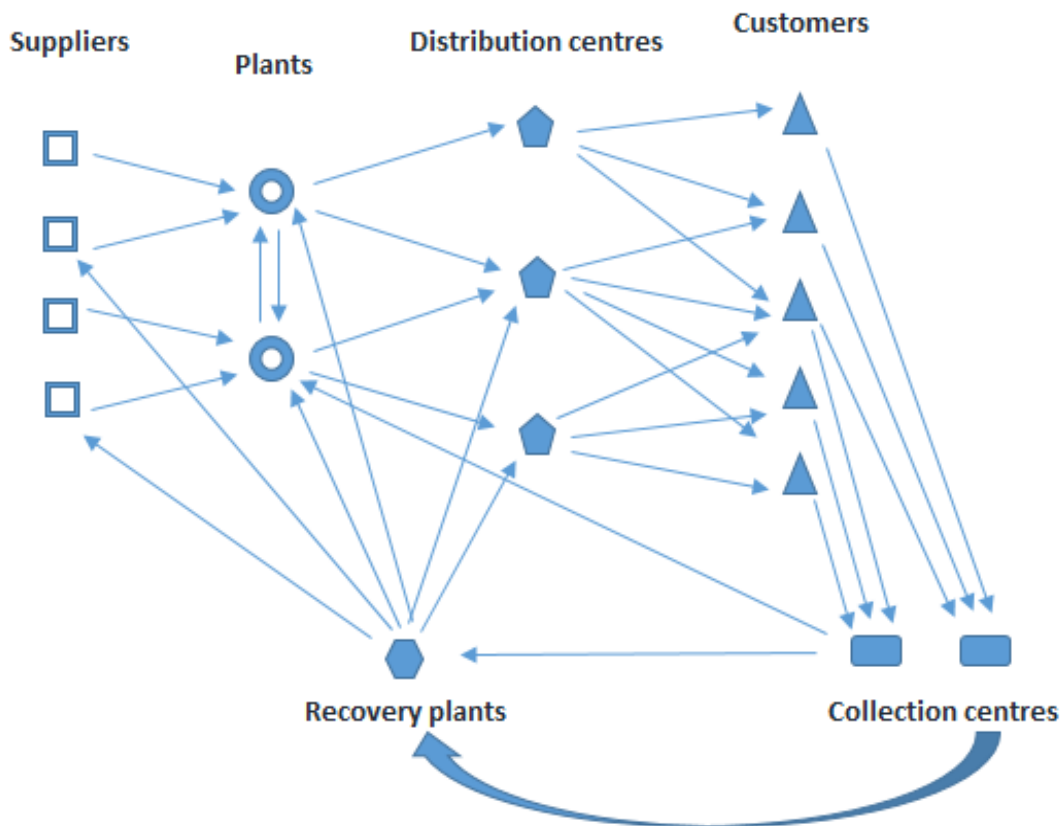


Figure 2 - A generic supply chain network
Source: Melo et al. (2009)

It is possible to distinguish SC of innovative products from SC of functional products, which are fundamentally different from each other (Fischer, 1997; Ramdas & Spekman, 2000; Stadtler & Kilger, 2005, pp. 38). The first type of products is characterized by short life cycles, changeable demands, although with rather high profit margins. The uncertain demand enhances the risk of shortages or excess supplies. Innovative products lead to a robust market orientation to align supply and demand. Within the SC of this kind of product, suppliers should not be chosen for their low cost, but from their speed and flexibility. On the other hand, there are SC of functional products, which have a much more stable demand and extended life cycles, but with low profit margins. It includes products that satisfy basic needs and do not change much over time, namely products that are sold in retail outlets, grocery stores or gas station (Fischer,

1997). These SC are more likely to focus on cost reduction of physical material flows and on value creating processes.

SC can differ in other aspects, for example, regarding the level of internationalization of the focal firm. Globalization goes from SC of organizations acting in a single country to those acting globally. Global SC has to take into account extra costs, such as foreign taxes and exchange rates (Stadtler & Kilger, 2005, pp. 66).

A well-designed SC network has become increasingly more important as the globalization reshapes the world economic scenario amidst new demands of the market. Therefore, globalization along with fast development of information technologies have conducted to shorter goods' life cycles, smaller batches and a more dynamic consumer behaviour (Melo et al., 2009). As firms aimed to strengthen their competitiveness by customizing products and services, fabricating higher quality goods with reduced cost, SC began to receive closer attention. Within this scenario, suppliers turned into partners due to their contribution to competitive advantage (Heizer & Render, 2014, pp. 469). Consequently, a new economic reality emerged as global markets took place in an unimagined scale. Thus, firms benefit from these colossal economies of scale in production, distribution, marketing and management (Berthon, Pitt, Plangger, & Shapiro, 2012; Chenhall, 2005; Levitt, 1983).

SCM is defined as the planning, implementation, coordination, and control of all SC processes, directly or indirectly, such as sourcing and procurement, conversion, and logistics operations activities, since raw materials suppliers until the satisfaction of the ultimate customer. Thus, SCM integrates supply and demand administration within and across firms (Chopra & Meindl, 2001; CSCMP, 2013; Heizer & Render, 2014; Melo et al., 2009). As per Christopher (2005, pp. 5) and Mangan and Lalwani (2016, pp. 11), SCM is described as the management of upstream and downstream relationships concerning material flows, information and resources with suppliers and customers to bring greater customer value at less cost to all SC components.

SCM is also the coordination of activities throughout the SC in order to increase its competitive advantage and satisfy the ultimate customer. This is done by improving the long-term performance of the individual firms and the hole SC, while creating value-and improving efficiency (Heizer & Render, 2014, pp. 468; Mangan & Lalwani, 2016, pp. 11; Mentzer, Keebler, Nix, Smith, & Zacharia, 2001). In general, SCM seeks to improve

performance through elimination of waste and better use of internal and external supplier capabilities and technologies (Wisner & Tan, 2000; Zhao, Huo, Selen, & Yeung, 2011).

With the arrival of new technologies, a lot of service-based activities were developed in order to serve customer in a better, cheaper and faster way along the SC (Mangan & Lalwani, 2016, pp. 4) contributing to firms' competitive advantage. Thus, the SCM plays a key role in the execution of the firms' strategy.

SCM has been known to be the fusion of numerous disciplines, with influence from logistics, operations and materials management, distribution management, transportation, marketing, industrial economics, inter-organisational behaviour along with purchasing and information technology (Giunipero, Hooker, Joseph-Matthews, Yoon, & Brudvig, 2008; M. Saunders, 1995). In an ideal scenario, SC managers learn from each of these areas to build a global SC strategy that ultimately improves firm performance (Croom, Romano, & Giannakis, 2000; Wisner & Tan, 2000).

When talking about performance, there are many examples of well-known and successful SC, such as Dell, Unilever, Colgate-Palmolive and Cisco Systems, to name only a few.

Dell has derived from being a personal computers manufacturer into an end-to-end technology solutions provider. The firm credits part of its success to SCM. Its competitors on the personal computer sector frequently take weeks to build and deliver the product, while Dell does it in hours/days (Mangan & Lalwani, 2016, pp. 77). As discussed, speed and flexibility are key abilities in SC of innovative products.

Unilever, rated as the best SC of 2018⁵, intends to leverage the suppliers' potential to grow by building capacities in emerging markets and other world's fastest growing regions searching for joint opportunities. The firm drives SC efficiently, invests in cutting edge technology, and searches for innovation while continuously encourages the development of new capacities. A great deal of Unilever SCM success comes from innovation – almost 30% of growth derives from it and over 70% comes from Unilever's suppliers. Along with the suppliers, Unilever is able to transform consumer's comments into solutions throughout the whole value SC (Unilever, 2019). In 2019, Unilever entered

⁵ Source: <https://www.industryweek.com/supply-chain/top-25-supply-chains-2018/gallery?slide=25> viewed on 10/11/2019

Gartner's "Master" category, a superior level that recognizes sustained leadership over the years⁶.

Colgate-Palmolive ranks second on Gartner's SC list in 2020. A combination of business-first mindset empowered by new technologies that boosted leadership capacities and decision-making⁷. End-to-end digital control tower and the use of predictive analytics together with artificial intelligence allowed visibility throughout the SC as well as improved production and quality⁸. This technological breakthrough gave the firm the first place in 2019 and remains crucial in 2020. In addition to its technology improvement, Colgate-Palmolive has focused on TRUE Zero Waste certification commitment. For the past three years, 15 of its plants have already earned this designation, and last year it launched a recyclable toothpaste tube⁹.

Cisco Systems ranked first on Gartner's SC list in 2020. It shifted from product-centric to offer-based, driving multiple business models within the firm, supported by a digital SC built on security foundation. Its physical SC is also secure with information technology capabilities. Cisco outsources its entire manufacturing operations to a global chain with hundreds of suppliers and partners. The firm makes an effort towards enterprise-wide circular economy including planning, sourcing, manufacturing and delivery throughout its whole SC. Moreover, Cisco demands its suppliers to stand by Environmental, Social, and Corporate Governance standards¹⁰.

From the examples above it is perceptible that nowadays, in the SCM, social and environmental dimensions are alongside with the financial dimension. This has been a gradual movement that reflects the pressures of society and governments on the firms' performing. Nevertheless, the addition of environmental and social aspects into the SCM could impact in a positive way firm's profitability, competitive advantage and performance (Carter & Rogers, 2008; Gold, Seuring, & Beske, 2010; Golicic & Smith, 2013). Figure 3 represents the three elements of a sustainable SC.

⁶ Source: <https://www.gartner.com/en/newsroom/press-releases/2019-05-16-gartner-announces-rankings-of-the-2019-supply-chain-t> viewed on 10/04/2020

⁷ Source: <https://www.gartner.com/en/newsroom/press-releases/2019-05-16-gartner-announces-rankings-of-the-2019-supply-chain-t> viewed on 10/04/2020

⁸ Source: <https://www.industryweek.com/supply-chain/media-gallery/22028091/top-25-supply-chains-of-2019/slideshow?slide=25> viewed on 10/04/2020

⁹ Source: <https://www.industryweek.com/supply-chain/media-gallery/21141688/top-25-supply-chains-of-2020/slideshow?slide=9> viewed on 19/09/2020

¹⁰ Source: <https://www.industryweek.com/supply-chain/media-gallery/21141688/top-25-supply-chains-of-2020/slideshow?slide=10> viewed on 19/09/2020

Financial responsibility regards the financial aspects and needs of the shareholders, employees, customers, firms, financial institutions, etc. Environmental responsibility addresses the world's green needs and firm's responsible use of the planet's resources (Mangan & Lalwani, 2016, pp. 8), producing the smallest footprint as possible. Social responsibility concerns moral, ethical, and philanthropic duties which firms have with society. As an example of this ethical conduct, firms should look for suppliers that respects labour rights and sustainable development (Krajewski, Ritzman, & Malhotra, 2013, pp. 463).

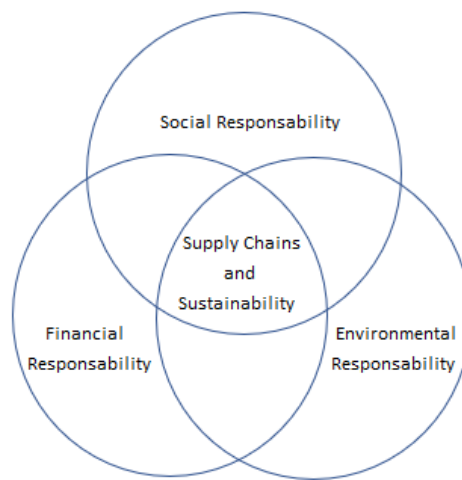


Figure 3 - Supply Chains and Sustainability
Source: Krajewski et al. (2013), pp. 463

For each of these new dimensions, an autonomous body of research has been developed in recent years (Ahi & Searcy, 2013; Dubey et al., 2017; Emamisaleh & Rahmani, 2017; Genovese, Acquaye, Figueroa, & Koh, 2017; Gold et al., 2010; Golicic & Smith, 2013; Seuring, 2013; Silvestre, 2015; Touboullic & Walker, 2015). By the importance that it has in the context of this dissertation, the environmental dimension will be detailed in the next section.

2.2. Green Supply Chain Management

Integration of environmental aspect into SCM is what characterizes GSCM. The foundation of GSCM lays either in environmental management and SCM literature (Sheu, Chou, & Hu, 2005; Srivastava, 2007; Zhu & Sarkis, 2004). GSCM means that all the processes involved in product design, material sourcing and selection, manufacturing

processes, final product delivery to the consumers as well as end-of-life management of the product after its useful life, are being done taking into account the environmental aspect.

GSCM seeks to reduce environmental impacts of the firms without losing quality, performance, efficiency or gains (Srivastava, 2007). By doing so, GSCM appears as a relevant tool for firms to accomplish profits and market shares (Muduli, Govindan, Barve, & Geng, 2013; Van Hoek, 1999; Zhu, Sarkis, & Lai, 2008a). The perspective shifted from seeing sustainability as a burden to seeing as a promising way to achieve competitive advantage (Van Hoek, 1999), thus GSCM appears as a strategic approach (Govindan, Sarkis, Jabbour, Zhu, & Geng, 2014). Then, collaboration with suppliers (Jinsoo Kim & Rhee, 2012; Narasimhan & Schoenherr, 2012; Zhu, Sarkis, & Lai, 2012) and customers is mandatory for manufacturing firms to have performance gains accruing from GSCM practices, coordination and integration (Cheng, Yeh, & Tu, 2008; Lee & Klassen, 2008).

In Figure 4, the existing GSCM literature is organized into three wide categories that characterize green SC ground: “GSCM importance”; “Green Design” and “Green Operations”. While “GSCM importance” deals with the literature more focused on the theoretical approach and its development, “Green Design” concerns promoting knowledge of how design choices impacts goods environmental compatibility (Glantschnig, 1994). “Green Operations” is about sustainable movements within the firms focusing on areas such as green manufacturing and remanufacturing, reverse logistics (RL), network design, and waste management (Srivastava, 2007).

Initial literature was needed to set the ground and to discuss and clarify the meaning of the vocabulary that were emerging, as well as recommend ways to analyse the GSCM further. Therefore, “GSCM importance” focused on showing the necessity of the area while it was being developed (Srivastava, 2007) and on establishing the concepts. In the last decade researchers analysed matters such as study of the environmental management system (EMS) implementation practices (Hui, Chan, & Pun, 2001), the impact of green purchasing on a firm’s supplier selection (Zhu & Geng, 2001), packaging and regulatory compliance (Min & Galle, 2001), focus on third-party logistics providers (Meade and Sarkis, 2002), product distribution to the final customer and end-of-life product management (Caniato, Caridi, Crippa, & Moretto, 2012; Zhu & Sarkis, 2004).

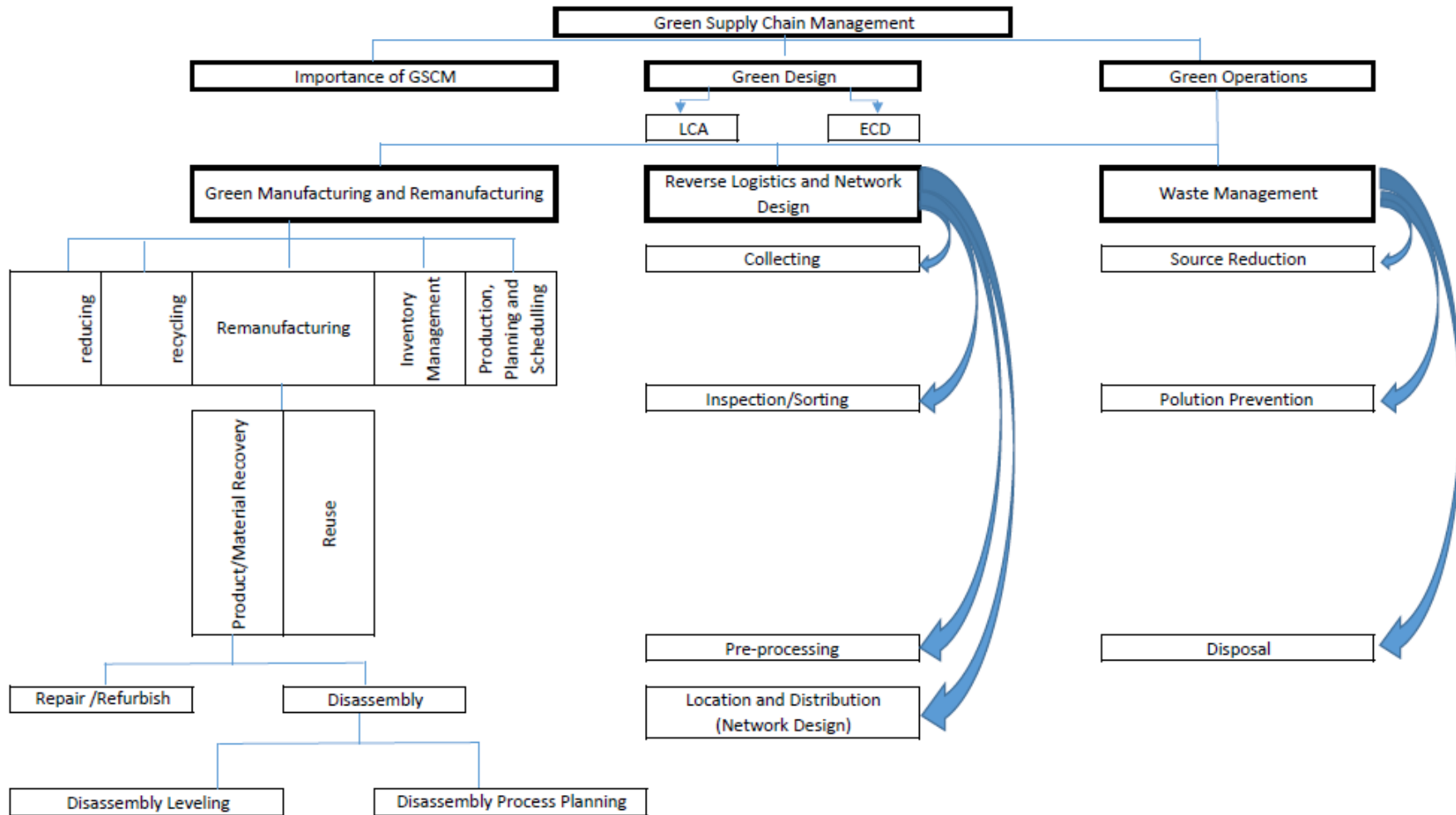


Figure 4 - GSCM network
Source: S. K. Srivastava (2007)

“Green design” can be seen from an environment conscious planning perspective considering the life cycle of the good. Environmentally conscious design deals with replacing a likely hazardous component or process by something that looks like less questionable (Srivastava, 2007). Moreover, it also deals with life cycle of the product/service, signifying that every step of the production cycle, since the raw material extraction to ultimate product is considered. The inputs (raw materials, resources, energy) and outputs (emission to air, water and solid waste) are calculated in each production stage, disposal back to the environment and the potential environmental impacts of the cycle (Arena, Mastellone & Perugini, 2003).

“Green operations” include all operational features that are relate to green manufacturing and remanufacturing (reduce, recycle, production planning and scheduling, inventory management, remanufacturing, re-use, product and material recovery), waste management (source reduction, pollution prevention, disposal), RL and network design (collection, inspection/sorting, pre-processing, network design) (Srivastava, 2007).

In a related line of thought, circular economy (CE) paradigm is being developed since the mid-1990s (Pishchulov, Richter, Pakhomova, & Tsenzharik, 2018). CE seeks to optimize resources and energy, reducing waste and pollution within the planet and minimizing the necessity for new inputs into the productive process (Genovese et al., 2017; Sauvé, Bernard, & Sloan, 2016). Therefore, environmental sustainability frontiers are expanded within the transformation of resources in a way that aligns economic growth, innovation and green matters (Genovese et al., 2017; Pishchulov et al., 2018).

This paradigm assumes forward and reverse flow of a SC, hence closing the loop in the flow of goods. In this sense, CE contributes for decoupling economic growth from environmental deterioration. The transition from a linear to a circular economy, where recovery, remanufacture, repair, recycle, re-use of used products are common, allows a resource to be used over and over again (Masi, Day, & Godsell, 2017; Pishchulov et al., 2018). This brings a new way to face what is discarded, since there is not out of the planet. What was previously considered waste, becomes a resource. Thus, CE allows an optimization of the current production model, extending the useful life of products and services. CE makes sustainability more feasible (Sauvé et al., 2016), moreover it can be seen more as a human development design and less as just an economic strategy (Murray, Skene, & Haynes, 2017).

Despite of having slightly diverse perspectives, both GSCM and CE aim to increase economic and environmental performances (Liu, Feng, Zhu, & Sarkis, 2018). CE performance can be improved by SC integration (Zhu, Geng, & Lai, 2011), whereas GSCM can improve environmental performance by incorporating CE practices (Genovese et al., 2017). The environmental aspect is potentialized as CE intends to improve environmental performance and enhance profitability by transforming residues into resources (Genovese et al., 2017; Masi et al., 2017; Pishchulov et al., 2018).

2.2.1. Green Drivers

The commitment to environmental sustainability is motivated by internal and external forces known as green drivers. Green drivers can be defined as what motivates or induces firms to embrace environmentally friendly initiatives (Jain & Shivani, 2014). Internal drivers can be described as organisational factors, while external drivers are dependent of external conditions that force the SC members to be more sustainable (Emamisaleh & Rahmani, 2017), for instance, regulations. The influence of institutional pressure may help firms to reduce obstacles to GSCM practices (Wu, Ding, & Chen, 2012).

Internal drivers are usually examined according to the resource-based view (RBV) of the firm which implies that all the assets and capabilities, its knowledge and culture are unique resources of a firm. In this sense, the firm can conceive value-creating strategies and improve its efficiency (Barney, Wright, & Ketchen Jr, 2001). Thus, firm's internal drivers towards green SC management practices consists in organizational factors such as employees, pressure from investors, desire to reduce cost by minimizing waste and pollution while improving quality, managing economic risk, extension of founder's value, personal engagement of top managers, middle management, investors, and employees (Defee, Esper, & Mollenkopf, 2009; Emamisaleh & Rahmani, 2017; Green, Morton, & New, 1996; Handfield, Walton, Seegers, & Melnyk, 1997; Jain & Shivani, 2014; McFadden, Henagan, & Gowen, 2009; New et al., 2000; Reed, 2002; Walker et al., 2008). For the employees' commitment to be significant, it is important that they are motivated by the top management (Daily & Huang, 2001; Reed, 2002).

In a sustainable chain, the focal firm needs to encourage green practices within its direct and indirect suppliers, in order to broaden a positive environmental impact on its SC (Carvalho, 2011). Thus, sustainable SC requires suppliers' monitoring and

implementation of sanction models, as a way to encourage them to improve their socioenvironmental performance, consequently improving the SC as a whole (Seuring & Müller, 2008). For the GSCM implementation to be successful, it depends on the adequate integration and collaboration between the focal firms and its SC partners (Tseng et al., 2019). Therefore, the role of the focal firm is essential in inducting GSCM in its SC as a whole (Arantes, Jabbour, & Jabbour, 2014).

External drivers are usually studied based on institutional theory which describes in what way a firm suffers external pressures. As per Wu, Ding, and Chen (2012) firms tend not to allocate resources for green management without institutional pressure. External pressures can be divided into normative, mimetic and coercive (DiMaggio & Powell, 1983; Ketokivi & Schroeder, 2004; Zsidisin, Melnyk, & Ragatz, 2005).

Coercive drivers stem from political affairs (national and international), regulations and laws set by governments. Some examples of these coercive green drivers are policies and legal guidance and requirements regarding environment issues. These elements put great pressure on firms that must adhere to regulation to not pay fines, avoid lawsuits, or prevent to undergo government retaliation. Moreover, these kind of situations can seriously damage firm's public image towards its current and potential customers (Lai, Cheng, & Tang, 2010; Perez-Batres, Miller, & Pisani, 2011; Teo, Wei, & Benbasat, 2003; Zhu & Sarkis, 2007).

Normative drivers are created by suppliers, working units, non-governmental organizations (NGO), local communities and commercial communications. They are originated from public expectations of groups (customers, local organizations, NGO, etc.) asking for sustainable practices within the firms. Their actions are based on beliefs and are not the result of legislation or coercion. Therefore, in order to be in accordance with public demands and assure legitimacy, firms follow society's norms (Delmas & Toffel, 2004; DiMaggio & Powell, 1983; H. Liu, Ke, Wei, Gu, & Chen, 2010; Teo et al., 2003).

Mimetic drivers appear when competitors try to copy sustainable practices or strategies. This may happen when the firms' objectives are vague and because imitation of the competitor behaviour represents low cost for them. This is an imitative behaviour that shapes competing firms. By doing so, it reflects the firm's awareness of the environment and competitive advantage (H. Liu et al., 2010). In sum, firm associates the success of its competitor to their strategic choices and resort to mimetic resources as a way to duplicate a business leverage (H. Liu et al., 2010; Zsidisin et al., 2005).

For example, a study made within the Iranian food sector contrasted the effect of the external and internal drivers using quantitative data. Results showed that internal drivers have positive impact on strategic sustainability orientation, being more important in creating sustainable orientation than external drivers. In addition, results also show that external drivers can affect internal drivers. However, external drivers have less importance than internal drivers when it comes to developing sustainable orientation within a firm (Emamisaleh & Rahmani, 2017).

In a different study, Luthra, Garg and Haleem (2015) show that Indian industries also face pressure to greening their SC from both international and domestic context. In a single case study of a cosmetic firm, it was observed that the purchasing and production categories were decisive in achieving a competitive position in the green business environment.

Strategies observed in these studies revealed a commitment to sustainability with the intention of increasing their financial gains from a reduction in environmental impacts (Borges & Herreros, 2011).

2.2.2. Green Practices

GSCM practices consists in all SC activities to eliminate or diminish environmental impact (Azevedo, Carvalho, & Machado, 2011; Rao & Holt, 2005), including every effort addressed from creation, development, production, till delivering the good to the ultimate user (Golicic & Smith, 2013). Furthermore, GSCM practices can be seen at the strategic, tactical or operational levels due to its relation to the SC and even to innovative actions (Azevedo et al., 2011).

Green practices include environmental purchasing (Holt & Ghobadian, 2009; Hu & Hsu, 2006), SCM flowing from supplier environmental collaboration (Zhu et al., 2008a), customer cooperation (Zhu et al., 2008a; Zhu, Sarkis, & Lai, 2008b), through eco design (Linton, Klassen, & Jayaraman, 2007; Zhu et al., 2008a, 2008b), ecological packaging (Rao & Holt, 2005; Zhu et al., 2008a, 2008b), design for product recyclability (Chen & Sheu, 2009), reduction of energy consumption - energy efficiency (Holt & Ghobadian, 2009; Rao & Holt, 2005; Vachon, 2007), certification according to international standards (ISO 14000 group) (Holt & Ghobadian, 2009; Hu & Hsu, 2006; Rao & Holt, 2005;

Vachon, 2007; Zhu et al., 2008b, 2008a), and RL (Chanintrakul, Mondragon, Lalwani, & Wong, 2009; Hu & Hsu, 2006; Pochampally, Gupta, & Govindan, 2009; Rao & Holt, 2005; Srivastava, 2007; Vachon, 2007).

For SCM, it is important to integrate environmental management practices into the SC in order to make it greener and to maintain competitive advantage (Linton et al., 2007; Rao & Holt, 2005) by reducing costs. Thus, green practices should improve both, the environmental and the economic performances.

Over the years, firms started adopting some kind of EMS to address environmental practices (Takahashi & Nakamura, 2010). EMS is a systematic process that concerns the prescription and implementation of environmental objectives, rules, policies and also auditing process of its members (Steger, 2000). Such systems act essentially reconciling economic and environmental matters (Hui et al., 2001). Despite of the fact that the standard adoption is voluntary, it might help firms improving their process control whereas increasing profitability (Epstain & Roy, 1997; Stock, Hana, & Edwards, 1997). Due to the voluntary aspect of ISO certifications, firms can behave strategically towards them. By developing their own priorities and choosing to obtain these standards certifications in some not all plants (Takahashi & Nakamura, 2010).

2.2.3. Green Performance

Green performance is related to firm's decrease of harmful impacts to the environment (Kenneth Green, Zelbst, Meacham, & Bhadauria, 2012; Wagner & Schaltegger, 2004; Zhu & Sarkis, 2004; Zhu et al., 2012; Zhu, Sarkis, & Lai, 2007a). For example, Yale's Environmental Performance Index is based on two main objectives: Environmental Health, that measures threats to human health, and Ecosystem Vitality, which gauges natural resources and ecosystem services (Wendling, Levy, & Sherbinin, 2018).

Green performance can be measured by making use of various indicators which reveal the firms' environmental impact in various categories, each measured by an individual item variable (Wagner & Schaltegger, 2004). For example, the ability of manufacturing plants to reduce pollutant emissions to air and water, odour emissions, energy consumption, non-renewable resources, toxic inputs, solid waste, soil contamination, landscape damage, effluent waste, and solid wastes; and the ability to

decrease consumption of hazardous and toxic materials (Yang, Lu, Haider, & Marlow, 2013; Zhu et al., 2008a). Furthermore, green performance also can be measured by other items such as percentage of materials recycled, cost of fines and penalties for pollution, packaging volume, response time to environmental accidents, percentage of suppliers audited for sustainability compliance, frequency of sustainability audits, percentage of product/process materials recyclable, product life, eco-efficiency of product use, number of accidents spills, number of products that can be reused or recycled, ISO 14001 certification by number and percentage of facilities (Epstein, 2008; pp. 172/173). GSCM stimulates synergy and effectiveness towards SC business, at the same time that improves green performance becoming a source of competitiveness (Rao & Holt, 2005).

Concerning the indicators that can measure green performance throughout different periods of time, we can name percentage of materials used that are recycled input materials; correct waste destination; amount of gross waste; amount of energy consumption; amount of water consumption; amount of chemicals; energy saved due to efficiency improvements; percentage of water recycled and reused; percentage of waste recycled and reused; amount of gas emissions (more harmful, such as ozone, sulfuric); total water discharged; total weight of waste by type and disposal method; amount of packaging materials; percentage of environmental damage (Epstein, 2008 pp. 171 to 173; Jabbour, Jabbour, Latan, Teixeira, & de Oliveira, 2014; Vanalle, Ganga, Godinho Filho, & Lucato, 2017; Wendling et al., 2018; Qinghua Zhu & Sarkis, 2004, 2007).

Epstein (2008; pp. 131) argue that performance evaluation is important within sustainability implementation as it can provide comparison over time and between firms, highlight of optimization potential, derivation and pursuit of green objectives, technical support for certification programs, provides information to modify managerial practices and improve performance, and it is a communication tool for corporate reports. Table 1 presents several environmental performance indicators retrieved from different authors, firms' reports, and environmental professional suggestions.

The use of green practices impact and relate to environmental performance (Geffen & Rothenberg, 2000; Kenneth Green et al., 2012; Pochampally et al., 2009; Sarkis, 2003; Seuring & Müller, 2008; Vachon, 2007; Zhu, Sarkis, & Lai, 2007b, 2013). For example, Jabbour, Jabbour, Latan, Teixeira, and de Oliveira (2014) argued that GSCM practices impacts firms' green performance in Brazil highlighting the importance of mediating influences in organizational sustainability research.

Environmental Performance	
Indicators	Authors / Firms' Report
Volume of reused water (amount of water captured you can reuse)	Caniato, Caridi, Crippa, and Moretto (2012); Wendling, Levy, and Sherbinin (2018)
Volume of treated water	Preuss (2002); Wendling, Levy, and Sherbinin (2018)
Greenhouse gas indicator (direct and indirect generation)	Wendling, Levy, and Sherbinin (2018); Kannan, De Sousa Jabbour, and Jabbour(2014)
Reduction of air emission	De Giovanni and Esposito Vinzi (2012); Zhu and Sarkis (2004), (2006)
Reduction of waste water	Vanalle et al. (2017); Zhu & Sarkis (2004), (2006); Zhu et al. (2013)
Reduction of solid waste	Vanalle et al. (2017); Zhu & Sarkis (2004), (2006); Zhu et al. (2013)
Decrease of consumption for hazardous/harmful/toxic materials	De Giovanni and Esposito Vinzi (2012); Zhu and Sarkis (2004), (2006); Zhu et al. (2013)
Decrease of frequency for environmental accidents	De Giovanni and Esposito Vinzi (2012); Zhu and Sarkis (2004), (2006); Zhu et al. (2013)
Improve an enterprise's environmental situation	Vanalle et al. (2017); Zhu & Sarkis (2004), (2006); Zhu et al. (2013)
Projects with customers / suppliers / community	Diabat & Govindan (2011); Zhu et al. (2012)
Use of environmentally sustainable products	Mitra & Datta (2014)
Designing products with biodegradable design	Mitra & Datta (2014)
Using alternative transport mechanisms	Mitra & Datta (2014)
Total quality environmental management	Zhu et al. (2012)
Compliance with environmental policies (fines) and audit programs	Zhu et al. (2012); Bansal & Roth (2000); Kannan, De Sousa Jabbour and Jabbour (2014)
Design of products for reduced consumption of material/energy	Diabat & Govindan (2011); Zhu et al. (2012)
Use of renewable energy	Green, Zelbst, Meacham, and Bhadauria (2012); Mitra & Datta (2014)
Initiatives to reduce greenhouse gas emissions and reductions achieved	Jain and Shivani (2014); Sarkis, Zhu, and Lai (2011)
Commitment by the company's top management to GSCM	Zhu et al. (2012)
Internal cooperation for environmental improvement	Zhu et al. (2012)
Integrating quality environmental management into the planning and operation process	Diabat and Govindan (2011)
EMS certification (e.g. ISO)	Diabat and Govindan (2011); Vanalle et al. (2017); Zhu et al. (2012)
Selection of suppliers using environmental criteria	Kannan et al. (2014); Min and Galle (2001); Mitra and Datta (2014)

Collaboration with suppliers to achieve environmental goals	Diabat and Govindan (2011); Mitra and Datta (2014)
Suppliers' environmental audit	Mitra and Datta (2014); Zhu et al. (2012)
Cooperation with customers/suppliers for eco-design (e.g. packaging)	Diabat and Govindan (2011); Zhu et al. (2012)
Cooperation with customers/suppliers for cleaner production (e.g. waste reduction)	Diabat and Govindan (2011); Zhu et al. (2012)
Cooperation with customers/suppliers for using RL	Zhu et al. (2012)
Project goods with reduction, reuse, recycling or recovery of materials, components or energy	Diabat and Govindan (2011)
Equipment replacement/maintenance and change processes to reduce the generation of gases	Coca-Cola; Sonae; Petrobras
Waste indicator/destination indicator	Coca-Cola; Sonae; Petrobras; Natura
Volume of separated/treated waste	Sonae; Petrobras; Natura; The Navigator Company
Number of tests on animals	Natura

Table 1 - Environmental Performance**Source: Author**

2.2.4. Interaction between Green Performance and Economic Performance

As per Kumar, Teichman, and Timpernagel (2012), firms should re-examine the way they are doing business to continue lucrative in the future. When sustainability becomes a priority in managerial decisions, it means more than having to handle risk and uncertainty. It means having the potential to achieve profits, efficiency and to gain a competitive advantage by adopting GSCM practices (Golicic & Smith, 2013).

The incorporation of environmental management within the SC can improve not only environmental performance, but also economic performance (Chien & Shih, 2007; Geffen & Rothenberg, 2000; Rao & Holt, 2005; Sarkis, 2003; Seuring & Müller, 2008; Vachon, 2007; Vanalle et al., 2017; Zhu & Sarkis, 2004). As discussed before, the environmental performance is usually measured by reductions in air emissions, effluent waste, solid waste, and the consumption of toxic and non-toxic materials (Kenneth Green et al., 2012; Zhu et al., 2012, 2013). Economic performance is achieved by decrease in some costs and increase in profitability supported by boosting operational and organizational performance (Azevedo et al., 2011; Geffen & Rothenberg, 2000; Golicic & Smith, 2013; Holt & Ghobadian, 2009; Rao & Holt, 2005; Sarkis, 2003; Seuring & Müller, 2008; Vachon, 2007; Vanalle et al., 2017; Zhu & Sarkis, 2004). Thus, the improvements on environmental performance has brought real economic gains for firms that have chosen to embrace sustainable development. As studies carried out in different industries and countries had shown the impact of GSCM on economic performance can be both, direct and indirect.

Huang, Wu and Rahman (2012) demonstrated that environmental performance is positively associated with economic performance in RL with evidence from the Taiwanese high-tech sector. Their study showed environmental performance can be related to increase of profitability in the short-term, whereas can turn into competitive advantage in the long-term. The empirical results indicated inventory investments reduction, increased recovery of assets, enhanced cost containment, profitability improvement, enhanced labour productivity and improved customer service.

An empirical study held in Brazilian automotive industry showed a positive relationship between GSCM practices and economic performance. The results of the research indicated decrease of costs in three indicators such as fee for waste treatment, fee for waste discharge, and fine for environmental accidents (Vanalle et al., 2017).

In the study conducted by Kim, Youn and Roh (2011), focused on South Korea companies, researchers also found a positive relation between green management and firm performance improvement. Their research empirically demonstrated that green orientation culminates in improving firm performance such as customer service, operational effectiveness, and financial outcomes. They posit that partner's trust and information sharing are mediating factors in GSCM orientation's impact. The results indicated improvement in cash flow, total sales, return on investment (ROI), as well as reduction in working hours and variable lead-time, production cycle times and new-product cycle times (development cycles), operational costs, and inventory levels.

A study carried out in Chinese manufacturing enterprises indicated that higher levels of GSCM practices positively impacts economic performance. Their study identified a "win-win" relation between the adoption of GSCM practices, environmental and economic performance. According to the empirical research, GSCM brings economic benefits to the firms due to the decrease in several costs, specifically related to materials purchasing, energy consumption, fee for waste treatment, fee for waste discharge and fines due to environmental accidents. Moreover, the absence of a substantial relationship with negative economic effect, such as increase in costs related to investment, operational cost, training and purchasing environmentally friendly materials, highlights even more GSCM and economic performance positive relationship (Zhu & Sarkis, 2004).

There is not much evidence pointing that environmental legislation is detrimental for competitiveness, therefore GSCM should not be seen as an element that would negatively impact it (Berrone & Gomez-Mejia, 2009; González-Benito & González-Benito, 2006; Jaffe, Steven, Portney, & Stavins, 1995). Nevertheless, some GSCM literature is still inconclusive when it comes to the relation between GSCM practices and firm performance (Golicic & Smith, 2013). Table 2 lists economic performance indicators found in the literature and analysed from firms' reports/websites¹¹.

¹¹Sources: <https://www.cocacolabrazil.com.br/content/dam/journey/br/pt/private/pdfs/relatorio-de-sustentabilidade-coca-cola-brasil-2018-baixa.pdf#page=106> viewed on 01/05/2020 and https://www.philips.com/a-w/about/news/archive/standard/news/press/2018/20180220-philips-increases-green-revenues-to-eur-10_7-billion-60-percent-of-total-sales-in-2017.html viewed on 01/05/2020

Economic Performance	
Indicators	Authors / Firms' Report
Sales' increase (volume or percentage) / Profit increase	De Giovanni & Esposito Vinzi (2012)
Increase in market share	De Giovanni & Esposito Vinzi (2012); Mitra & Datta (2014)
Penetration of new markets	Mitra & Datta (2014)
Acquisition of new customers	Kumar, Teichman & Timpernagel (2012); Mitra & Datta (2014)
Increase in organizational growth	Mitra & Datta (2014)
Energy cost reduction	Green et al. (2012); Zhu & Sarkis (2004); Zhu, Sarkis, & Lai (2007)
Sale of scrap and used materials	Green et al. (2012); Vanalle et al. (2017); Zhu, Sarkis, & Lai (2008), (2012), (2013)
Decrease of fee for waste treatment	Vanalle et al. (2017); Zhu & Sarkis (2004), (2006)
Decrease of fee for waste discharge	Vanalle et al. (2017); Zhu & Sarkis (2004), (2006)
Cost reduction with environmental fines	Vanalle et al. (2017); Zhu & Sarkis (2004), (2006)
Decrease of cost for materials purchasing	Green et al. (2012); Zhu & Sarkis (2004); Zhu, Sarkis, & Lai (2008a)
Profit from recyclables' sale	Azevedo, Carvalho & Machado (2011); Hervani, Helms & Sarkis (2005)
Establishing a recycling system for used and defective products	Zhu et al. (2012), (2013)
Sale of excess capital equipment	Green et al. (2012); Vanalle et al. (2017); Zhu, Sarkis & Lai (2012), (2008b), (2013)
Water waste cost reduction (e.g., investing in treatment / reuse / reduction of use in the production process)	Petrobras; Coca-Cola
Percentage of sales revenues from green products	Petrobras; Coca-Cola

Table 2 - Economic Performance
Source: Author

2.2.5. Theoretical lenses applied to Green Supply Chain Management

GSCM has been analysed from the point of view of various organizational theories as a way to identify where the field stands at present and point into new directions (Sarkis, Zhu, & Lai, 2011). The institutional theory and RBV are considered the most appropriate for this dissertation considering GSCM practices.

Institutional Theory

Institutional theory posits that external pressures strongly affect organizational decision making (DiMaggio & Powell, 1983). Institutional theory is appropriate to the adoption of GSCM practices as firms operate in a way that meets social and legal expectations (Tate, Dooley, & Ellram, 2011).

Pressures from stakeholders such as governments, customers (Hoejmose, Grosvold, & Millington, 2014), competitors, communities and environmental interest groups, and industry associations are likely to dictate environmentally responsible behaviour (Delmas & Toffel, 2004). Firms who act according to the norms are rewarded through increased legitimacy, resources, as well as survival capabilities (Guler, Guillen, & MacPherson, 2002). Failure to comply with these regulations may result in the loss of earnings, a damaged reputation and even the loss of the license to operate (Bansal, 2005).

Within institutional theory, as seen before, there are three types of institutional mechanisms affecting managerial decisions: coercive, normative and mimetic pressures (DiMaggio & Powell, 1983), which gives a perspective on supplier adoption of environmental practices (Tate et al., 2011). The pressures for environmental sustainability vary along the supply chain (Hall, 2000). Moreover, peer pressure such as professional networks and industry associations has a positive impact on GSCM adoption (Tate et al., 2011).

Resource-Based View

The resource-based model of competitive advantage suggests that “sustained competitive advantage derives from the resources and capabilities a firm control that are valuable, rare, imperfectly imitable, and not substitutable.” Such resources and capabilities can be classified into tangible or intangible assets which include firm’s

management skills, organizational practices and habits, as well as the information and knowledge the firm controls (Barney, 1991). Gold et al. (2010) claims that extension of RBV to the competitive advantages through the SC can also be applied to GSC.

The theory extension includes integration of dynamic capabilities (Helfat & Peteraf, 2003) and natural resources (Hart, 1995). The development of resources might be demonstrated in several organizational performance metrics due to its development (Sarkis et al., 2011). For example, green partnerships with customers had a positive impact on environmental performance (De Giovanni & Esposito Vinzi, 2012; Rao & Holt, 2005; Vachon & Klassen, 2008; Zhu et al., 2013), flexibility and quality, whereas partnerships with suppliers was related to better delivery performance (Vachon & Klassen, 2006). Another example is that environmental collaboration can lead to the development of knowledge-sharing routines and improvements of the capability to integrate external resources (Vachon & Klassen, 2008). Moreover, previous research has shown that GSCM adoption has improved cost performance (Chavez, Yu, Feng, & Wiengarten, 2014) and financial performance (De Giovanni & Esposito Vinzi, 2012; Rao & Holt, 2005; Yang et al., 2013; Zhu et al., 2013). These resources are usually ambiguous and socially complex; thus, it is difficult for competitors to imitate (Shi, Koh, Baldwin, & Cucchiella, 2012), so it might be strategically beneficial to the firms implementing GSCM practices (Sarkis et al., 2011).

RBV is often used to explain more strategic drivers of GSCM adoption, such as why firms operating within the same context (market or industry) pursue distinct GSCM strategies regardless of experiencing very much alike institutional pressures (Testa & Iraldo, 2010). Potential directions for RBV are to absorb additional knowledge management and learning theoretical perspectives that focus on inter-organizational learning and knowledge sharing for GSCM practices diffusion (Sarkis et al., 2011).

2.3. Conclusion

The purpose of this chapter was to present the literature review. The literature review concerns SCM research field in convergence with GSCM. This chapter shows that both theories are current and extremely important for firms to remain competitive. Both have positive impact on economic and environmental performance.

Taking into account the challenges related to the scarcity of natural resources, climate change and the growing awareness of environmental responsibility, sustainability has become an essential matter for all industries. Firms and their partners along the SC are being more pressured, for internal and external drivers, to pursue green practices.

It can be seen that SCM acts as a great ally of firms operating networks seeking to reduce costs and time of production and delivery, while increasing profits. SCM promotes variety, price and range never seen before.

As discussed throughout the chapter, adopting GSCM can help lower costs while increasing performance. However, caution is required when adopting these practices. A prior study is important to assess costs and viability along the throughout network, allowing real action plans to be made. The adoption of environmental practices within the SC is a field that is being constructed by both researchers and firms.

3. Research Methodology

In this chapter, the research methodology is presented. The chapter is divided into four sections. In the first section, *Research strategy*, the possible strategies and their implications are discussed, and the adopted strategy is presented (qualitative research). Within the second section, *Sector and firms selected* the choice for the cosmetic sector and the process of firms' selection are discussed. In the third section, *Research questions and hypotheses*, the RQ that guided the study are presented, as well as the formulated hypotheses justified by the literature. Finally, in the last section, *Questionnaire design and data collection*, the questionnaire design is presented, it is explained how it was thought and which aspects are intended to be answered, along with data collection description.

3.1. Research strategy

Research strategies for empirical analysis may vary according to study's purpose. In general, data may be used for (1) the characterization of contemporary and historical aspects, (2) comparative study or replication of original study, (3) reanalysis (ask different questions from the ones which the data were originally addressed), (4) research design and methodological growth, and (5) teaching and learning (Hox & Boeije, 2005).

The empirical research might rely on primary data, secondary data, or on a combination of both. Primary data is original data collected for a specific research goal, through questionnaires, interviews, observations, etc., using methods that fit best to answer the research problem (Hox & Boeije, 2005; Yin, 2009). These type of data are namely independent descriptive observations of events and activities, physical documents, and test results (Yin, 2009). When these data are used by other researchers, it is called secondary data. Secondary data is data originally collected for a different purpose and reused for answering other questions / problems (Hox & Boeije, 2005). It often includes administrative records, official statistics, management information systems, economic and social indicators, official data archives, and various types of documents (e.g., prior research studies). The researcher does not collect new data, he/she works with already existing sources such as census data, program administrative records, etc. (Hox & Boeije, 2005; Yin, 2009).

Quantitative and qualitative methods are available options often seen in empirical studies. One notable difference between a qualitative research and a quantitative research is that a qualitative approach often uses words to explain findings and theories instead of numbers which most often is the case with quantitative approaches (Bryman & Bell, 2011).

Numeric data analysis can be divided in two broad forms. The first is summarizing the data into relevant indicators, called descriptive statistics. Quantitative research uses descriptive methods that include presentations of results through simple statistics and graphic displays, such as (a) measures of central tendency, (b) measures of relative standing, and (c) measures of association/relationship between variables. The indicators should be easy to understand, compare, contrast and spread the knowledge. The second form, inferential statistics, resides in techniques for estimating population parameters, testing hypotheses, or making predictions (Yin, 2009).

Quantitative research is best suited to test a theory or explanation. Nevertheless, it is also the best approach if the RQ calls for (a) the identification of factors that impact an outcome, (b) the utility of an intervention, or (c) understanding the best predictors of outcomes. Quantitative research is the approach for testing objective theories through the examination of the relationship between variables. These variables should be measured so that it is possible to analyse numbered data using statistical procedures (Creswell, 2014).

Quantitative approach on GSCM has been adopted by a lot of researchers, for example the study of Diabat et al. (2013) was based on a quantitative approach. Researchers examined the relationship between GSCM practices and performance outcomes, in an automotive company in a developing country using primary data and a fuzzy multiple criteria decision-making method. Brandenburg, Govindan, Sarkis and Seuring (2014) analysed, based on quantitative methods, forward SC evaluating developments and directions of this research area. Researchers used formal models, most were analytically based on multiple criteria decision-making, that address sustainability aspects in the forward SC. In another study, concerning a Brazilian electronics company, researchers rank suppliers based on fuzzy TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution). Moreover, they also used a sensitivity analysis to examine the influence of the preferences for the chosen GSCM practices on green suppliers' selection (Kannan, De Sousa Jabbour, & Jabbour, 2014). In the studies

conducted by Kim and Rhee (2012) and Mitra and Datta (2014), researchers used structural equation modelling, combining confirmatory factor analysis and regression analysis. Zhu and Sarkis (2006) performed ANOVA (analysis of variance) to evaluate if compelling differences existed between drivers and practices among different industries. ANOVA was also applied by in Zhu, Sarkis and Lai (2007).

Qualitative research can be defined as a methodology that creates data from observations extracted directly from the study of processes with which the researcher seeks to establish a direct interaction to understand the studied phenomena (Guiloto, 2002, pg 151). Qualitative research demands a wider and less restrictive idea of “design”. This methodology is ideal when the researcher wants to explore one or few entities or phenomenon, limited by time and activity. In its essence, qualitative data analysis of any type is the development of a typology of categories which summarize a mass of narrative data (Yin, 2009).

Qualitative research can take many ways and examples include action research, grounded theory, case studies, content analyses and research interviews (Creswell, 2014). Indeed, Myers (2009) asserts that interviews are the most common technique for qualitative data as they help to understand the broader context of the phenomenon by analysing key elements to determine drivers and practices of it.

In fact, a lot of researchers have adopted qualitative research methods in GSCM studies. Bansal and Roth (2000) conducted a qualitative study of the motivations and contextual factors that induce corporate ecological responsiveness. They applied analytic induction to data collected from various firms in the UK and Japan. The work of Kumar, Teichmana and Timpernagel (2012) relies on case studies, existing research and annual sustainability reports of selected firms. They created and applied a framework for implementation and measurement on chosen companies. In the case study of Arantes, Jabbour and Jabbour (2014), in addition to applying the questionnaire to the interviewees, during the visit direct observations were made in the companies, on the “factory floor”, in the information panels (environmental goals, integrated management policy); and secondary data were obtained. Thus, data triangulation was performed. The data analysis was based on the convergence between the theory and the reality of the companies studied. A summary of the interviewees' testimonies was prepared, based on notes and observations during the interviews and then interpreted in the light of the theory. Finally, analyses were developed based on the crossing of data from all cases.

Since the purpose of the dissertation is to gain better knowledge of GSCM in Brazilian context, it is applied a qualitative research perspective. Creswell (2014, pp. 152) indicates qualitative research as a suitable option for the phenomena still little explored, which needs a deeper knowledge, as is the case of GSCM in cosmetics sector.

Birkinshaw, Brannen and Tung (2011) argue that qualitative research is growing in recognition in International Business (IB) which is particularly significant since it is a hybrid field composed by diverse cultural contexts. Thus, qualitative research would enrich IB, since this kind of study plays an important role in clarifying and comprehending the complex plurality of contexts – institutional, cultural, organizational, etc., that were brought by globalization. Moreover, this type of research can improve IB by confronting most used measures and theories as they are not able to fully capture value-behaviour. By doing so, it can yield a more nuanced understanding, illustrate and exemplify new phenomena and surface contextual differences between countries.

In this sense, the case study as a research methodology acts delimiting the case unit(s); performing data collection, analysing, and interpreting the data and finally producing a report of the case. In order to choose case study as a method, we have to have a research that make explanatory questions possible (this is the case for questions where you want to know “how” and “why”) and there is no need for control over events and is focused on a contemporary phenomenon, in a real-life context (Yin, 2009).

The multiple case study design is a research method used when two or more case studies are chosen. It is more suited when the study covers one region. The design is claimed to be preferred to single case study, as it presents a more broadly view of the research (Eisenhardt & Graebner, 2007; Yin, 2009, pp. 278). It is used often to understand particularities in the chosen cases as it can be a valuable way of analysing existing theory. Multiple case studies can develop robust theory since the propositions are better grounded in varied empirical evidence and more generalizable. Additionally, relations and influences are more easily defined as it is clearer to indicate more probable definitions (Eisenhardt & Graebner, 2007). By doing so, multiple case study contrasts with the limited scope of a single case (Yin, 2009, pp. 278). Moreover, a well-constructed case study may provide a source of new RQ (Saunders, Lewis, & Thornhill, 2009, pp. 178) and theoretical elaboration (Eisenhardt & Graebner, 2007). The findings of case study might bridge the gap among inductive and deductive research (Eisenhardt & Graebner, 2007).

According to Seuring, Sarkis, Müller, and Rao (2008), an advantage of using case study in SCM is that it allows a direct observation of the object of study, which can be appropriate when dealing with several levels of SC. In order to illustrate this, we present a case study of two cosmetic firms. Another highlight for choosing the method is the lack of research produced on this sector in Brazil and, more particularly, on these two firms, which share a characteristic of having their activities directed to the popular classes.

3.2. Sector and firms selected

The choice of studying the Brazilian cosmetic sector was due to the small amount of studies regarding GSCM in both cosmetic sector and developing countries. According to ABIHPEC (2018), this is a sector (personal hygiene, perfumery and cosmetics) in which the industry of the segment achieved a real growth of 2.75% in 2017. Moreover, cosmetic sector exports for over 170 countries which contributes to the economy movement in Brazil (ABIHPEC, 2018, 2020).

The cosmetic industry is constantly seeking to improve knowledge, focusing on innovation through research programs. These actions are examples of how they provide a substantial contribution to the competitive strategies of firms. In this sense, it was the second industry that more invested in innovation in Brazil in 2017 (ABIHPEC, 2018) and third global market in product launches per year (ABIHPEC, 2019, 2020). The average investment of the Brazilian personal hygiene, perfumery and cosmetics industry in research and development was 1.7% of its revenues in 2015 (ABIHPEC, 2018). According to Euromonitor (2019)¹², global beauty and personal care registered 6% value growth in 2018 worldwide, which was the strongest for over ten years.

Asia-Pacific and Latin America markets drove the industry forward, becoming a very attractive market for firms to seek internationalization of their operations. Brazil exports for countries all over the globe and its main destination countries for these exports in 2018 were Argentina, Colombia, Mexico, and Chile. In terms of beauty and personal care sales, the sector ended 2018 with moderate growth in Brazil (ABIHPEC, 2019).

¹² Source: <https://blog.euromonitor.com/the-story-behind-the-data-euromonitors-latest-beauty-and-personal-care-data-2019/> viewed on 01/05/2020

Compared with the world market consumption, Brazil ranks in fourth in 2019, with approximately 6.1% market share (ABIHPEC, 2020). The position is a result of the growth in domestic consumption with increasing participation of Brazilian woman in the job market; constant launch of new products; an increasingly growing culture focused on care with health and wellness; the intensification of men's participation in the personal hygiene, perfumery and cosmetics product consumption. This movement brought economic return with revenues in excess of R\$ 47 billion in 2017, which can be seen in Graph 1 below.

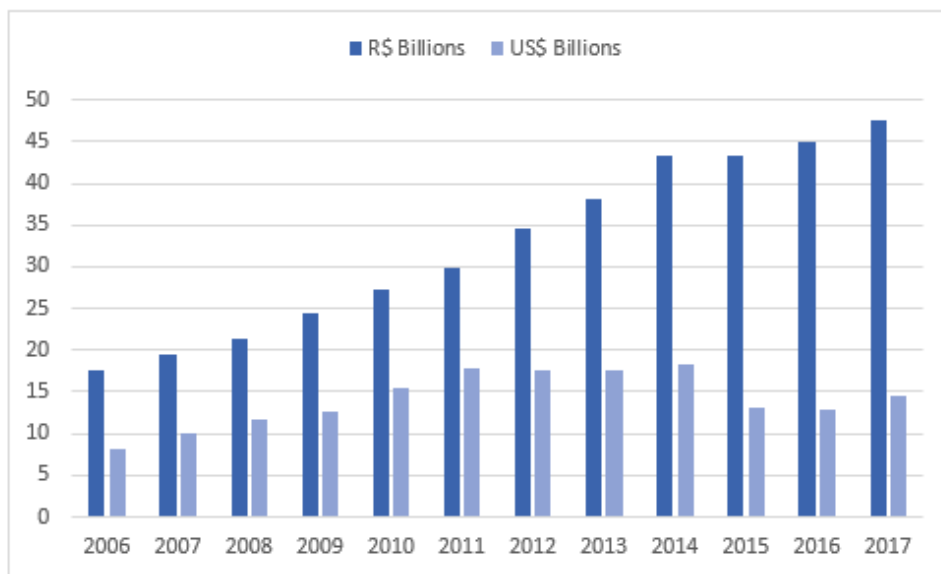


Figure 5 - Brazilian HPPC Market Evolution
Source: (ABIHPEC, 2018)

These data demonstrate the importance of the cosmetics sector within Brazilian reality. Nevertheless, as a sector that is highly pollutant and needs to use huge amount of plastic and packing, it is important to analyse the efforts the cosmetic industry is doing to achieve GSCM. Moreover, Brazil's biome is an oasis of natural ingredients which is a great value for the beauty industry. Rainforest resources have made their way into beauty, cosmetic and personal care industry globally, however most beauty formulations remain conventional with synthetics. Despite of the fact that Brazil and other countries in Latin America became major exporters, they continue as small consumer of green products¹³.

¹³ Source: <https://www.gcimagazine.com/marketstrends/segments/natural/Sustainability-a-Bigger-Target-in-Brazil-264253711.html> viewed on 01/05/2020

For the purpose of this study, firms were contacted before the study began to confirm their availability. Requests were sent out to several different firms asking them to participate. However, only two agreed to take part in the study. Reasons varied between disinterest, lack of time, and COVID-19 situation. AymaraUna (and its outsourced firm for production, C&R Cosméticos e Terceirização) and Bio Extratus were, among the firms invited, the ones that agreed to participate in the study. The firms who accepted the invitation referred to a correspondent who was considered to be best suited to answer the questions. The titles of the respondents varied between CEO and environmental supervisor.

AymaraUna

AymaraUna is a Brazilian cosmetic firm relatively new. Founded in 2016, the familiar business managed by the two founders, was born in São Paulo. As it is a small firm, it outsources the production to C&R Cosméticos e Terceirização and part of its distribution. In its portfolio, it has a range of 14 products divided between hair, skin, and personal care. The idea of an affordable sustainable beauty combined with environmental conservation is present in the company's values and its products. The firm was born with a proposal for natural, multifunctional, and vegan cosmetics. As a matter of fact, it started with a handmade production of cosmetics made by its founders. AymaraUna sells to a large part of Brazil through e-commerce and is also present in 13 physical cosmetics stores. Its business volume is around 25 thousand reais per year.

- **C&R Cosméticos e Terceirização**

C&R Cosméticos e Terceirização is a firm engaged in the development, manufacture and packaging of cosmetics and perfumery especially for third parties. Founded in São Paulo in 1997, the firm manufactures product lines for facial, body, hair, sunscreen, perfumes and non-compact makeup. With strict quality control and directed by pharmaceutical-biochemists, C&R specializes in the production of small batches and has been growing in the market of micro and small companies, manufacturing more than 30 national distribution brands (AymaraUna being one of them). It has facilities strictly supervised by institutional bodies such as - Health Surveillance, Ministry of Health, CETESB, Civil Police and Regional Chemistry Council. Among its clients: handling pharmacies, distributors of products for professional use, cosmetics and perfumery

companies, distributors of cosmetic lines with door-to-door sales, beauty clinics, dermatological clinics, virtual stores. All customers have their own brand with great prospects for expansion.

Bio Extratus

Bio Extratus history began in 1989, in a beauty salon, when the owners were looking for a differentiated line of cosmetics, with quality and affordable price. Combining knowledge and experience, the former owners of the salon and current owners of Bio Extratus also started a handmade production of cosmetics rich in natural assets. In 1991, Extratus – Produtos Naturais brand was born, a pioneer in the use of marrow oil in hair cosmetics. In 1997, production was no longer artisanal, but industrial. It has become a microenterprise with an increasingly strong brand and an increasingly larger market. In August 1998, Extratus Produtos Naturais changed its name to Bio Extratus Cosmetic Natural LTDA. Today, the company has over 500 employees and several suppliers.

As a growth strategy, the brand prioritizes the quality of its products and a relationship that values the opinion-forming public. Bio Extratus has been present in all Brazilian territory since the beginning of the 1990s, with a line that grows and diversifies each year. In addition to its strong presence in the Brazilian market, the company has representation in USA, Spain, Peru and Portugal¹⁴.

3.3. Research questions and hypotheses development

Research questions

Institutional pressures enable minimizing GSCM obstacles for firms. On the contrary, under no environmental institutional pressure, firms may not allocate their resources towards GSCM (Wu et al., 2012). Hence, RQ1 intends to identify the main institutional pressures that influenced GSCM adoption in Brazilian cosmetic firms.

RQ1: What are the main institutional pressures that have influenced the adoption of GSCM practices in Brazilian cosmetic firms?

GSCM has the potential of improving not only environmental performance, but also economic performance (Geffen & Rothenberg, 2000; Rao & Holt, 2005; Sarkis, 2003;

¹⁴ Source: <https://Bio-Extratus.com.br/> viewed on 29/01/2020

Seuring & Müller, 2008; Vachon, 2007; Vanalle et al., 2017; and Zhu & Sarkis, 2004). Moreover, GSCM adoption has the potential to increase profitability as well as competitive advantage (Golicic & Smith, 2013). It stimulates effectiveness towards SC while improves green performance, hence also improving competitiveness (Rao & Holt, 2005). Following this line of reasoning, RQ2 intends to perceive the relationship between GSCM adoption and performance.

RQ2: What is the effect (economic and environmental) of GSCM practices implementation for the cosmetic firm?

Carvalho (2011) and Vanalle et al. (2017) point out that the main evidences of the need for the focal firm, in a sustainability-oriented chain, to induce socio-environmental practices in direct and indirect suppliers, relate to its initiatives to broaden the influence on the positive social and environmental impacts of its SC. Sustainable SC demands monitoring of suppliers and implementation of sanction models for suppliers, in order to encourage them to improve the socioenvironmental performance of the SC as a whole (Seuring & Müller, 2008). So, RQ3 seeks to understand how the focal firm induces green practices in its SC.

RQ3: In what ways does the central firm act to induce sustainable procedures in its SC?

Hypotheses development

From the literature review a set of hypotheses can be set, congruent with the references listed. Hypotheses presented aim to evaluate the extent of the impact that drivers can have over a firm adoption of GSCM, as well as the impact on performance (economic and environmental) after its adoption.

Drivers

Several studies identified potential drivers that impact firms to adopt GSCM. Defined as what motivates or induces a firm to embrace green initiatives (Jain & Shivani, 2014), green drives are divided in internal and external forces (Emamisaleh & Rahmani, 2017). Internal drivers can be described as organisational factors, while external drivers are dependent of external conditions that induce the SC members to be more sustainable (Emamisaleh & Rahmani, 2017). As per Sarkis, Gonzalez-Torre and Adenso-Diaz (2010), firms use their resource in a wiser manner to perform green practices under intense environmental institutional pressures. Business strategies suffer influence of

institutional pressures that include: the main suppliers, resources, customers, ruling agencies and competitors (DiMaggio & Powell, 1983). In the absence of institutional pressure, firms do not allocate resources for environmental management (Wu et al., 2012). Hence, we hypothesize:

H1: Institutional pressures positively impact on adoption of GSCM practices.

H2: Consumer pressures positively impact on adoption of GSCM practices.

H3: Focal firm pressure on the suppliers positively impacts on adoption of GSCM practices.

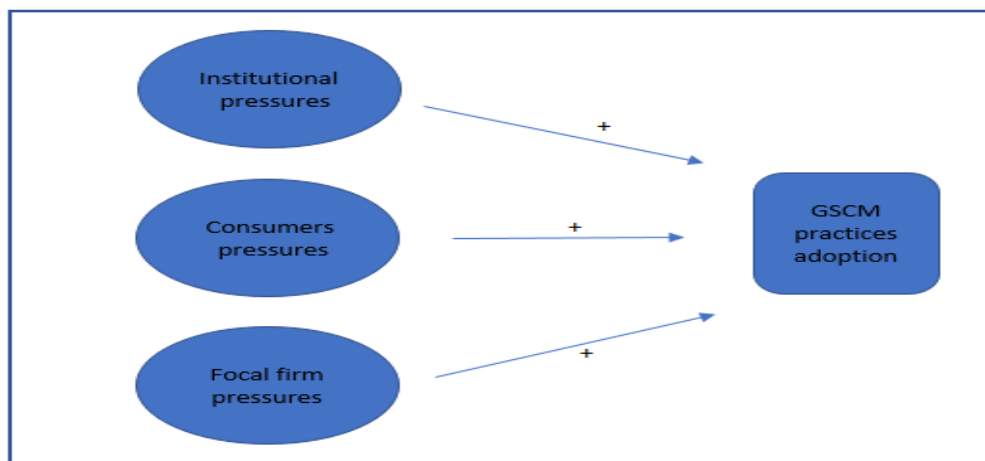


Figure 6 - Hypotheses on Drivers

Source: Author

Impact on performance

In accordance with a great deal of GSCM research that analyses performance after GSCM adoption (Chien & Shih, 2007; Vanalle et al., 2017; Zhu & Sarkis, 2004), this dissertation will deal with two aspects of performance – economic and environmental.

GSCM adoption can improve not only environmental performance, but also economic performance (Geffen & Rothenberg, 2000; Rao & Holt, 2005; Sarkis, 2003; Seuring & Müller, 2008; Vachon, 2007; Vanalle et al., 2017; and Zhu & Sarkis, 2004). Studies carried out in different industries had shown that the impact of GSCM on economic performance can be both, direct and indirect. Nevertheless, GSCM adoption is positively related to green performance, as its adoption have an influence on decreasing

firm's environmental impact (Kenneth Green et al., 2012; Vanalle et al., 2017; Wagner & Schaltegger, 2004; Zhu & Sarkis, 2004; Zhu et al., 2012).

Hence, we hypothesize:

H4: The adoption of GSCM practices in Brazilian cosmetic firms positively impacts economic performance.

H5: The adoption of GSCM practices in Brazilian cosmetic firms positively impacts environmental performance.

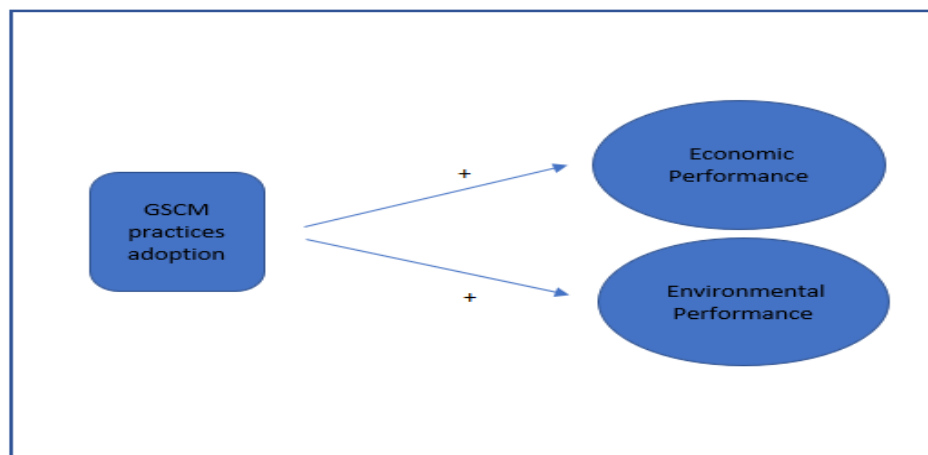


Figure 7 - Hypotheses on Performance
Source: Author

3.4. Questionnaire design and data collection

A questionnaire, based on literature review (Jabbour, Jabbour, Govindan, Kannan, & Arantes, 2014; Mitra & Datta, 2014) and covering mainly four aspects, was constructed. The aspects covered are: (a) green drivers; (a.1) the influence of institutional pressure; (b) green practices current being adopted; (c) performance (economic and environmental); (d) central firm influence on suppliers.

A pilot test was conducted, so the questionnaire was analysed by specialists in GSCM, researchers of other fields of study and international manufacturing professionals to confirm if (1) it was easy to understand; and (2) the questions were relevant.

The questionnaire was originally written in Portuguese, as it is the native language of the people interviewed. Then, it was translated into English for the purpose of this

dissertation. The questionnaire was sent to the firms previously for prior knowledge about the addressed issues. It was designed to be operationalized and analysed in person to verify the consistency of the answers given. As per Vanalle et al. (2017), despite the fact that similar studies were conducted in other countries, they show a significant and validated rate for GSCM examination. Thus, the importance of replicating the study in other industries and countries.

The questionnaire measured institutional pressures concerning GSCM, GSCM practices and also performance after adopting GSCM. The items were measured by 1-5 Likert scales.

The questionnaire questions were asked in order to obtain answers to RQ and to confirm or reject hypotheses, as well as deepen the knowledge about the GSCM in the cosmetics industry. Table 3 summarizes the rationalization and purpose behind the questions. Hence, primary data were collected through the questionnaire (Appendix).

In-depth interviews were conducted with the responsible employee of the firms. It is important to note that AymaraUna was interviewed by video call and the firm responsible for its production (C&R Cosméticos e Terceirização) chose to answer by email, as did Bio Extratus. The main interview script themes were drivers, barriers, characteristics, and information of the companies' environmental management; importance of GSCM to the company; adopted and non-adopted GSCM practices and firms' green performance.

As for the analysis of these data, some indicators were selected, allowing to have a comparative view of the processes, as well as, it makes it possible to clarify the process of assessing the adherence of the theoretical proposals studied with the presented reality.

	Question	In order to investigate	Relate to
Part 1	1 (1.1, 1.2, 1.3, 1.4, 1.5)	GSCM drivers	RQ1
	2 (2.1)	Board's commitment; Employee's commitment (internal driver)	RQ1
	3	Board's commitment within SC (internal driver)	RQ1
	4 (4.1)	EMS	Green Practices
	5 (5.1, 5.2, 5.3, 5.4)	Water reduction consumption; reuse; monitoring; sustainability campaign	Green Practices
	6	RL	Green Practices
	7 (7.1, 7.2, 7.3)	RL	Green Practices
	8 (8.1, 8.2, 8.3, 8.4)	Product design	Green Practices
	9 (9.1, 9.2, 9.3)	Packaging; stock; transport; distribution of raw materials	Green Practices
	10	Renewable energy/Energy reduction	Green Practices
	11 (11.1)	Green purchasing; Cost centre for sustainability	Green Practices
	12	Sale of surplus sale/Sustainable disposal	Green Practices
	13 (13.1)	Sale of used equipment; Equipment change	Green Practices
	14 (14.1, 14.2, 14.3, 14.4, 14.5, 14.6)	Firm's behavior in diminishing environmental impact	Green Practices
	15 (15.1, 15.3, 15.7, 15.9)	Quality enhancement; Product innovation; Improvement of firm's image; Green practices – other impacts	Green Practices
	15 (15.2, 15.4, 15.5, 15.6, 15.8)	Economic performance	RQ2
	16 (16.1, 16.2)	Economic and environmental performance	RQ2
	17 (17.1)	Sustainability monitor; Internal/external audit	Green Practices
	18	Animal testing	Green Practices
19 (19.1, 19.2, 19.3)	Firm's dimension	Size of the firm	
Part 2	1	Choice on suppliers	Green Practices
	2	SC green compliance	Green Practices
	3	Suppliers' audit	Green Practices
	4	Supplier's EMS	Green Practices
	5	GSCM practices induction along SC	RQ3
	6	Cooperation with suppliers	Green Practices
Part 3	1 (1.1)	Main institutional pressures	RQ1
	2	Rate Drivers	RQ1
	3	Rate Customer's influence	RQ1
	4 (4.1, 4.2)	Projects with clients	Green Practices
	5 (5.1, 5.2, 5.3)	Customer as Drivers	RQ1
	6	Customer/community cooperation	Green Practices
	7 (7.1, 7.2)	Compliance with competitors/Mimetic Driver	RQ1
	8	Rate Competitor's influence	RQ1

Table 3 - Rationalization of the questions

Source: Author based on Jabbour et al. (2014); and Mitra & Datta (2014)

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4. Data Analysis and Discussion of Results

A multiple case-study approach is developed in this section, focused on the two Brazilian cosmetic firms that answered the questionnaire, AymaraUna and Bio Extratus. Moreover, C&R Cosméticos e Terceirização (AymaraUna's outsourced firm) also participated in the study. The objective is to find answers to the RQ formulated in Chapter 3 and to develop a discussion based on the cases analysis. This section is organized as follows: first individual case studies are presented - the firm's responses are exposed; second cross-case analysis is presented to provide a better explanation of how firms are affected by drivers, induce green practice in their SC and apply green practices in their daily routines.

4.1 Case-study AymaraUna

4.1.1. The firm

In relation to **internal green drivers**, the firm's adoption of sustainable practices was due to internal guidelines from the owners. The firm was born aiming to fulfil a market gap and provide sustainable and vegan cosmetic with affordable prices. In this sense, AyamaraUna seeks to adopt sustainable practices and raise employee environmental awareness. The production is done by an outsourced firm, which also seeks to implement sustainable practices within the firm and in the production chain. As an internal driver, the outsourced firm seeks to make its employees aware of water consumption.

AyamaraUna owners plan to expand its green practices and enhance its green efficiency by investing in actions that minimize its waste, for example. However, this should be done in the long term, as, at the moment, high costs still prevent its expansion. In addition, for future projects, the AymaraUna intends to invest in biodegradable products and promote social and environmental programs. Moreover, the firm **does not do test on animals**.

According to the outsourced company, in line with AymaraUna, environmental practices are being sought, as new launches are almost exclusively made from sustainable inputs. This is in fact a trend in the sector and, little by little, items that do not fit, will certainly be discontinued. It is a gradual process, but inevitable.

AymaraUna has, from the start, license from ANVISA (Brazilian National Health Surveillance Agency), a regulatory agency, being in compliance with regulatory policies. The same happens to its outsourced company that is also in **compliance with environmental policies** as it goes through ANVISA and CETESB (Environmental Company of the State of São Paulo) audit and oversight to get environmental licensing from time to time.

AymaraUna's pays a recycling stamp "*I recycle*"¹⁵ that ensures the firm seeks **environmental compensation**. The stamp certifies the firm pays a fee and that this fee is converted into remuneration to recycling firms, generating income for their workers.

When it comes to **RL**, AymaraUna owners can practice it while working in fairs and receiving used packaging from customers, while AymaraUna's production firm does RL with packaging, in addition to encouraging the same by suppliers and strives to maintain an ecological disposal.

The outsourced firm, driven by post-consumer responsibility brought by legislation, is involved in "*Hold hands for the future*"¹⁶ an **environmental program** promoted by ABIHPEC in cooperation with the community. The program aims to collaborate with the national initiative for the disposal of solid urban waste, helping to increase the volume of **recyclable** materials, promoting social inclusion and better work conditions for the people whose work is to grab waste and send to recycling.

Thus, the company responsible for production seeks as, internal practices, the use of local labour (reducing the need to use public or private transport), packaging the products in reused shipping boxes, forwarding empty packaging for recycling or reuse, according to the possibility.

The outsourced firm uses **reuse water** (from washing and cooling equipment) to clean the external area, reducing water waste. It has a plan to increase the reuse of water. The firm monitors and evaluates its results in terms of water consumption and effluent disposal. This water waste reduction impacts in the reduction of effluent waste.

This is all assessed by CETESB when renovating the licensing. The firm does not generate any type of liquid effluent that needs treatment and the amount of sewage generated is very small. It is considered equal to the amount of water consumed. Its

¹⁵ In Portuguese "Eu Reciclo"

¹⁶ In Portuguese "Dê as mãos para o futuro"

sewage is captured by SABESP's (Basic Sanitation Company of the State of São Paulo) sewage network. The interconnection of the sewage network in that region with the municipal sewage treatment plant is scheduled for 2021.

Regarding **solid waste**, the firm promotes its reduction by sending them to recycling/reuse (plastics/paper/cardboard) or to incineration, in accordance with relevant legislation. Incineration is carried out by a company licensed by CETESB for this purpose, so it has all the necessary and mandatory monitoring plans. The use of reused shipping boxes allows a very small generation of this type of waste. The reduction in disposal by incineration is achieved through rational purchases (purchases of raw materials only when production is already scheduled). The recent release by ANVISA of the possibility of reanalysis of inputs, increasing their useful life, should also have a positive impact in this regard.

Concerning **energy**, the outsourced firm uses natural light in some sectors and currently is replacing the ordinary lamps by the light-emitting diode (LED) ones and with presence sensor. The firm plans to install a system to capture solar and/or wind energy in the near future.

The **packaging** is made with recyclable materials and using as little material as possible. Moreover, regarding their raw materials, the firm claims that most of them are environmentally sustainable.

The firm performs **equipment** maintenance and has a program for selling used equipment, increasing its life cycle. Another firm habit is to renew equipment as a way to reduce environmental impact and promote greater energy efficiency. Regarding the **distribution** of products, the company seeks to make this logistics possible with the release of products in batches that use vehicles more fully, avoiding unnecessary travel. In addition, all carriers are required to monitor their vehicle emissions. For this, they periodically undergo mandatory vehicle inspection carried out by state agencies.

The outsourced company states that its activity does not generate polluting waste as well as no emission of polluting gases. In Brazil, the legislation is not clear concerning the criteria for emission of polluting gases for small companies.

Environmental and Economic Performance

Bearing in mind that AyamaraUna has little time in the market, sustainable practices adopted at the moment, do not differ much from the practices initially adopted. Thus, there was no significant increase in environmental performance.

In terms of improvement in economic performance, it does not apply considering that the company was born in this sustainable scenario. As there was no strengthening in environmental practices, there was no increase in profit or decrease in costs, from the expansion in green practices, that could impact economic performance.

4.1.2. Suppliers

Regarding the SC, the induction to sustainable practices occurs at the limit of economic strength, so it is a gradual process. Furthermore, the outsourced firm select its new suppliers using environmental criteria. The choice of new inputs is also based on the sustainability criterion.

Despite of the fact that internal guidelines were the main driver to AymaraUna adoption of green practices, the firm is also in **compliance with legislation**. AymaraUna claims not to have had or suffered any mimetic driver.

In the outsourced firm's view, during the last 5 to 10 years, consumers started to demand greater coverage in green products. Thus, the entire SC and suppliers followed this request, bringing more and more inputs that fit this more sustainable profile. Moreover, the legislation brought post-consumer environmental responsibility.

4.2 Case-study Bio Extratus

4.2.1 Firm

According to Bio Extratus' answers, **internal guidelines** were the main driver to the implementation of green practices in the firm. Since the beginning it has sustainability as one of its pillars. Sustainability concept was carried out with high investments even before implementing SGA (Environmental Management System) and having ISO 14001 certification. SGA was created in the middle of 2008 and certified in 2010 by ABNT (Brazilian Association of Technical Standards).

In relation to the **board's commitment**, the directors manage and incentive managers' decision-making process in a way to pursue the best possible environmental

performance. Besides, there is a designated director chosen to monitor all work carried out in the environmental area, to validate processes initiated by management or defining the firm's sustainability objectives. Thus, internal guidelines are driven by the directors to the whole firm, even SGA. The directors are also committed to green practices that are inherent in the product life cycle perspective within SC.

Nevertheless, **employees' commitment** is also well evaluated due to the understanding of the importance of working towards sustainable efficiency and its role in the firm's environmental performance maintenance. Specially, the employees that participated in the process of implementing SGA in 2008.

In addition, there was a great deal of awareness by all employees regarding the importance of selective collection, which makes this process a smooth management and with excellent results. In its constant search to minimize the volume of its waste, Bio Extratus still produces its own waste collectors, promoting the reuse of dozens of drums.

The adoption of **green practices** has brought to Bio Extratus: **product innovation, increase in sales** - new customers and entering into new markets - as well as **improvement** in the Bio Extratus' image and **performance improvement**.

Bio Extratus undergoes internal **audit** focused on the environment, in addition to undergoing, every year, an external audit carried out by ABNT for the purpose of maintaining ISO 14001 Certification.

In terms of **environmental programs**, the firm operates at three levels: internal, SC and community. Internally, Bio Extratus conducts short-term training (*Think Green Moment*¹⁷) carried out by SGA. In addition, employees receive a newsletter on environmental awareness, with topics such as the rational use of water, released by SGA department. At the SC level, the company seeks to raise awareness among its consumers, as much as possible and also certain suppliers, providing guidance through emails and making its environmental policies available through its portal (used for quotations). Nevertheless, the firm does not have a collaboration program to work together with its suppliers. Finally, at the community level, Bio Extratus has been participating, for over than ten years, in the "*Hold hands for the future*"¹⁸ program promoted by ABIHPEC. As previously mentioned, the program operates in the **RL**, collecting and recycling a

¹⁷ In Portuguese "Momento Pense Verde".

¹⁸ In Portuguese "Dê a Mão Para o Futuro"

percentage of packaging that is sent to the market annually. The program acts promoting investments in cooperatives of waste pickers in several estates of Brazil.

The **stocks management** of inputs and finished products is based on the FEFO method (First to Expire, First Out), which prevents their loss due to the expiration date. Inventories are also monitored for temperature, humidity and other characteristics that guarantee adequate storage and non-deterioration of the items stored.

In terms of logistics, there is a monitoring by the transport team so that the trucks that will deliver the products travel the shortest possible routes in each delivery. In addition, Bio Extratus invested to open a branch of its largest supplier of inputs next to its industrial park, which resulted in a decrease in the need for **transportation**.

Bio Extratus replaced the fluorescent lamps in the industrial park with LED lamps. Besides that, in 2016, a plant for generating cleaner and renewable **energy** with a set of photovoltaic modules was inaugurated. The power plant is capable of generating enough energy to keep the entire firm up and running.

The company has a **purchasing sector** based on sustainable criteria. However, information regarding values/percentages is not available. Suppliers go through a qualification process, in which, among other criteria, their performance is evaluated from the perspective of sustainability.

Concerning **product design**, packages are made with recyclable material and designed to use the minimum amount of material possible. Some products are designed with biodegradable and easy to disintegrate materials. All products have recyclable packaging material.

Bio Extratus chooses primarily to purchase **equipment** that uses a limited amount of water or that has a better environmental performance. In addition, several systems and equipment have been provided with structures that promptly promote water reuse in the processes for which they are intended. The greatest example is the “condensate return from the boiler” which promotes the reuse of a high percentage of the water it uses during the generation of steam. In addition, all equipment that is no longer part of the company's plans and still in working condition is sold to interested parties or donated to entities in need. Besides, it is the firm's practice to replace equipment for others that will have less environmental impact, within its technical and economic capacity.

Both **water consumption** and the generation of **effluents** are monitored by the

company. Regarding the monitoring of water consumption indicators, it is possible to assess whether consumption is conscious and adequate to the processes. As for the effluents, in addition to their flow and generation volume, parameters that determine their return to the environment in compliance with legal requirements are also evaluated. And in this respect, it is emphasized that the result of the effluent treatment has efficiency rates higher than those required by the legislation.

The amount of effluents generated by the company is adequate for the activities it carries out. Bio Extratus seeks to **invest** in structures and technologies to ensure that it is returned to nature in conditions at least ideal. Therefore, their efforts are in the search for the reduction of pollutants found in effluents.

The firm is building a new manufacturing unit. For this new building, a structure for **water reuse** from their **sewage treatment** was designed. The water recovered is used for irrigation purposes and to trigger flushing in bathrooms.

Aware of the region's water potential, Bio Extratus decided to invest in the necessary structure to promote the **recovery of water** sources that might be close to the location of its facilities. Investments were made in the construction of a set of 11 lagoons and in the **planting of about 35 thousand trees**, among native and fruit species. This project has resulted in the recovery of several water sources over the years.

Bio Extratus adopts the 3R culture for **waste management**. The idea is to follow exactly the order in which they are: *Reduce, Reuse and Recycle*. The focus on Reduce led the company to invest in cleaner technologies and stop generating tons of waste in its processes. Reuse is present in several stages of Bio Extratus' activities, for example, when reusing all cardboard boxes containing the packaging material received. If Reduction and Reuse are not possible, the waste generated will be sent to companies that can carry out its recycling. Recycling, in addition to reducing the risk of contamination of soil, water and air, also decreases the consumption of water and energy in the manufacture of new products. Currently all waste is properly disposed of and more than 80% of the waste generated is recycled or reused.

At least once a year, the firm's team aligns all data concerning sustainability indexes. The **environmental management** team conducts a detailed survey of the firm's environmental aspects and the possible beneficial or harmful impacts that could be generated by them. The monitoring that is often controlled monthly is gathered and

submitted for critical review of the board. From such a survey, Bio Extratus invests in structures and implements procedures that are capable of preventing damage.

Moreover, Bio Extratus has a weekly **monitoring program** for boilers, diesel vehicles and equipment with potential for air pollution. If the smoke pattern begins to tend towards a range close to the indicative of pollution, the equipment is sent to **preventive maintenance** and receives **repairs** before they cause major damage to the environment.

Finally, Bio Extratus **does not test its products on animals** neither subcontracts or outsources this type of test.

Environmental and Economic Performance

Since the implementation of SGA, the firm has woven increasingly relevant environmental objectives. Therefore, the implementation of actions to achieve them has ensured a significant improvement in environmental performance. For example, the replacement for LED lamps brought environmental gain related to the generation of waste. LED lamps have a longer life, which implies less need for disposal and their components are not dangerous to the environment.

The firm seeks ways to avoid losses of products and or inputs and several procedures were carried out to guarantee the internal reuse of materials that, in theory, would be discarded. For example, shampoo residues are used to clean floors in most sectors, which also configures as an economic gain.

Moreover, there is evidence of several gains in the economic part. For example, the replacement of all the fluorescent lamps in the industrial park with LED lamps, resulted in a 10% reduction in Bio Extratus' global energy cost. In addition, it is estimated that the investment in the photovoltaic solar park will be paid off in about nine years of use and that it will work for another 16 years only generating profit of the savings in the electricity bills. The rational use of resources associated with measures to combat waste also implies a reduction in the operational cost of manufacture.

4.2.2 Suppliers

Bio Extratus applies an environmental criterion established for suppliers and service providers, however it varies according to their industry. Yet, a criterion that is

common to all is the need to have their activities properly regularized before the environmental agencies at the national, state, and municipal levels. Thus, assuring Bio Extratus that their suppliers and service providers have an adequate respect for environmental legislation. Moreover, a good part of their suppliers has ISO 14001 and ISO 9001 certifications. As it is a high volume of suppliers, it is not possible to specify the year of certification for each of them.

Bio Extratus also does **audits in some of its suppliers/service providers**, whose frequency, methodology and scope vary according to the input supplied or service provided.

4.2.3 External pressures

According to the firm, external drivers were not a decisive point in implementing green practices. Bio Extratus' direct competitors do not have ISO 14001 certification or stands out for investments in sustainability. Thus, the competitor factor on implementing green practices or copy them was low. Yet, in general, many others cosmetic firms have good sustainable performance and Bio Extratus seeks to obtain inspiration from these for the implementation of their own sustainability actions.

Concerning customers, the firm's perception is that consumers are divided into different groups. One group that do not care about environmental issues, so for them it is not important if the product is sustainable or if the firm implements green practices. Another group, with environmental consciousness, demands sustainable products and make pressure for implementation of green practices.

In this sense, they realized that although external drivers were not decisive for the implementation of green practices and SGA, consumers (the group most involved with environmental issues, at least) were the actors that stood out for their sustainable demand and environmental awareness. Thus, consumers had a small role in the firm's adoption of green practices.

Cross-Case Analysis

In the cross-case analysis it is considered in what areas the two cases suggest the same points and where they differ. Considering each firm individually, each one has a

different perspective on the most important practices to achieve GSCM. This can be explained because of the difference in age and size of the firms. AymaraUna is a new and small firm, whereas Bio Extratus has over 30 years and can be considered a medium to large cosmetic firm.

Through the analysis of the case studies, it was found that the role of internal guidelines was crucial for GSCM adoption in both cases. The internal guidelines led to firms' engagement in green practices such as environmental compensation, compliance with regulatory policies, environmental programs, recycling, reuse, water reuse, solid waste reduction, energy, green product design, equipment (maintenance or selling), not conducting tests on animals, among others. However, the maturity level of environmental management is different within the firms, mainly due to its age and size.

It was verified that, the more proactive the environmental management practiced is, the more GSCM practices are adopted (Bio Extratus). Thus, the more evolved the board is, the more it tends to act as an internal driver inducing the adoption of GSCM practices, enhancing the possibility to increase efficiency, in accordance with Golicic and Smith (2013). Overall, pursuant to the answers given by the firms, internal drivers have more impact than external on GSCM adoption.

As AymaraUna and Bio Extratus sell cosmetics of personal hygiene, this characterizes their products as functional. Since these types of products, mainly shampoos and conditioners, are easily found in cosmetic markets and grocery stores. These are products that satisfy basic needs and do not change much over time, they have a predictable demand (Fischer, 1997).

Hypotheses Check

<i>Hypothesis</i>	<i>AymaraUna</i>	<i>Bio Extratus</i>
H1	No	No
H2	No	Yes
H3	No	No
H4	No	Yes
H5	No	Yes

Table 4 – Hypotheses Check
Source: Author

Throughout the qualitative analysis, it was possible to understand in a more detailed way the relationship between the adoption of green practices, GSCM and its impact on the firms' performance. The firms presented different results regarding hypotheses confirmation, as it is possible to see in Table 4. None of the hypotheses were validated for AymaraUna and for Bio Extratus, hypotheses H2, H4 and H5 were validated.

H1: Institutional pressures positively impact on adoption of GSCM practices.

Throughout the analysis it could not be determined if institutional pressures had a significant weight for the adoption of GSCM in any of the cosmetic firms.

H2: Consumer pressures positively impact on adoption of GSCM practices

The answers given by AymaraUna could not determine if consumer pressures had a significant impact for its GSCM adoption.

Despite of the fact that internal guidelines were the major driver for GSCM implementation at Bio Extratus, it also suffered some pressure by its consumers as the answers given by the firm could determine.

H3: Focal firm pressure on the suppliers positively impacts on adoption of GSCM practices

Throughout the analysis it could not be determined if the focal firm had a significant weight on its suppliers' adoption of GSCM for either AymaraUna or Bioextratus.

H4: The adoption of GSCM practices in Brazilian cosmetic firms positively impacts economic performance

The adoption of green practices has not yet generated a clear positive impact on economic performance of AymaraUna, probably because it is a relatively young firm.

In the case of Bio Extratus, through the answers given by the firm its adoption of GSCM practices did reflect on positive economic performance.

H5: The adoption of GSCM practices in Brazilian cosmetic firms positively impacts environmental performance

The adoption of green practices has not yet generated a clear positive impact on environmental performance of AymaraUna, probably because it is a relatively recent firm.

In the case of Bio Extratus, through the answers given by the firm its adoption of GSCM practices did reflect on positive environmental performance.

Questionnaire Check

<i>Part I</i>			
Question	AymaraUna	C&R Cosméticos e Terceirização (AymaraUna's outsourced firm)	Bio Extratus
1.1	The adoption of sustainable practices was due to internal guidelines.	The adoption of sustainable practices was due to external drivers (clients).	The adoption of sustainable practices was due to internal guidelines.
1.2	-	The adoption of sustainable practices was due to external drivers (clients).	-
1.3	-	The adoption of sustainable practices was due to external drivers (competitors).	-
1.4	-	The adoption of sustainable practices was due to external drivers (legislation).	-
1.5	The biggest motivation of launching AymaraUna was due to the lack of vegan/sustainable products with affordable prices in the market.	The adoption of sustainable practices was due to a compilation of internal and external drivers.	Protection of the environment is one of the pillars that have been the foundation of Bio Extratus since its creation.
2	AymaraUna's owners work from their home, as the production is outsourced. By doing so, their administrative work tends to generate less environmental impact than a big firm does. The owners have plans to decrease environmental impact of their products, however, for now, it is not affordable.	The firm seeks to be committed with environmental practices.	There is no particular program to induce practices. These practices are driven and designed by the board and pass on to SGA put them in practice. Directors encourage employees to seek the best possible environmental performance.
2.1	AymaraUna seeks alternatives in the long term, because in the short term it is still unfeasible (costs). As mentioned before, AyamaraUna is a small but growing cosmetic firm, thus its owners are its main employees and they hire freelancer when needed (e.g. for helping in fairs).	-	The majority of employees internalized the importance of working for sustainable development and understood the unique role they play in ensuring that the company maintains an excellent environmental performance.
3	AymaraUna is not involve so much in its own SC. The owners claim to trust in their outsourced firm (C&R Cosméticos e Terceirização). Moreover, the owners actively participate in the choice of raw	-	The board demonstrates an exemplary level of commitment and engagement.

	materials, however not in the selection of suppliers/production.		
4	The firm does not have an EMS, however it has a recycling stamp (paid) that seeks environmental compensation.	No, it does not.	Bio Extratus has an Environmental EMS called SGA.
4.1	The stamp “I recycle” was adopted in 2018, after the government launch PNRS (National Solid Waste Policy).	-	SGA implementation began in mid-2008 and was approved in 2010 by ABNT Certificadora
5	-	Yes, employee awareness.	There is a preference for the purchase of equipment that uses a limited amount of water or that has a better environmental performance.
5.1	-	Yes, it does.	In addition, several systems and equipment promote the reuse of water. Bio Extratus is building a structure for the reuse of water from our sewage treatment for irrigation purposes and to trigger flushing in bathrooms.
5.2	-	No, because reuse water is sufficient.	-
5.3	-	Yes, it does. It is evaluated by CETESB.	Both water consumption and the generation and characterization of effluents are monitored by the company.
5.4	-	Yes, it does.	The theme "rational use of water" is recurrent in the approaches taken by SGA in short training with environmental approach and in the reports for the internal circulation newspaper.
6	Aymara uses fairs to do RL (customers bring used product to them and they give the correct destination). However, due to COVID-19 situation fairs are not happening for now.	Yes, it does. It is part of “Give Hand for the Future”. The program collects and recycles a percentage of packaging that is sent to the market each year, as it promotes investments in waste picker cooperatives in Brazil.	For over than 10 years, Bio Extratus has participated in the “Give Hand for the Future”. The program collects and recycles a percentage of packaging that is sent to the market each year, as it promotes investments in waste picker cooperatives in Brazil.
7.1	There is an effort by the firm in ecological disposal, when possible.	There is an effort by the firm to practice ecological disposal.	There is an effort by Bio Extratus in ecological disposal.
7.2	AymaraUna does not encourages the use of RL by its suppliers.	The firm encourages the use of RL by some suppliers.	Bio Extratus encourages the use of RL by some suppliers.

7.3	In general, customers have a vision aligned with sustainable RL practices.	In general, customers have a vision aligned with sustainable RL practices.	Customers do not have aligned vision with RL.
8.1	-		Product design with biodegradable materials.
8.2	Product design with recyclable materials.	-	Product design with recyclable materials.
8.3	Product design with easy disintegration (testing phase).	-	Product design with easy disintegration.
8.4	Product design with the minimum material needed.	-	Product design with the minimum material needed.
9.1	Use of sustainable (recyclable) packaging.	-	Use of sustainable (recyclable) packaging.
9.2	Small stock.	-	The management of stocks of inputs and finished products is based on the FEFO method (First Expired First Out), which prevents their loss due to the expiration date.
9.3	-	The distribution of finished products is the responsibility of the customers, as they are outsourced firm. But C & R to make logistics viable tries to avoid unnecessary travel (vehicle full). The transportation of the material to be disposed of is also carried out with the authorization of CETESB by a licensed company and within the legal requirements, which are not few. All carriers are required to monitor their vehicle emissions. For this, they periodically undergo mandatory vehicle inspection.	In terms of logistics, there is a monitoring by the transport team so that the trucks that will deliver the products travel the shortest possible routes in each delivery. In addition, Bio Extratus invested in opening a branch of its largest supplier of inputs next to its industrial park, which resulted in a decrease in the need for transportation.
10	-	The firm uses natural light in some sectors. Moreover, all luminaires are being replaced by LED technology and presence sensor.	In 2016, Bio Extratus inaugurated our plant for the generation of cleaner and renewable energy that are capable of generating enough energy to keep the entire firm running. Besides that, Bio Extratus replaced all the fluorescent lamps in the industrial park with LED

			lamps. This replacement was responsible for the savings of 10% in the company's global electricity consumption. The new lamps brought yet another environmental gain related to waste generation. LED lamps have a longer life, which means less need for disposal and their components are not dangerous to the environment.
11	-	Yes, there is a supplier validation system. The choice of new inputs is also based on the sustainability criterion.	Suppliers go through a qualification process, in which, among other criteria, their performance is evaluated from the perspective of sustainability.
11.1	There is not a cost center, but a percentage is earmarked for obtaining the stamp "I recycle". The firm has other projects, but for now there is no budget.	Not yet.	Bio Extratus do not share this information in monetary and / or percentage values.
12	AymaraUna does not sell its surpluses, but does sustainable disposal (partnership with customers)	Yes	Bio Extratus seeks to ensure the internal reuse of materials that in theory would be discarded. For example, they use "shampoo residues" to clean the floors of most of the firm.
13	-	Yes	All equipment that is no longer part of the firms' plans and is still in working order is sold to interested parties or donated to entities in need.
13.1	-	Yes	In addition, it is the company's practice to exchange equipment for others that will bring less environmental impact, within its technical and economic capacity.
14	Not directly, but the firm pays an environmental compensation program ("I recycle" stamp).	There is no generation of contaminating waste by the firm.	Every year, SGA carries out a detailed survey of Bio Extratus' environmental aspects and the possible beneficial or harmful impacts that could be generated by them. From such a survey, the firm invests in structures and implements procedures that are capable of preventing damage.
14.1	-	There is no emission of polluting gases by the firm.	Bio Extratus does not carry out an inventory of greenhouse gas emissions. But it has a weekly monitoring program for boilers, diesel vehicles

			and equipment with potential for atmospheric pollution. If the smoke pattern starts to tend towards a range close to the indicative of pollution, the equipment is sent to preventive maintenance and receives repairs before they cause damage to the environment.
14.2	-	The water use waste reduction program directly impacts the reduction of effluent waste.	At this point, efforts are being made to reduce pollutants found in effluents.
14.3	-	Solid waste is sent for recycling or reuse (plastics / paper / cardboard) or for incineration, according to the relevant legislation. The use of reused shipping boxes allows a very small generation of this type of waste. The reduction in disposal by incineration is achieved through rational purchases (purchases of raw materials only when production is already scheduled). The recent release by ANVISA of the possibility of reanalysis of inputs, increasing their useful life, should also have a positive impact in this regard.	Bio Extratus adopts the 3R's culture for waste management. The idea is exactly to follow the order in which they are: Reduce, Reuse and Recycle. The focus on Reduce causes the company to invest in cleaner technologies and stop generating tons of waste in its processes. Reuse is present in several stages of Bio Extratus' activities, for example, by reusing all cardboard boxes containing the packaging material received.
14.4	-	-	-
14.5	-	-	Bio Extratus decided to invest in the necessary structure to promote the recovery of water sources that might be close to the location of its facilities. Investments were made in the construction of a set of 11 lagoons and in the planting of about 35 thousand trees, among native and fruit species. This project has made it possible to recover several springs over the years.
14.6	-	The firm recycles.	If Reduction and Reuse is not possible, the waste generated will be sent to companies that can carry out its recycling. Recycling, in addition to reducing the risk of contamination of soil, water and air, also decreases the consumption of water and energy in the manufacture of new products. Currently all waste is properly disposed of and

			<p>more than 80% of the waste generated is recycled or reused.</p> <p>In addition, there was a great deal of awareness by all employees regarding the importance of selective collection, which makes this process a smooth management and with excellent results. In its constant search to minimize the volume of its waste, Bio Extratus still produces its own waste collectors, promoting the reuse of dozens of drums.</p>
15.1	-	-	The adoption of sustainable practices has improved the product quality.
15.2	-	-	The adoption of sustainable practices has improved the performance (environmental).
15.3	-	-	The adoption of sustainable practices has improved the innovation.
15.4	-	-	The adoption of sustainable practices did not increase sales.
15.5	-	-	The adoption of sustainable practices did not increase market share sales.
15.6	-	-	The adoption of sustainable practices has enhanced entry into new markets.
15.7	-	-	The adoption of sustainable practices has enhanced Bio Extratus' image.
15.8	-	-	The adoption of sustainable practices has attracted new customers.
15.9	Attract people who are more environmental consciousness.	-	The rational use of resources associated with measures to reduce waste also implies a reduction in operational cost of manufacture.
16.1	-	-	There is evidence of several gains in economic performance. For example, replacing all the fluorescent lamps in the industrial park with LED lamps, resulted in a 10% reduction in the company's global energy cost. In addition, we

			estimate that the investment in the photovoltaic solar park will be paid for with about 9 years of use and that it will work for another 16 years only generating the profit of the savings in the electricity bills.
16.2	-	-	Since the implementation of SGA, Bio Extratus has woven increasingly relevant environmental objectives and the implementation of actions to achieve them has ensured a significant improvement in environmental performance.
17	-	-	Yes. At least once a year, the Bio Extratus' team aligns all data that is often controlled monthly and submits it for critical review by the Board.
17.1	-	-	Yes. Bio Extratus carry out an Internal Audit annually with a focus on the environment and every year we undergo an external audit carried out by ABNT (Brazilian Association of Technical Standards) in order to maintain ISO 14001 Certification.
18	AymaraUna does not test its products on animals.	-	Bio Extratus does not test its products on animals and also does not subcontract or outsource this type of test.
19.1	2 employees (owners).	-	Approximately 530 employees.
19.2	AymaraUna does not know for sure how many suppliers it has.	-	For strategic reasons, the firm does not share this information.
19.3	20/30 thousand reais.	-	Bio Extratus' products are present in Brazil, United States, Peru and Portugal.

<i>Part II</i>			
Question	AymaraUna	C&R Cosméticos e Terceirização (AymaraUna's outsourced firm)	Bio Extratus
1	-	The major factor is always the economic issue and environmental practices are being sought, as new launches are almost exclusively made of sustainable inputs. This is, in fact, a trend in the sector and, little by little, items that do not fit, will certainly be discontinued.	The environmental criteria established for suppliers and service providers vary according to their line of business. Yet, a criterion that is common to all is the need to have their activities properly regularized before the environmental agencies at the national, state and municipal levels.
2	-	-	Suitable.
3	No.	-	Yes. However, the frequency, methodology and scope of the audits vary according to the input supplied or service provided.
4	-	-	A good part of its suppliers has ISO certifications. As it is a high volume of suppliers; it is not possible to specify the year of certification for each of them.
5	Relationship of trust with C&R Cosméticos e Terceirização, but not involved in the production process, only in the choice of products (raw materials).	-	Bio Extratus provide environmental guidance through e-mails to certain suppliers. Besides that, their environmental policies are available on the Portal that they use to make quotations.
6	No.	-	No, there is not.

<i>Part III</i>			
Question	AymaraUna	C&R Cosméticos e Terceirização (AymaraUna's outsourced firm)	Bio Extratus
1	There was no external pressure, it was internal pressure that drove the creation of the company within the sustainable molds. From the start, AymaraUna has ANVISA approval.	-	The firm claims that did not face any external pressure to implement environmental management. As indicated in item 1.1, the main reason was a search for the formalization of the company's posture; that since the beginning of its history has sustainability as one of its pillars of activity
1.1	-	-	-
2	-	-	-
3	AymaraUna does not feels pressured but external drivers but see its consumers as a complementary factor in its sustainable choices.	-	Considering the general aspects of the adoption of environmental practices; consumers often do not have a critical view of how important it is for a product to be manufactured in an environmentally friendly process; therefore, they do not become an influential force for the implementation of an EMS for example. Yet, specific consumer groups become especially strong because they demand certain characteristics for products such as: not being tested on animals or not having certain types of raw materials.
4.1	AymaraUna seeks to consciously educate its consumers.	-	Bio Extratus seeks to consciously educate its consumers.
4.2	AymaraUna seeks to build sustainable practices together.	-	Bio Extratus does not seek to build sustainable practices together.
5.1	AymaraUna does not feels pressured to implement and comply with EMS by its consumers.	-	Bio Extratus does not feels pressured to implement and comply with EMS by its consumers.
5.2	AymaraUna feels a request for sustainable products by its consumers.	-	Bio Extratus feels a request for sustainable products by its consumers.

5.3	AymaraUna feels, in some cases, consumer influence in adopting environmental practices.	-	Bio Extratus feels consumer influence in adopting environmental practices.
6	RL with consumers.	-	Bio Extratus does not have cooperation with consumers / community for sustainable projects.
7.1	Regarding competition, AymaraUna does not feel pressured to implement and comply with other cosmetic firms.	-	Regarding competition, Bio Extratus does not feel pressured to implement and comply with other cosmetic firms.
7.2	Regarding competition, AymaraUna does not seek to copy sustainable practices adopted by other companies in the industry.	-	Regarding competition, Bio Extratus does not seek to copy sustainable practices adopted by other companies in the industry.
8	Low. As it is a small firm, there aren't many direct competitors.	-	Low. No direct competitor of Bio Extratus has ISO 14001 or stands out for investments in sustainability. Yet, in general, many cosmetic firms have a sustainable performance and Bio Extratus seeks to obtain inspiration from these for the implementation of their own sustainability actions.

Table 5 - Summary of firms' answers
Source: Author

AymaraUna Checklist (and C&R Cosmetics e Terceirização):

- As AymaraUna is a new cosmetic firm that began with a more environmental consciousness practice, it is not possible to determine more substantial changes
- Because the firm outsources production, we were also able to analyse another link (C&R Cosmetics e Terceirização) in SC
- Due to the fact that production is outsourced, this means that the focal firm does not have much control over suppliers or green practices in its production
- As it is a small firm, its environmental impacts are small
- Despite being a firm with reduced capital, it still makes investments related to green practices
- The economic factor is yet the biggest barrier to adopting environmental practices
- In general, the outsourced firm's responses were somewhat generic

Checklist Bio Extratus:

- Bio Extratus environmental practices have a better scope and planning which reflect in the positive impact on performance (environmental and economic)
- Some responses were left without a more concrete example to prove it
- There is a concern about the image that the firm wants to convey, possible to be noticed in some responses, especially when it comes to internal policies, as well as having sent the questionnaire answered
- Some inconsistencies in responses (e.g. disagrees with consumer influence in adopting green practices initially, and then points out that there is some influence on the part of the consumer)
- There is no induction, in fact, of green practices in SC. The influence exercised over its SC still very small

Having analysed the questionnaires, it was possible to conclude that both firms involved in this study look for initiatives to reduce their environmental impact. They kindly informed about the sustainable practices which are being adopted, however, we did not have access to internal sustainability reports or indicators on which they were based to answer the questions. Therefore, we propose indicators that allow the measurement and evaluation of the performance of these firms. The indicators proposal is based on the literature review and the questionnaire.

Indicators
Compliance with environmental policies and audit programs
Criteria established by the purchasing sector
Decrease of environmental accidents
Decrease of consumption for hazardous/harmful/toxic materials
Design goods with reduction, reuse, recycling or recovery of materials, components or energy
EMS certification
Environmental criteria for supplier's selection
Equipment replacement / maintenance
Greenhouse gas indicator
Internal cooperation for environmental improvement
Projects with customers / clients / community / suppliers
Reduction, reuse or recycling policies
Reverse Logistics
Suppliers' audit
Surplus sale / donation
Sustainable product design
Test on animals
Use of renewable energy
Volume of reused water
Volume of treated water
Volume of treated solid waste
Volume of separated waste
Waste destination indicator

Table 6 – Suggested indicators**Source: Author**

At the end of this analysis, it was possible to identify significant and relevant indicators. In this sense, these indicators could serve as a basis for monitoring GSCM in the firms.

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5. Conclusion

In this concluding chapter the findings are further elaborated, taking into account contributions and limitations of the dissertation. In addition, suggestions for future studies are presented.

The increasing awareness about environmental issues that permeate society has gradually shaped social and commercial relations. The climate crisis gives the tone of necessary urgency in the implementation of measures in order to decrease firms' environmental impact. The growing shift for incorporation of environmental alternatives emerged not only within firms but also within SC. Hence, GSCM progressively becomes more important in the routine of the firms. Thus, its adoption can be found in several sectors signalling the cross trend. The cosmetic sector, through the companies analysed, proved to be in line with other sectors of the industry that sought in GSCM a way to remain competitive.

From the former analysis, it was found that the major driver in adoption of green practices was internal guidelines. This could mean that firms are more likely to understand and invest in sustainable practices. In relation to the impact of green practices on performance, we could not determine its impact on both firms, especially because AymaraUna is a new firm, but it was possible to establish a positive relation between the adoption of green practices and performance (both environmental and economic) in the case of Bio Extratus. As for understanding the way GSCM practices are induced by the focal firm on its suppliers, it was not possible to determine the extension of influence they might have or if there is any influence at all. In the case of AymaraUna, it was seen that the firm does not have any influence, on the other hand Bio Extratus has very little influence on its suppliers GSCM engagement.

Nevertheless, this study has some contributions to share, it was the first GSCM multiple case study in Brazilian cosmetic firms, to our knowledge. The study allowed the identification of relevant elements of GSCM existing in Brazilian cosmetic sector, such as drivers, practices and performance. In this sense, it was able to expand knowledge not only about the cosmetics sector, but also about the adoption of GSCM in a developing country. While this study makes good contributions, however, it has limitations and does

not exhaust the possibilities of analysis, which can be deepened and compared with other studies, in order to expand GSCM empirical knowledge.

This dissertation like any other is subject to limitations. The first is the sample size. Despite of the fact that is a multiple case study, it has only two firms, therefore does not represent the entire Brazilian cosmetic context. Moreover, there might be a bias in the results because the firms included are eco-friendly. Another point is that even though an extensive questionnaire was run with employees of AymaraUna and Bio Extratus, we did not go to the firms to see if the words were not saying more than the firms' actions. In the case of Bio Extratus, the firm sent the questionnaire answered by the environmental supervisor. Another limitation was not being able to describe the firms' SC due to the lack of information provided. In the case of AymaraUna, we could understand more about its SC by the participation of its outsourced firm for production, however it was not a complete view. Finally, the dissertation did not combine the use of quantitative methods and this would help to corroborate the results found. Nevertheless, this dissertation provides useful insights for both scholars and practitioners, but still there is a need for new studies that deepen the study.

As evidence from the literature, GSCM has been a topic of interest for many researchers for a few decades now. Yet, there is still a lot of issues to be addressed. This dissertation points to a number of possibilities for future research agenda, not only concerning cosmetic industry, but GSCM in general. As a suggestion, future studies should focus on:

- Add more case studies and see if the pattern is repeated in Brazil; or other countries;
- Describe the SC of the firms in the study;
- Application of statistical tools (quantitative method). Bearing in mind that qualitative methods are intended to raise questions so that they can later be explored, metrified and replicated to other organizations, sectors and countries;
- Deepen GSCM research in developing countries outside the axis, as a way to enrich the literature and bring new perspectives;
- Replication of the study in other productive sectors, in order to verify if the results are characteristic of each industry, or if there is a pattern of trend or repetition throughout the various industries;

- Comparison of results obtained with those verified in research in other countries;
- Research GSCM in the light of other theories, such as Organizational Learning;
- GSCM design for cosmetic industry propositions;
- Other aspects such as suppliers' perspectives and logistics issues.

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Appendix

Questionnaire

Personal data

1) Name:

2) Firm:

3) Area:

4) E-mail:

Part I – Firm

1. The firm's adoption of sustainable practices within the supply chain was due to:

(1 - strongly disagree; 2 - disagree; 3 - cannot say; 4 - agree; 5 - strongly agree)

1.1) internal guidelines

strongly disagree strongly agree

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5

1.2) external pressures (customers)

strongly disagree strongly agree

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5

1.3) external pressures (competition)

strongly disagree strongly agree

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1	2	3	4	5

1.4) external pressures (legislation/regulation)

strongly disagree strongly agree

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

1 2 3 4 5

1.5) Could you mention a more expressive example?

2) How would you rate the board's commitment to environmental practices inside the firm? Ex: Is there a program to encourage / induce practices?

2.1) How would you rate the employees' commitment to environmental practices within the company?

3) How would you rate the board's commitment to environmental practices within SC?

4) Does the company have an EMS - Environment Management System (ISO 9000, 14001 or other)?

4.1) If so, when was EMS obtained?

5) Does the company adopt practices to reduce water consumption? *E.g. eco efficient systems and equipment*

5.1) Does the company practice water reuse?

5.2) Does the company collect rainwater for specific uses? *E.g. garden watering, cleaning*

5.3) Does the company monitor and evaluate water consumption and effluent disposal?

5.4) Does the company campaign and/or communicate its workforce regarding the rational use of water?

6) Is there a reverse logistics program (collection and proper disposal of used products) within the company? If so, I could tell you when it started and how it works?

7) Following the line of reverse logistics, we can see that:

(1 - strongly disagree; 2 - disagree; 3 - cannot say; 4 - agree; 5 - strongly agree)

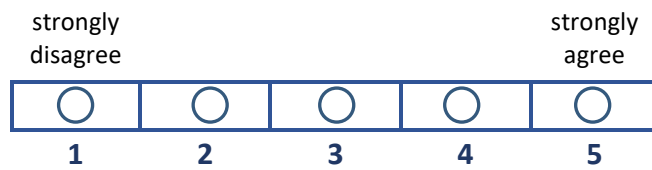
7.1) there is an effort by the firm in having ecological disposal

	strongly disagree				strongly disagree
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	1	2	3	4	5

7.2) the firm encourages the use of reverse logistics by suppliers

	strongly disagree				strongly agree
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	1	2	3	4	5

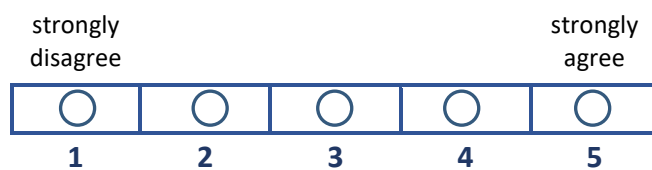
7.3) customers have a vision aligned with sustainable reverse logistics practices



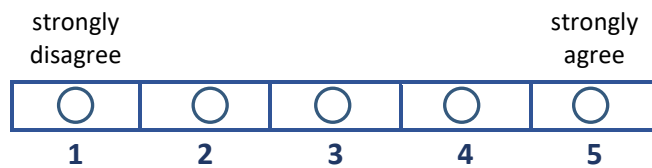
8) As for the product's design, it is done with:

(1 - strongly disagree; 2 - disagree; 3 - cannot say; 4 - agree; 5 - strongly agree)

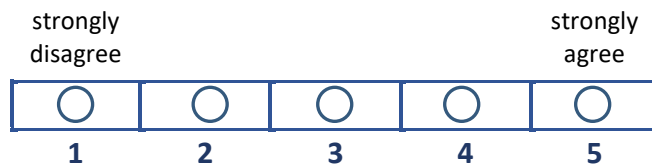
8.1) biodegradable materials



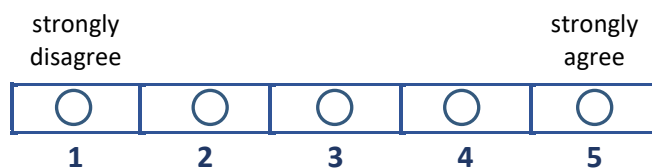
8.2) recyclable materials



8.3) materials with easy disintegration



8.4) thought to require as less material as possible



9) Regarding the packaging, stock, transport and distribution of raw materials or finished products, what is the firm's practice?

9.1) use of sustainable packaging

9.2) sustainable stock

9.3) distribution (use of less polluting means of transport)

10) Does the firm use renewable energy? If so, in a specific sector or in several? Or does the firm use an energy reduction program?

11) Does the procurement sector have sustainable criteria?

11.1) Is there a cost centre for investment in sustainable practices? If so, what percentage, on average, is earmarked for it?

12) Does the firm have a surplus sale program or sustainable disposal?

13) Does the company have a program for selling used equipment?

13.1) Does the company usually change equipment to reduce environmental impact/ increase energy efficiency?

14) Does the company have a program to reduce environmental contamination? Or program to reduce environmental damage in different places?

14.1) Reduction of pollutant gas emissions (e.g. greenhouse gases) - emissions inventory

14.2) Reduction of effluent waste

14.3) Reduction of solid waste (volume of separation / waste treatment)

14.4) Ocean cleaning

14.5) Reforestation project

14.6) Others: e.g. selective collection, composting of organic waste, recycling, etc.

15) The adoption of sustainable practices has brought the firm:

(1 - strongly disagree; 2 - disagree; 3 - cannot say; 4 - agree; 5 - strongly agree)

15.1) product quality enhancement

strongly disagree	strongly agree					
<table border="1" style="width: 100%; height: 20px; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 20%;">○</td> <td style="text-align: center; width: 20%;">○</td> <td style="text-align: center; width: 20%;">○</td> <td style="text-align: center; width: 20%;">○</td> <td style="text-align: center; width: 20%;">○</td> </tr> </table>	○	○	○	○	○	
○	○	○	○	○		
1	2	3	4	5		

15.2) improvement in efficiency/productivity (performance)

strongly disagree	strongly agree					
<table border="1" style="width: 100%; height: 20px; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 20%;">○</td> <td style="text-align: center; width: 20%;">○</td> <td style="text-align: center; width: 20%;">○</td> <td style="text-align: center; width: 20%;">○</td> <td style="text-align: center; width: 20%;">○</td> </tr> </table>	○	○	○	○	○	
○	○	○	○	○		
1	2	3	4	5		

15.3) product innovation

strongly disagree	strongly agree					
<table border="1" style="width: 100%; height: 20px; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 20%;">○</td> <td style="text-align: center; width: 20%;">○</td> <td style="text-align: center; width: 20%;">○</td> <td style="text-align: center; width: 20%;">○</td> <td style="text-align: center; width: 20%;">○</td> </tr> </table>	○	○	○	○	○	
○	○	○	○	○		
1	2	3	4	5		

19) To have a better understanding of the size of the firm, could you inform:

19.1) number of employees?

19.2) number of suppliers?

19.3) business' volume?

Part II – Suppliers

1) Is the choice of suppliers based on any environmental criteria? If so, which one?

2) How would you rate the supply chain actors' commitment to green practices and environmental legislation?

3) Does the company carry out any environmental audits on its suppliers? If so, how often?

4) Do the suppliers have EMS - Environment Management System (ISO 9000, 14001 or other)? If so, what year was it obtained?

5) In what ways does the firm seek to make its suppliers follow green practices? Was there, in fact, adherence by the main suppliers?

6) Is there a cooperation program with suppliers to achieve environmental goals?

Part III – External Pressures

1) What were the main institutional pressures (government and market) that influenced the adoption of green practices?

1.1) To what extent did government and market pressures affect the implementation of the company's sustainable practices? Could you cite examples?

2) Among the actors (government, consumer and competitors) of external pressures for sustainable practices, who would be the biggest influencer of the adoption of practices within the company? Why?

3) How would you rate the consumer's influence in adopting environmental practices?

4) With respect to consumers, the firm:

(1 - strongly disagree; 2 - disagree; 3 - cannot say; 4 - agree; 5 - strongly agree)

4.1) seeks to educate consciously

strongly disagree strongly agree

○	○	○	○	○
1	2	3	4	5

4.2) seeks to build sustainable practices together

strongly disagree strongly agree

○	○	○	○	○
1	2	3	4	5

4.3) pressured to implement and comply with EMS

strongly disagree strongly agree

○	○	○	○	○
1	2	3	4	5

4.4) feels a request for sustainable products

strongly disagree strongly agree

○	○	○	○	○
1	2	3	4	5

4.5) How would you rate the consumer's influence in adopting environmental practices?

strongly not important strongly important

○	○	○	○	○
1	2	3	4	5

5) Does the firm have any cooperation with customers / community for sustainable projects? If so, which one?

6) Regarding competitors, the firm:

(1 - strongly disagree; 2 - disagree; 3 - cannot say; 4 - agree; 5 - strongly agree)

6.1) feels pressured to implement and comply with other companies in the industry?

strongly disagree strongly agree

○	○	○	○	○
1	2	3	4	5

