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**A FRAMEWORK FOR PERFORMANCE
MEASUREMENT IN FOOD SUPPLY CHAIN
SUSTAINABILITY**

PHD THESIS

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LIST OF ABBREVIATIONS

CSR	: Corporate Social Responsibility
CRM	: Customer Relationship Management)
EMS	: Environmental Management Standard
ERP	: Enterprise Resource Planning
ESCM	: Environmental Supply Chain Management
GRI	: Global Reporting Initiative Standards
GSCM	: Green Supply Chain Management
HACCP	: Hazard Analysis and Critical Control Points
ISCM	: Internal Supplier Chain Management
JIT	: Just-in-Time
SC	: Supply Chain
SCM	: Supply Chain Management
SCS	: Supply Chain Sustainability
SRM	: Supplier Relationship Management
SSC	: Sustainable Supply Chain
SSCM	: Sustainable Supply Chain Management
TQM	: Total Quality Management
TBL	: Triple Bottom Line

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One of the effect of globalization is the pressure that is being put on firms towards the enhancement of their supply chains, and especially within the framework of sustainability. Adding value for consumers through efficient sustainable supply chain (SSC) activities is currently a common route to competitive advantage. Thus, many manufacturers are concentrating their efforts on sustainable supply chain management. By the means of performance measurement, the companies can assess their sustainable supply chain efficiency. Literature review showed that there is need for a related performance measurement framework and metrics that integrates all the supply chain macro processes, namely supplier relationship management, internal supply chain management, and customer relationship management; the three dimensions of sustainability, namely economic, environmental and social (Triple Bottom Approach or TBL). And, this should be developed taking into consideration the corporative aspect of the industries.

With the aforementioned taken into consideration, the aim of this research was to create and implement an integrated supply chain performance assessment system. This system would be built through supply chain macro processes that combine upstream actors (suppliers, supplier relationship management), the focal firms (internal supply chain management) and downstream actors (customers, customer relationship management) with businesses), as well as GRI Requirements, and finally against all three sustainability dimensions.

This study's analysis methodology was divided into three phases. Firstly, concerns were found during the preliminary analysis of the literature at the beginning of the study. At the next stage, the study identified the performance measurement metrics based on the thorough analysis of the literature. The GRI Sustainability Reporting Standards (GRI Standards), the first and most broadly accepted global standards for sustainability reporting, were reviewed and used as a tool against which the reviewed performance measurement metrics were shortlisted and adapted on the conceptual framework. Finally, in the third stage of the study, the suggested conceptual supply chain performance measurement framework was implemented to the firms that constitute the case studies from the Turkish Food Manufacturing sector. The necessary data was collected using mainly a qualitative methodology, with in-depth interviews acting as the primary data collection tool. As secondary evidence, this analysis used records and reports from the case study organizations, as well as other public documents.

The findings provided new viewpoints and observations into the analysis of supply chain performance measurement in terms of sustainability in Turkey and in relation to performance measurement variables and framework. The study revealed the relative significance of each supply chain macro process and dimension of sustainability to the case studies firms and their related undertaken assessment and applied policies.

Keywords: Supply Chain, Sustainability, Performance Measurement, Food Manufacturing

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Küreselleşmenin etkilerinden biri, özellikle sürdürülebilirlik olgusu çerçevesinde firmalara tedarik zincirlerinin etkinliğinin geliştirilmesi konusunda hissettirdiği baskıdır. Etkin bir şekilde Sürdürülebilir Tedarik Zinciri (STZ) faaliyetleri yolu ile tüketiciler için katma değer oluşturmak, günümüzde rekabet avantajı oluşturanın en yaygın yollarından biridir. Bu nedenle, birçok üretici çabalarını Sürdürülebilir Tedarik Zinciri yönetimi üzerinde yoğunlaştırmaktadır. Performans ölçüm araçları sayesinde firmalar, Sürdürülebilir Tedarik Zinciri etkinliklerini değerlendirebilirler. İlgili literatür, Sürdürülebilirliğin üç boyutu olan ekonomik, çevresel ve sosyal (Üçlü Alt Yaklaşım - Triple Bottom Approach or TBL) boyutları kapsayan ve tedarikçi ilişkileri yönetimi, iç tedarik zinciri yönetimi ve müşteri ilişkileri yönetimi gibi unsurlardan oluşan tüm tedarik zinciri makro süreçlerini entegre edecek ilgili bir performans ölçüm yaklaşımına ve ölçütlere ihtiyaç olduğunu göstermektedir. Bu yaklaşım ve ölçütler, endüstrilerin kurumsal yönü dikkate alınarak geliştirilmelidir.

Bu çerçevede, bu araştırmanın temel amacı, entegre bir tedarik zinciri performans değerlendirme sistemi geliştirmek ve uygulamaktır. Geliştirilen bu sistem, endüstri değer zincirinin dikey gerisindeki aktörleri (tedarikçiler ve tedarikçi ilişkileri yönetimi), odadaki firmaları (dahili tedarik zinciri yönetimi) ve değer zincirinin dikey ilerisindeki aktörleri (alıcılar ve müşteri ilişkileri yönetimi) bir arada değerlendiren tedarik zinciri makro süreçleri ile Küresel Raporlama Standartları (Global Reporting Initiative - GRI) gereklilikleri ve sürdürülebilirliğin üç boyutu olan ekonomik, çevresel ve sosyal boyutları bütüncül bir şekilde ele alarak geliştirilmiştir.

Araştırma nitel bir yöntemle dayanmakta ve çalışmanın metodolojisi üç aşamadan oluşmaktadır. İlk olarak, Sürdürülebilir Tedarik Zinciri Yönetimi ile ilgili literatür gözden geçirilerek, ilgili alanda ölçüm ile ilgili temel sorunlar tespit edildi. Bir sonraki aşamada, gene ilgili literatürün kapsamlı analizine dayanarak performans ölçüm kriterleri belirlendi. Sürdürülebilirliğin raporlanması için ilk ve en geniş kabul gören küresel standart olan GRI Sürdürülebilirlik Raporlama Standartları gözden geçirildi. Bu standartlar, ölçüm kriterleri için bir "kısa liste"nin oluşturulması ve kavramsal çerçevenin uyarlanması için bir araç olarak kullanıldı. Son olarak, örnek olay incelemesine temel oluşturacak şekilde Türk Gıda İmalatı sektöründen seçilen bazı firmalara, araştırmada önerilen kavramsal tedarik zinciri performans ölçüm çerçevesi uygulandı. Araştırmanın verileri, firmalarla yapılan derinlemesine mülakat yoluyla elde edilen birincil verilerden oluşmaktadır. İkincil veri kaynağı olarak, analize dahil edilen firmaların şirket kayıtları ve raporlarının yanı sıra kamuya açık belgelerden yararlanılmıştır.

Bulgular, Türkiye'de sürdürülebilirlik açısından ve performans ölçüm değişkenleri ve çerçevesi ile ilgili olarak tedarik zinciri performans ölçümünün analizine dair yeni bakış açıları sağlamıştır. Çalışma, tedarik zinciri makro sürecinde yer alan her aktörün ve sürdürülebilirliğin boyutlarının örnek olay olarak incelenen firmalar için sürdürülebilirlik değerlendirmeleri ve uygulanan politikaları açısından göreceli önemini ortaya koymaktadır.

Anahtar Kelimeler: Tedarik Zinciri, Sürdürülebilirlik, Performans Ölçümü, Gıda İmalatı

INTRODUCTION

1.1. Outline

The study offers an introduction to the topic and related research that will be in the core of the PhD thesis. It starts by providing a brief presentation of the background of this thesis on performance measurement in supply chain sustainability; the study aim and objectives are given then, after the scope of the study; the conceptual model is introduced then and a brief presentation of the research methodology concludes this work.

1.2. Context of the study

Both locally and globally, globalization has a big effect on food manufacturing. Customers put larger pressures on companies to boost efficiency, ability of service, and being flexible, while retaining low prices as a result of globalization, which broadens the market and increases competition (Laosirihongthong & Dangayach, 2005). Adding value for consumers through efficient sustainable supply chain (SSC) activities is currently a common route to competitive advantage. Thus, many manufacturers are concentrating their efforts on supply chain management (SCM) (Goh & Pinaikul, 1998). Furthermore, the element of supply chain sustainability has piqued academic and industrial interest during the last decades as a result of demands from key parties to follow sustainability practices. As a result, the demand to achieve optimum efficiency in sustainable supply chain management has increased.

According to Lummus and Vokurka (1999), supply chain is “all the activities involved in delivering a product [or service] from raw material through to the customer” (p.12). A traditional supply chain consists of a network of tiered suppliers that provide raw resources, components, and finished goods, as well as business processes and customers. (Mentzer et al., 2007). The supply chain concept is an effective one, when bringing the correct amount of product to the correct location and minimizing costs to all parties, one stage at a time. (Saad et al., 2002).

Though SCM is defined as the whole of practices that can be applied to all supply chain process from raw material suppliers to the final customer it has significant integrated upstream and downstream components (Jüttner et al., 2003). Towards an improved

overall supply chain efficiency (Harwick, 1997), it works to locate new vendors while reducing inefficiencies within the entire supply chain and also to identify new methods and alternate technologies to use (Petersen et al., 2005). Mentzer et al. (2001) analyzed different descriptions of the SCM in the literature and described it as follows by collecting all of the distinct facets of the SCM.

“Supply chain management is defined as the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole” (p.18).

A critical subject of contemporary market strategy and science is supply chain management. It boosts organizational effectiveness and profitability by implementing a game-changing approach to business management that ensures long-term viability (Gunasekaran et al., 2004). For companies that provide products and services to end users, supply chain management has become increasingly relevant (Waller et al., 2015). All companies, regardless of size or whether they provide goods or services, should place a strong emphasis on various stakeholder groups and cultivate relationships with them. However, since there is a physical movement of products in manufacturing, supply chain management may be more easily conceptualized than in other industries (Waller et al., 2015).

Sustainable development is achieved when the needs of environmental, social and economic requirements are met, and on top of this productivity can be retained (Dienes, Sassen, & Fischer, 2016). According to the above concepts, businesses that practice SSC Management (SSCM) must accomplish several goals, such as optimizing profitability and decreasing operating costs, while minimizing environmental impacts, and maximizing social well-being. Dealing with various policy makers and analyzing the environmental effects and social gains of a multi-party supply chain based on an inter-organizational approach, as well as dealing with complex mechanisms for planning, importing, manufacturing, and delivering goods in global markets, are among the obstacles faced by supply chain managers (Qorri et al., 2018).

Despite numerous methods, Elkington (1998) has found the triple bottom line (or "TBL") method to be one of the most popular in the business environment, particularly because of its simplicity (Elkington, 1998; Sitnikov, 2013). In this theory, natural, social, and fiscal, as well as well as social aspects must be accommodated. The environmental and social facets of sustainability stretch far outside the organization's boundaries. Considering and handling supply chain sustainability is one of the competencies for a business that is less readily imitated (Carter and Rogers, 2008). Nevertheless, sustainability related studies have been at a preliminary stage and have not been fully developed (A. Ashby et al., 2012; Stefan Seuring & Müller, 2008). Accordingly, Seuring and Müller (2008) have stated that examination of the social component of supply chain management is limited, and systematic incorporation of three aspects within supply chain sustainability is scarce. This demonstrates the continuously changing complexity of the industry is evolving, and therefore there are various different approaches to SSCM. Concerned with both the three-dimensional sustainability, and its organizational aspect, Seuring and Müller (2008) have described a balanced consideration of SSCM according to both organizational and global priorities, as followed:

“the management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e., economic, environmental and social, into account which are derived from customer and stakeholder requirements” (p. 1700)

Regardless of the developed methods for SSCM, there is no proof that this limited academic work has been of use within the industries, and that there are ones emerged from representatives of the “industry or specialists” (Taticchi et al., 2013). On the other hand, from a practical point of view, organisations gradually have been favoring the usage of business related models for sustainability assessment, such as the Global Reporting Initiative, with the academic work being left behind on this topic.

Sustainability, as well as theoretical and scientific analysis, is dominated by national economies, and industrial processes have received little consideration outside of a sense of a case or sample study focusing on SSC. Although multiple viewpoints are given on sustainable supply management, few of them concentrate on the actual results (Taticchi

et al., 2013). Moreover, it should be taken into consideration the fact that the realities of each country, where supplies may come or firms may operate, are different. Global supply chains cover a variety of countries with diverse environmental, economic, social, and legal regulations. Stakeholders are constantly demanding that they use their influence to strengthen supply chain conditions and implement the same level of responsible procurement around the globe, even in developing countries. Control ensures this in developed countries, but not in developing ones (Taticchi et al., 2013). According to same authors, the majority of related publications have been observed in North America and Europe.

Performance assessment can be used to assess sustainable supply chain efficiency. Currently, the term “measurement framework” has come to be favored by scholars and practitioners (Gunasekaran et al., 2004). Nevertheless, through several production chains, tracking data is problematic because it is impossible to assign output to a specific individual. Difficulties exist in evaluating internal performances, but more difficulties are created in internal performance (Hervani et al., 2005a). The supply chain management performance assessment challenge is increasingly expanding due to the complexity of the amount of variables that influence decisions. Nonetheless, the right selection of output measurements is important in the era of globalization (Bhagwat & Sharma, 2007). Although quite time-consuming, the idea of supply chain assessment, as a way of evaluating all the output in the chain, helps accelerate quality improvements. Progress in achieving these targets may be calculated by the use of specific metrics. This helps ensure high-quality production in order to meet competitive goals and increase reliability from initial sources to consumers, all the way down the whole chain (Shepherd & Günter, 2006).

Specifically for sustainable supply chain performance measurement, preliminary analysis showed that researchers should focus on the topic towards the direction of metrics and frames that serves this purpose. Their development should depend on existed work, but bypassing the issues that were mentioned above. They should cover the inter-organisational needs, as well as extending their view across the supply chain (Taticchi et al., 2013).

Then, a crucial idea to consider is a shared supply chain. The company goal is to increase total efficiency by measuring a comprehensive supply chain perspective

(Angerhofer and Angelides, 2006). However, several researchers' attention has often been confined to a specific aspect of performance measurement, although analysis of a holistic strategy regarding the overall performance of supply chain management has remained somewhat overlooked (Aramyan, Lansink, et al., 2007; Benita M. Beamon, 1999; Chae, 2009; Chan & Qi, n.d.; Chia et al., 2009; Clivillé & Berrah, 2012; Gunasekaran et al., 2001; Huang & Badurdeen, 2017; Otto & Kotzab, 2003; Rosic et al., 2011; Zhu et al., 2008).

Finally, since the research on the field is still new, a wide range of research methods can be applicable and desirable, so that they can contribute to shape the knowledge. According to Taticchi et al. (2013), these could include “conceptual modelling, surveys, action research and case studies”.

1.3. Research Problems

The following research problems have been established as a result of initial literature review:

- a. The conceptual framework and implementations are limited across all three aspects of sustainable supply chain management.
- b. Limitations on collated models/frameworks that involve all three dimensions of the supply chain's horizontal (supply chain macro processes) component in terms of performance assessment on sustainability.
- c. Lack of association between the academic research and industrial practices when it comes to frameworks for sustainable supply chain performance measurement.
- d. A taxonomy of performance metrics for sustainable supply chain management is needed.

As a result, the aim of this analysis is to include a further comprehensive approach towards a review of sustainable supply chain output assessment frameworks through the integration of three elements, including supply chain macro processes, business reporting principles, and all three dimensions of sustainability using a cross-organizational approach (see figure 1).

1.4. Aim of the study

The aim of this research is to build and use an interactive sustainable supply chain performance measurement system. This architecture will be built in accordance with the Global Reporting Initiative Standards (GRI), along with supply chain -macro- processes that combine upstream activities (suppliers and supplier relationship management) and downstream activities (customers and customer relationship management) with enterprises (internal supply chain management), and finally against all three sustainability dimensions (see figure 1).

In order to accomplish the ultimate study purpose, three unique research goals were considered. They were as follows:

1. Defining performance assessment indicators for all supplier chain macro processes, namely supplier relationship management, internal supply chain management, and customer relationship management in relation to business reporting standards structure for a supply chain performance measurement framework that covers all three dimensions of sustainability.
2. Creating a conceptual framework established upon the performance measurement metrics that have been proposed.
3. To examine the validity of the suggested framework through its application to the case studies that companies of the Turkish food manufacturing sector will constitute, so that the author can determine the supply chain's sustainability efficiency in relation to performance measurement indicators.



Figure 1. Theoretical Framework

1.5. Research Method

This study's analysis methodology will be divided into three phases. Firstly, concerns were found during the preliminary analysis of the literature at the beginning of the study. This procedure entailed revising the initial proposals in phases before gaps in the field of concerned study concern found. On the base of the research questions that were derived from the search, the research goal was established, and the research objectives were drawn from the key aim. The literature was then analyzed further to develop an adequate hypothesis in order to address the study question. The study of literature focused on many topics. Initially, the subject of supply chain management was considered, followed by the performance measurement methods, and then, the sustainability of supply chain management and its performance measurement was investigated. Following that, the study went one to develop the conceptual model for sustainable supply chain performance measurement.

At the next stage, the study identified the performance measurement metrics based on the thorough analysis of the literature. The GRI Sustainability Reporting Standards (GRI Standards), the first and most broadly accepted global standards for sustainability reporting, were reviewed and used as a tool against which the reviewed performance measurement metrics were shortlisted and adapted on the conceptual framework.

Finally, in the third stage of the study, the suggested conceptual supply chain performance measurement framework was implemented to the firms that

constitute the case studies from the Turkish Food Manufacturing sector. The necessary data was collected using mainly a qualitative methodology, with in-depth interviews acting as the primary data collection tool. The details were gathered by semi-structured interviews with key organization employees. As secondary evidence, this analysis used records and reports from the case study organizations, as well as other public documents (use of data triangulation).

1.6. Selection of industry: Turkish food manufacturing

This study has chosen to employ its developed model on firms that belong to the supply chain of a Turkish food manufacturer: a dairy manufacturer, suppliers for the product packaging and a retailing firm that serves as the customer .

The EU food and drink sector is the EU's biggest manufacturing industry, employing 4.82 million workers and generating €1.2 trillion in sales and €266 billion in value added, making it the EU's largest manufacturing industry. The food and beverage sector hires the most people in half of the EU's 27 member states (FoodDrinkEurope, 2020).

On national level, food and beverage production is a major component of Turkey's economy, accounting for approximately 20% of GDP, and is primed for further growth. The Turkish government has set a target of substantially rising food production by 2023.

Food and beverage processing is a \$141 billion sector (WorldFoodInstabul, 2018).

There are 47,617 food processing and 595 beverage producing enterprises in Turkey as of 2017, according to the latest statistics published by TurkStat (see figure 2). Turkey has a modern and developed food processing industry supplying the domestic population and exporting, which represents 16 percent of all manufacturing activities (USDA , 2019).

Table 1: Food Processing Industry in Turkey

Food Processing Industry in Turkey	2017
Processing and Preserving of Fruit and Vegetables	17.9%
Bakery and Farinaceous Products	11.9%
Processing, Preserving, Production of Meat and Meat Products	11.8%
Dairy Products	11.0%
Flour, Starches and Starch Products	10.2%
Vegetable Oils and Fats	9.8%
Cocoa, Chocolate and Sugar Confectionery	5.8%
Beverages	5.1%
Prepared Animal Feeds	5.0%
Manufacture of Sugar	3.9%
Processing of Tea and Coffee	3.4%
Other Food Products	2.9%
Processing and Preserving of Sea Food	1.4%

Sources: (USDA , 2019)

Of note, food production entails manufacturing everything from ice cream to oils and beyond; it is about investing in the meat industry; and it is about expanding aquaculture around the world. Turkey is caught in the middle of it all (Swartz, 2016).

It's not as if Turkish brands are exclusive to the domestic market. Turkish cuisine has a nationwide – and, indeed, a global – audience. Ülker, for example, is a giant in the world of cookies, cakes, and confectionery. Yildiz Holdings owns a variety of international brands, including McVitie's biscuits in the United Kingdom and others. Beta Tea has grown from being Turkey's first tea importer to a big international player (WorldFoodInstabul, 2018).

Turkey has over 41,000 registered suppliers, but population changes and increasing domestic output costs are opening the door wider for international products.

Although the food industry has an important influence on the European economy and society, its energy use and climate problem are still very important relative to other manufacturing sectors. With the related stakeholders (consumers, governments, NGOs etc.) putting pressure for a more sustainable policy from a business side, the topic of sustainable supply chains is more than ever essential (Kucukvar & Samadi, 2015).

Increased sustainability is now transforming the food industry, considering, evaluating and implementing environmental, economic and social considerations as never before in the entire supply chain (Baldwin, 2009).

When customers grow more worried with environmental concerns, offering sustainability packages tends to be a rational business approach (Olsen, Slotegraaf, &

Chandukala, 2014). For example, 96 percent of European citizens believe that businesses can do more to reduce plastic waste and expand recycling opportunities (European Commission, 2014). Furthermore, Tobler, Visschers, and Siegrist (2011) discovered that customers assumed that avoiding unnecessary packaging has the biggest environmental effect in the form of ecological food use.



CHAPTER 1: LITERATURE REVIEW

1.1. Introduction

In this chapter the supply chain related literature will be presented; the key areas that were researched are related to sustainability and performance measurement.

1.2. Defining Supply Chains

According to Samaranayake (2005), most organisations belong to at least one supply chain and competing each other is gradually on supply chain basis (Gold et al., 2010). The global nature of business and the current trends in economy have led to the need of very compound supply chains (Varma, Wadhwa, and Deshmukh, 2006), and consequently the structure, organization, interacting, capabilities, and managing of supply chains have developed into significant topics (S. Seuring and Gold, 2013). In order to define supply chain, Sridharan, Caines, and Patterson (2005) mention that “a supply chain includes all the activities, functions and facilities involved (either directly or indirectly) in the flow and transformation of goods and services from the material stage to the end-user” (Sridharan, Caines, and Patterson, 2005), p.313). The typical supply chain goes onward from raw materials to completed product (Crandall, 2006) and “encompasses all activities associated with the flow and transformation of goods from the raw materials stage (extraction), through to the end user, as well as the associated information flows” ((Seuring, 2004), p.1060).

Literature review showed that there are several aspects, when it comes to supply chain definition. From one aspect, many scholars tend to define it from one direction chain perspective; in this way though, a very complex system of interrelations and processes is extremely simplified. On another point of view, there are definitions that concentrate on the flow of physical goods (from raw materials to end product), without the inclusion of information, capital, people etc. that are elements of a supply chain (Lowson, 2002). Therefore, researchers that describe the supply chain as a system of cells that process materials with the characteristics of supply, transformation and demand (Burgess, Singh, and Koroglu, 2006; Spekman, Kamauff, and Myhr, 1998). According to Samaranayake (2005, p.48) supply chain is “a series of autonomous or semi-autonomous business entities involved, through upstream and downstream links, in different processes and activities that produce physical goods or services to customers”.

Lowson (2002) supports that a typical supply chain will involve 3 main components, namely organizations (supply chain actors); processes (transformation from inputs into outputs); and the internal connections via communication and exchange of information.

Among the supply chain actors, the one that is in charge of the initiation of business activities, the conception and setting of the product or service characteristics that will finally be delivered to the customer is the focal firm (Cavusgil, S. Tamer, Knight, G. A, & Riesenberger, 2008). Considering the aforementioned, this firm is expected to be the owner or the main manager of the supply chain and its activities, a role that is supported by its close position to the end customer and its powerful organizational status in comparison to the other actors of the supply chain (Leppelt et al., 2013; Seuring, 2004). Nevertheless, the different levels of supply chain, “from point of origin (manufacturers and suppliers) to point of consumption (consumers)”, depend on each other (Svensson and Bth, 2008). Even more, there is sometimes no differentiation between the rest of the supply chain actors from the customers, which makes them put the responsibility only on the focal firm, even regarding their suppliers’ activities (Lippman, 2001).

Lately, the structure of supply chain is shifting from a vertical functionality towards the outsourcing concept where the specialization of a firm in a specific process or product matters, and thus, it can offer efficiency, speediness and fast progress (Samaranayake, 2005). Moreover, outsourcing gives the chance to a company to concentrate on its core competencies and remove the costs associated with the non-essential functions such as warehousing (Varma, Wadhwa, and Deshmukh, 2006). This has moved the competition from a firm to a supply chain level, that makes the Supply Chain Management (SCM) essential to the supply chain efficiency (Varma et al., 2006).

1.3. The context of Supply Chain Management

This part moves on to the supply chain management concept as a research topic, providing the related terminology and growth of supply chain management through the years, as well as its impact on the firms and its several practices.

1.3.1. Concepts and advancement

The concept of supply chain management first appeared in the manufacturing sector at the beginning of 1980s. It was derived from management practices like Total Quality Management (TQM) (Kanji & Wong, 1998) and Just-in-Time (JIT) (Vrijhoef &

Koskela, 2000). Therefore, it can be considered as another case of evolutionary and growing novelty, which was originated from internal programs that are aiming to improve the whole efficiency (Saad et al., 2002). Besides the aforesaid improvement of internal firm efficiency, supply chain management has expended its role on the reduction of non-added value processes, enhancing the value of the supply chain as a whole (Croom et al., 2000). Moreover, supply chain management has started focusing not just on the internal organizational activities, but also on the relations and processes that occur externally; hence, it depends on and utilizes the information and feedback that is derived by the occurred activities between the organization and its external environment. Supply chain management is considered to include all the related undertakings that manage and coordinate the entire supply chain, meaning from raw material suppliers to end customers (Slack et al., 2001), something that according to New & Ramsay (1997) increases the degree of interaction through collaboration among all actors of the supply chain.

According to the Council of Supply Chain Management Professionals (2020), “Supply Chain Management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, SCM integrates supply and demand management within and across companies.”

The Council (Council of Supply Chain Management Professionals, 2020) also describes supply chain management as “an integrating function with primary responsibility for linking major business functions and business processes within and across companies into a cohesive and high-performing business model. It includes all of the logistics management activities noted above, as well as manufacturing operations, and it drives coordination of processes and activities with and across marketing, sales, product design, finance and information technology”.

Moreover, according to Chopra & Meindl (2007), a supply chain contains all the stages that need to take place - directly or indirectly - so that a customer order is fulfilled. Thus, the supply chain consists not solely of the manufacturing company and its suppliers, but additionally the transportation related actors, warehousing providers,

retailers, and the customers themselves. As aforementioned, a supply chain involves all activities that fill a customer order, so internally this is translated into functions that contain at least the marketing, customer service, accounting, new product development, distribution, and operations.

Supply chain management relates to efficiently managing the interactions among all involved actors (von Hippel, 1987), plus the incorporation of processes of both upstream and downstream supply chain flows (Christopher & Jüttner, 2000). That substantial importance of coordinated status and incorporation of processes is strongly connected with the establishment of further efficient and long term relations between procurement parties and suppliers (Koskela, 1999).

According to Dubois & Gadde (2000), these are the kind of relations within a supply chain that are considered to be a tool of a more effective usage of resources throughout the supply chain. Besides, Ali et al. (1997) state that they can similarly provide other benefits, such as better transaction transparency, enhanced trust and loyalty. According to Holti (1997), in this way, supply chain management can successfully improve the performance of the whole supply chain. It can also positively contribute to the innovation of products, processes and organization (Edum-Fotwe et al., 2001). This integration of activities and cooperation makes information easily identified and shared among all organizations in the supply chain (Mowery, 1989). For the supply chain members to achieve important advantages, such as sharing resources, information, knowledge etc., they implement corporation schemes and inter-institutional agreements (Akintoye et al., 2000).

Nevertheless, the success of the supply chain management depends on the systematic comprehension of the concept itself, which can be an extensive, complicated and dynamic process (Whipple & Frankel, 2000). Spekman et al. (1998) state that, from an implementation point of you, supply chain management relies on the capability to build, cope and redesign relations between entities, firms and networks inside the supply chain. This needs a new base on the organizational structures and culture, which in turn requires a substantial engagement, funds and time to build (Kennerley & Neely, 2002).

Taking into consideration all the elements that were mentioned above, there is need to identify that supply chain management is a composite topic, and hard to apply. Moreover, it is multifactorial, depending on close and long-term relationships at both

inner and outer level of the supply chain actors (Saad et al., 2002). With the growing rise of outsourcing and the competitors, and an increased dependence on suppliers, the management and incorporation of all activities among all organisations has become challenging for the supply chain management to sustain and enhance towards the enhancement of the supply chain performance as a whole. Thus, the connection of supply chain management with the performance measurement of the supply chain is vital to be considered.

1.3.2. Development of supply chain management

As it occurs from the work of Ross (1998), considerations of supply chain management frequently employ complex jargon, hence restricting management's interpretation of the notion and its efficiency for functional employment. The term of "supply chain" appears to be more popular among scholars compared to the one of "supply chain management" (Croxtan et al., 2001). Moreover, scholars suggest that the supply chain constitutes a group of organizations that move resources forwards (La Londe & Masters, 1994). Generally, numerous individual companies take part in the manufacturing and delivering of a product to the end customer of the supply chain – "raw material and component producers, product assemblers, wholesalers, retailer merchants and transportation companies" are altogether supply chain's actors (La Londe & Masters, 1994). Likewise, Croxtan et al. (2001) claim that a supply chain is formed as a number of companies that are brought together to provide goods or services. As it is noticed, these definitions involve the final customer as an element of the supply chain. A further description presents supply chain as a series of companies which interconnect various operations, starting with upstream links and ending with links to the final customer, which together contribute to the overall creation of demand in the form of goods and services (Christopher, 1999). Particularly, a supply chain contains several organizations, that cover the upstream (i.e., supply) and downstream (i.e., distribution) part of the chain, and the final customer. Mentzer et al. (2001) present the development of supply chain through three stages in the way that the following figure shows:

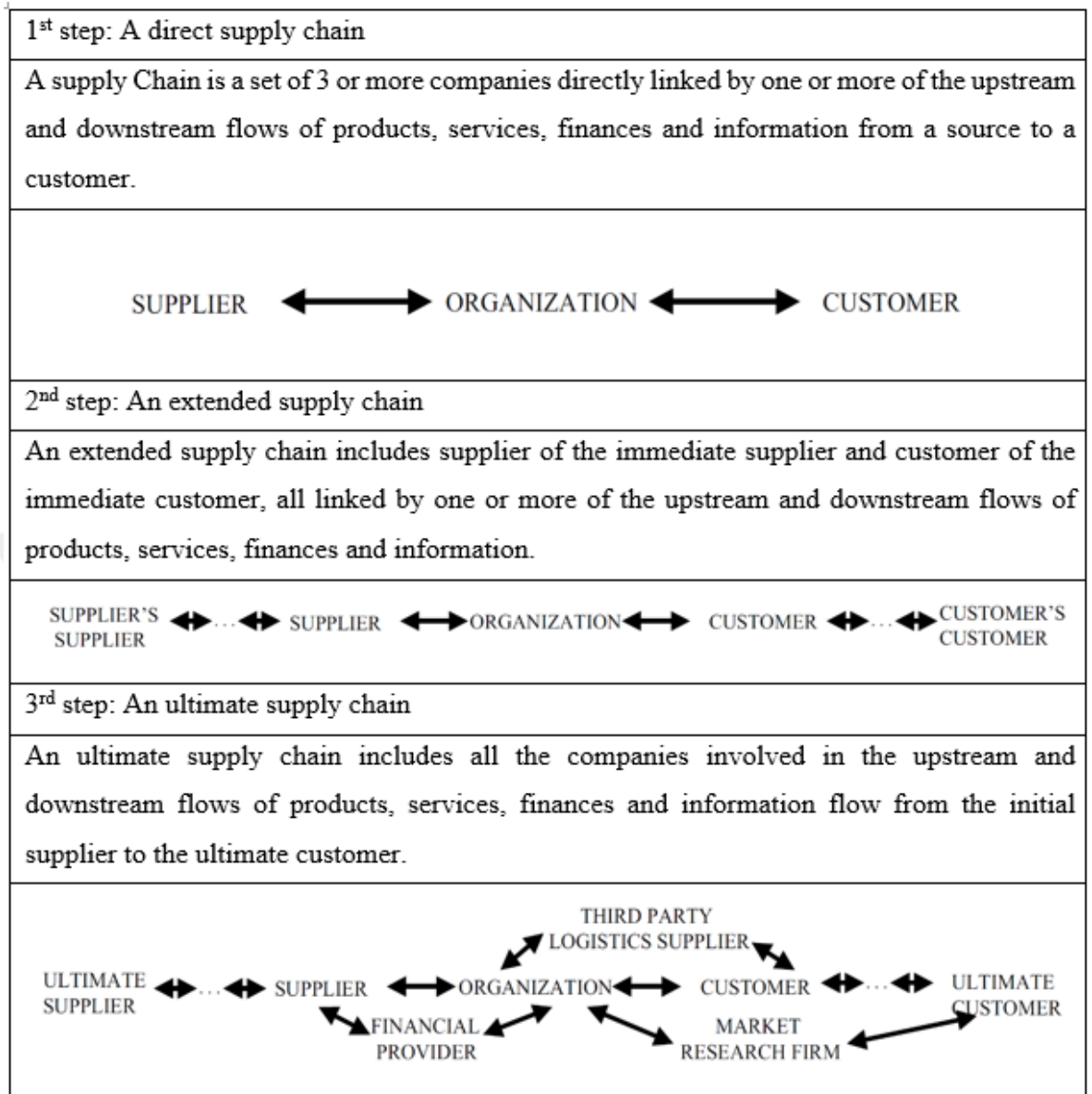


Figure 2. Evolution of Supply Chain

Source: Adopted by Mentzer et al., 2001

1.3.3. Supply Chain Processes

Supply chain's processes are able to be categorized into the next three macro ones: supplier relationship management, that signifies the interaction between the firm and its suppliers for all processes; internal supply chain management, that stands for the whole processes within the firm; and customer relationship management, which represents an intersection between the company and its customers for all processes. These aforementioned macro processes oversee the flow of information, resources, as well as the product needed for producing, receiving and fulfilling a customer order. (Chopra & Meindl, 2007). The internal supply chain management mechanism is coordinated by

supplier relationship management and customer relationship management, which are essential ties in the supply chain. Each macro process has components that expand across functions and across firms (Lambert et al., 2005).

1.3.3.1. Supplier Relationship Management

The framework for how supplier relationships are formed and managed is provided by supplier relationship management (Croxtan et al., 2001). Service and service arrangements with main vendors are tailored by cross-functional teams (Lambert et al., 2005). The macro method of supplier relationship management seeks to coordinate and control supply sources for a large range of products and services. According to Croxtan et al. (2001), the identification and procurement of suppliers for different products; the negotiating of price and distribution arrangements with suppliers; placing of replenishment orders; the exchange of production and supply schedules with suppliers; plus contact with suppliers on new products and orders are all forms of supplier partnership management process.

1.3.3.2. Internal Supply Chain Management

Internal supply chain management, as a macro process, is designed to meet consumer demand in a timely and cost-effective way (Chopra & Meindl, 2007). Vollmann et al. (1997) mention that the customers' demands must be balanced against the firm's supply capabilities, that means predicting demand and aligning it together with manufacturing, procurement, and distribution. Meeting consumer expectations for order fulfillment constitutes a core element of successful internal supply chain management. Manufacturing, distribution, as well as communications strategies must all be integrated for effective order fulfillment. To satisfy consumer needs and minimize overall supplied cost to consumers, the business can form relationships with key members of the supply chain (Mangla et al., 2014). Furthermore, Lambert et al. (2005) consider the internal supply chain management as a mechanism, which is concerned with producing products and developing the manufacturing agility required to satisfy target customers, and it encompasses all tasks required for controlling inventory movement across production facilities as well as purchasing, implementation, and flexible management. Croxtan et al. (2001) express that the internal supply chain management involves internal production scheduling, which includes choosing which items to store at each warehouse; storage planning, which involves assessing the location and scale of

warehouses; demand and supply forecasting, which involves identifying material management policies; and order fulfillment, which involves selecting, packaging, and delivering individual orders.

1.3.3.3. Customer Relationship Management

The macro process of customer relationship management (CRM) establishes a framework for the advancement and maintenance of customer relationships (Croxtan et al., 2001). Being part of the firm's corporate mission, managers recognize important clients and consumer segments to pursue. Service and service arrangements are tailored by cross-functional client teams to satisfy the demands of main accounts and groups with the rest of the customers (Lambert et al., 2005). Moreover, customer relationship management seeks to create customer demand and make buying and monitoring orders simpler. Pricing, catalog and other marketing content scheduling, sales, handling of web site and orders, and managing the call center which handles orders and delivers assistance, are all procedures that fall under the customer relationship management umbrella (Croxtan et al., 2001).

Since all three macro processes serve a certain customer, it is critical that they are efficiently coordinated in order for a supply chain to be competitive (Croxtan et al., 2001). The effectiveness or failure of the incorporation effort is largely determined by the company's organizational structure. For most industries, procurement that is in control of supplier relationship management macro processes; manufacturing that is in control of internal supply chain management macro processes; and last, marketing that has the control of customer relationship management macro activities, have no actual coordination between them (Chopra and Meindl, 2010). When marketing and production make preparations, it's not uncommon for them to have two separate projections. The supply chain's capacity to successfully balance supply and demand is harmed by the absence of alignment, resulting in disappointed consumers and high prices. As a consequence, enterprises should create a supply chain system which reflects the macro processes, and guarantees effective cooperation and collaboration along with the ones in charge of processes that communicate with one another (Chopra & Meindl, 2007).

1.4. Sustainability in SCM

This part provides the terminology and dimensions of sustainability, the function of sustainability in Supply Chain Management (SCM), the concept of performance measurement, the frameworks of performance measurement in SC, as well as the metrics for Sustainable SC performance.

1.4.1 Sustainability

According to Gallopín (2003, p. 7), “the concept of sustainability and particularly of sustainable development figure among the most ambiguous and controversial in the literature”.

This imprecision in the definition of sustainability, as aforementioned, has steered misunderstanding and several descriptions of these terms.

Gallopín (2003, p. 35) goes on saying that “sustainability is a property of a system open to interactions with its external world. It is not a fixed state of constancy, but a dynamic preservation of the essential identity of the system amidst permanent change. A small number of generic attributes may provide the foundations of sustainability”.

The significant issue about the notion of sustainability is not about making a change, but preventing the loss of the replenishment sources, which may facilitate the system to recover from the “unavoidable disturbances” to which it is vulnerable. The discussion on the relation of sustainability with the system should be based on whether the attention is on the “sustainability of the system itself” or “sustainability of the output(s) of the system”, since they both do not automatically relate to the similar concept and the consequences may be distinct for these occasions (Gallopín, 2003).

The definition of Brundtlan Commission (*World Commission On Environment And Development*, 1987) is often used for the sustainable development:

“Sustainable development seeks to meet the needs and aspirations of the present without compromising the ability to meet those needs of the future. Far from requiring the cessation of economic growth, it recognises that the problems of poverty and under-development cannot be solved unless we have a new era of growth in which developing countries play a large role and reap large benefits”.

Gallopín (2003) continues by declaring the sustainable development implies transition and not a state; thus, it is a way of transformation that is able to enhance the system in a sustainable way. The aforementioned change of the system can be either to enhance itself, or the output, or both.

Within the reviewed literature, sustainability is identified as a multi-dimensional concept (Dempsey et al., 2011; Oriens, 1990; Udo & Jansson, 2009), although there can be variances regarding what these scopes are taken into consideration. There is agreement on the environment being treated as the key aspect of sustainability, with close relations to the economic dimension; it is the most researched topic among the other dimensions (A. Ashby et al., 2012; Pagell & Wu, 2009a; Schaefer, 2004; Sharma & Ruud, 2003). “Sustainability has broad appeal and little specificity, but some combination of development, equity and environment is found in most attempts to define it” (Parris & Kates, 2003, p. 13).

Besides the environmental and economic dimensions, the social one is often found in the published works; along with the financial and the environmental, they constitute the 3 pillars of sustainability (Hutchins & Sutherland, 2008; S. Vachon & Mao, 2008). It is also known as the “interconnected rings” (Giddings et al., 2002), in the way it is demonstrated in Figure 3. The aforesaid dimensions were clearly designed by Elkington, within the framework of the economic theory of the Triple Bottom Line (TBL or 3BL) (Elkington, 1994).

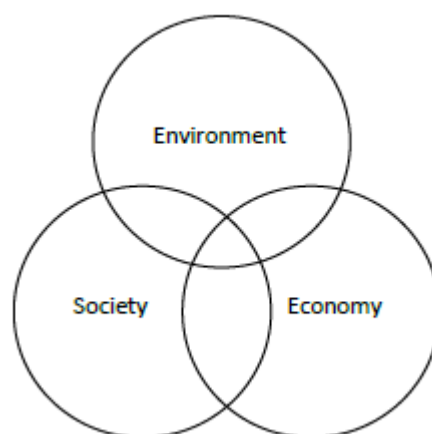


Figure 3. Interconnected rings of Sustainability

Source: Giddings et al., 2002

The idea of sustainability reflects the “integration of environmental thinking into every aspect of social, political and economic activity” (Elkington, 1994, p.90). Moreover, it successfully mixes “social progress, eco system, natural resources, and economic growth as a comprehensive business concept bridging the profits with fundamentals of a commercial business” (Liyana, 2007). Reid (2013, p.71) goes on by stating that “development is a whole; it is an integral, value-loaded, cultural process; it encompasses the natural environment, social relations, education, production, consumption and well-being”.

The purpose of the TBL idea meant to incorporate all 3 sustainability dimensions together (Elkington, 1998), and basically is economically focused. Many scholars present this 3 dimensional aspect of sustainability in several ways. Dyllick & Hockerts (2002) refers to the 3 dimensions as the “business case”, the “natural case” and the “societal case”, whereas Liyana (2007) classifies 3 performance groups, namely economic accountability, social fairness and protection of the eco-system, which shape the pillars of sustainability. Also, Hart (1997) separates the worldwide economy in 3 inter-reliant dimensions, namely marketplace, endurance and nature economies. Furthermore, Udo & Jansson (2009) think of sustainability as a capability that is based on capacities of society, technology and environment. Then, Grinde & Khare (2008) take economic development towards the “triple E” standpoint of Environment, Economy and social Equity, and above the pure economics.

As it can be derived from the aforementioned, the 3 dimensions of sustainability are shown in the related literature, that provides the complete frame to understand the idea; there are queries though on the degree that these dimensions can be incorporated and well-adjusted in business affairs. One example of that is the work of Gladwin et al. (1995), which clearly questions the “3-sector model aspect”, while supporting that this promotes a “technical fix methodology”. Instead, they suggest the “sustaincentrism paradigm”, which provides an consolidative equilibrium among the "3-E" trio of economy, ethics , and ecology, in which civilization and financial system are combined to exist inside the ecosystem for enabling human reconfiguration, as well as satisfaction of needs (Giddings et al., 2002; Gladwin et al.,1995)).

The literature review revealed that the environmental component has piqued the most scholarly attention regarding sustainability, with much of the publications focusing on

the relationship of the economic and environmental aspects. The economic-environmental relation has shown quantifiable results, while the social-economic and social-environmental relationships are more vague (S. B. Banerjee, 2003). Social and ethical gains are less objective than the other two foundations, which are measured by empirical and contextual indicators; social capital is also found in partnerships (Dempsey et al., 2011). While the climate is more observable, achieving an “environmental balance”, it remains a significant task in terms of prioritizing challenges, placing these issues in regional, state, and global contexts, and aligning expenditures with economic indicators (Wilkinson et al., 2001).

1.4.1.1. Economic Dimension

Economic sustainability means generating economic prosperity but simultaneously shielding and defending the environment and the people who work in it (Yusuf et al., 2013). It leads to efficient use of capital to achieve long-term benefits while minimizing the negative consequences of resource misuse. Economic sustainability entails not just positive investment returns; it additionally entails the assurance that an organization's actions do not cause any damage to the environment or society (Tsai et al., 2009). Furthermore, economic dimension considers the natural ecosystems, which store natural resources to enterprises, the fiscal value of the resources, as well as the efficiency with which they are used, all of which are important for the long-run viability of enterprises and sustainable economic development (Doane & Macgillivray, 2001; Goodland, 1995; Joseph Sarkis et al., 2011; Tsai et al., 2009). However, an organization's financial implications at the micro (internal) level, such as expense minimization and benefit maximization of returns for stakeholders (GRI, 2002) and at the macro (external) level, such as business commitments to corporate responsibility, are what matter (Azapagic, 2004; Labuschagne et al., 2005). “Economically sustainable companies guarantee at any time cash flow sufficient to ensure liquidity while producing a persistent above average return to their shareholders” (Dyllick & Hockerts, 2002, p. 133).

Financial capital (equity and debts), fixed capital (machinery, property, furniture, and equities), and intangible capital (prestige, innovations, expertise, and operational routine) are all necessary for economic sustainability (Dyllick & Hockerts, 2002). Economic philosophy emphasized the adequacy of products' use and, to a lower degree, distributional value (Goodland, 1995). Moreover, economics is focused on economic

development and productive allocation of resources, while sustainability is dealing with long-term size, equal and balanced resource sharing, and allocation (Aguilar- González, 2005; Costanza et al., 2014). As a result, in order to ensure long-term resilience, economic record-keeping processes must take into account ecosystem services (Costanza et al., 2014). Because overlooking the environmental and social considerations constitutes a barrier towards economic growth, and having a business as profitable does not assure its long-run existence, and it does not reflect a positive impact upon its imminent environmental and social factors (Doane & Macgillivray, 2001).

Following the World Wars, economists became concerned with resource management and usefulness because of resource depletion (Bromley, 1998). Their goal was to build a structure through which development would not exhaust the ecosystem, as well as a cost-benefit one that would have a direct impact on the organizations' potential (Aras & Crowther, 2009). Ecosystems are regarded as “externalities” in economics (van den Bergh, 2010). Managing the environment as like that can result in a fast benefit (Kinsley, 1997). Firms use business process steps to continue to internalize this aspect (Cato, 2012).

Furthermore, by integrating an industry's economic, environmental and social bottom lines, lower prices, a favorable impact on value (Handfield et al., 1997; Walker et al., 2008) and resources use may be realized (Lin et al., 2010; Theyel, 2000). According to Jennings & Zandbergen (1995) and Walker et al. (2008) incorporating environmental related principles into their supply chain will lower operational costs and enhance customer experience.

Furthermore, the management of a sustainable supply chain entails the long-term enhancement of a firm's economic outcome, which includes savings in costs that are related with decreased packaging, as well as an enhanced plan for reuse and recycling; fewer costs regarding health and safety, and lower turnover and recruiting costs because of safer warehousing and transportation (Carter & Easton, 2011; Walker & Jones, 2012).

1.4.1.2. Environmental Dimension

The “green” or sustainable component has been well reflected during the review of published works, and the search word “green supply chains” yielded the most articles,

indicating that it is actually the best established relationship of Supply Chain Management (SCM) with sustainability.

The existence of a green supply chain means that a firm collaborates with its vendors to increase the environmental value of materials and production methods (Gong et al., 2018; Zhu et al., 2005). It necessitates conceptual change away from the traditional correlation of performance with financial criteria, as well as a complete environmental interest (Varma et al., 2006). For controlling a supply chain's environmental efficiency, all of the phases and processes must be discussed, since any operation may potentially cause an adverse influence on the chain's environmental results (Bloemhof et al., 2015; Toharny, 2009; Tsoulfas & Pappis, 2006). Traditionally, supply chain partnerships have been governed based on expense, efficiency, as well as distribution, and the ecosystem is barely considered as important once opposed to those priorities (Simpson & Power, 2005). While the examined works recognized that supply chain partnerships may be a crucial path for companies to impact their efficiency on environment, as previously stated, the existing emphasis on SCM and sustainability analysis is about the more concrete aspects of commodity, operation, and performance.

The Green Supply Chain Management (GSCM) is a subset of SCM that includes green sourcing, green procurement, managing of green products, green delivery as well as promotion, and Reverse Logistics (Hervani et al., 2005b; Testa & Iraldo, 2010; Thun & Müller, 2009). GSCM incorporates considerations for the environment within the frame of SCM practices through defining expenses, advantages, and dangers, as well as ways to control and mitigate waste, with the primary objective of waste reduction (Darnall et al., 2008; Zhu et al., 2008). It also has an opportunity to lower an organization's finished product's direct and indirect environmental impacts (Darnall et al., 2008). Even so, the examined sources recognizes that the companies utilizing GSCM can just assess first-tier suppliers, while the SCM feature has an effect further down the supply chain to second and third-tier suppliers, and likely further (Darnall et al., 2008; Pagell & Wu, 2009a).

The expression “Environmental Supply Chain Management” (ESCM) is often used to define a series of managing the supply chain practices, activities, and partnerships built in reaction to environmental issues (Hagelaar & van der Vorst, 2001). Given this disparity in language, the literature emphasizes the increasing interest in this particular

area, which has mostly grown in the last few years. Companies usually have no liability regarding their suppliers' environmental practices, which poses the question of motivation for enhancing environmental efficiency (Simpson & Power, 2005). Larger companies are more likely to face demand to increase environmental efficiency, whereas their manufacturers face less clear incentives (Hall, 2006). Several businesses are concerned with taking some kind of responsibility for the environmental results of their vendors, which provides an obstacle to ESCM (Darnall et al., 2008). There is still a common misunderstanding that environmental policies are more expensive, and the connection between increased environmental efficiency and expenses is often interpreted as non-viable rather than synergistic (Darnall et al., 2008). According to Porter (1991), the issue between the conservation of the environment and a competitive economy is a fake dilemma established on a limited perception for the origins of growth and a fixed viewpoint of rivalry.

Profit growth, as well as emission reduction do not have to be equally incompatible, and handling the environment throughout supply chains will result in a multitude of advantages and changes (Simpson & Power, 2005). This involves cost savings by more effective resource use, quality management, and improved Human Resource policies (Simpson & Power, 2005). Going green may have a strategic benefit by product differentiation, a marketing advantage, and the use of innovative solutions (van Hoek, 2001; Reinhardt, 1999). It is progressively becoming essential to consumer growth, as demonstrated by the rise in “environmentally friendly” goods, but expenditure in green practices only is not guaranty for success (Min & Galle, 1997).

Knowledge transfer, as well as the opportunity to incorporate additional expertise will often have a strategic advantage by knowledge and know-how cooperation (Vachon & Klassen, 2006). Environmental efficiency of the supplier may constitute the “order champion”, while quality along with cost are usually “order qualifiers” (Darnall et al., 2008). Green supply has the capacity to include social benefits such as a shift toward recycling and the use of a comprehensive strategy, indicating a connection between supply chain behavior and achieving sustainability (Bowen et al., 2001).

1.4.1.3. Social Dimension

In the surveyed literature, the environmental context was well-represented, with Green Supply Chain Management (GSCM) processes and activities being the main subject.

Although the Brundtland concept includes both environmental and social preservation, there was a scarcity of SCM literature on the latter (Ashby, 2018). Despite the reality that the “human” factor in terms of labor, expertise, and the development of partnerships could reflect a core element of SSCM, there was no equal usage within the framework of SSCM, e.g. social supply chains etc., compared to using the “green” component, which has many supply chain related terms (Ashby et al., 2012).

The social element of sustainability frequently includes improving educational quality and promoting cultural diversity by upholding the cultural and ethical values of the communities in which businesses work, by way of preserving the ethics and the culture related standards of the society in which the businesses are active (Bals & Tate, 2018; Yakovleva et al., 2010). As a result, businesses will profoundly impact mutually their corporate cultures and the ones with which they relate to their suppliers (Dyllick & Hockerts, 2002).

Although the studied literature does not use a single concept of social sustainability, it has been recognized that profit is just one component for a company's lasting survival, and the future of humans, as well as the world are different credibility issues (Kleindorfer et al., 2005). The aspect of sustainability owes to be a moral code for people's life along with development (Sharma & Ruud, 2003). Moreover, it ought to be done in “an inclusive, connected, equitable, prudent and secure manner” (Gladwin, Kennelly, and Krause, 1995, p.878). The first three aspects of this concept are closely linked to the social aspect (Schaefer, 2004), as well as by what means it may be implemented across the supply chain to reduce unemployment, maintain the health of the employees along with their welfare, ensure fair pay, and avoid social exclusion (Leire & Mont, 2009). Pojasek (2010) goes on to list the seven standards of social sustainability that are part of a modern ISO 26000 standard that is about Social Responsibility: openness, openness, moral behavior, interests of stakeholders, rule of law, universal guidelines of behavior, and civil rights.

Social justice constitutes a central feature of the social dimension of sustainability, requiring that the citizens within a community are entitled to the same access to services and opportunities which includes workforce care that is reasonable and inclusive (Bansal, 2005; Krause et al., 2009). Social dimension deals with the cases of people being poor, , inequality, as well as civil rights; moreover, within a supply chain

viewpoint, it reflects the wellbeing of the whole workers worldwide (Krause et al., 2009). From a social point of view, Supply Chain Management (SCM) is required to impose the company's principles along with its expectations on the suppliers, emphasizing the significance of longstanding partnerships, coordination, and growth of supplier (Leire & Mont, 2009; Murfield & Tate 2017). Few researchers mentioned the topic of social justice, so while there is a hope that SCM will resolve this critical aspect, there is little scholarly research to back this up.

Although environmental sustainability focuses on natural resource management, the social dimension deals with managing the social resource, which includes individuals' talents and capacities, organizations, partnerships, as well as community related principles (Sarkis et al., 2010). At a corporate point, this makes businesses along with their vendors to improve with the means of individual resources growth, as well as group social wealth (Dyllick & Hockerts, 2002).

Thus, the social dimension of sustainability is closely related to “Corporate Social Responsibility” (CSR), that includes activities that are not imposed by statute but advance social benefit beyond a firm's specific, transaction - based objectives (Sarkis et al., 2010). CSR allows companies to acknowledge stakeholders' fiscal, legal, ethical, and contractual preferences, with the assumption that ignoring a firm's social obligation would result in the loss of social control (Bansal, 2005; Davis, 1967). It entails many methods, that include the management of social problems, which entails solving society related issues, for example child labor (Bansal, 2005).

1.4.2. Concept of Sustainable Supply Chain Management

All three dimensions of sustainability, including environmental and social features, stretch further than the borders of organizations and consist of activities in the supply chain. Carter & Rogers (2008a) note that companies can be an essential competency that is not as imitable for the consideration and handling of these sustainability matters across the supply chain. The investigations though that have aimed at integrating these environmental elements into the supply chain are only in the early stages (Ashby et al., 2012; Seuring & Müller, 2008). Furthermore, Seuring & Müller, (2008) added that social aspects of supply chain management are extremely weak, and the concurrent incorporation in supply chain management of three dimensions of sustainability is also

uncommon. This reflects the emerging existence of this sector, which has led to different concepts of sustainability management of the supply chain (SSCM).

Carter & Rogers (2008a, p.368) describe the SSCM, “as the strategic, transparent integration and achievement of an organisation’s social, environmental, and economic goals in the systemic coordination of key inter organizational business processes for improving the long-term economic performance of the individual company and its supply chains”. Yet, the term centers on the organisation's economic efficiency and aims more to be sustainable rather than the holistic approach followed in this survey between organizational and global sustainability. In Seuring & Müller (2008), the SSCM is established, taking into account the priorities of all three aspects of sustainability and providing a holistic approach to both global and organizational sustainability.

According to them, SSCM is, *“the management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e., economic, environmental and social, into account which are derived from customer and stakeholder requirements.”* (Stefan Seuring & Müller, 2008, p. 1700)

The literature that was examined recognizes that the success of the supply chain should not only be calculated by profits, but rather its effect on environmental and social structures (Pagell & Wu, 2009b). The above TBL principle helps an organization to assess its progress against a sustainable development goal (Elkington, 1994). When a sustainable supply chain works well in all three dimensions, SSCM is the way to accomplish this objective, and includes a cross-connection of modules to interfaces across supply chains (Pagell & Wu, 2009b; Svensson & Bth, 2008).

SSCM needs an expanded methodology to SCM and the financial, environmental and social facets of business should be stressed (Svensson & Bth, 2008). “A company is no more sustainable than its supply chain” (Krause et al., 2009, p.19); thus, SCM is inadequate, and SSCM should turn out to be a standard. SSCM is “the strategic, transparent integration and achievement of an organisation’s social, environmental and economic goals in the systemic coordination of key inter-organisational business processes for improving the long term economic performance of the individual company and its supply chains” (Carter & Rogers, 2008a, p.368). Certain topics that

need to be dealt with coordination and collaboration between supply chain stakeholders that lead to a strategic approach; risk assessment for recognizing environmental and social problems in advance of market disclosure, as well as a total product life cycle (S. A. Seuring, 2008).

Krause et al. (2009) suggest that, along with historically accepted goals, efficiency, expense, distribution and versatility, sustainability should become a strategic priority. However, these four factors are concrete rather than social and environmental aspects and demonstrate the challenge of detecting or ensuring the main sustainability components, as well as how all the components are matched with the supply chain decisions (Krause et al., 2009). The SSCM model of Carter & Rogers (2008a) (Figure 5) introduces a three-way approach to sustainability and a 3BL concept, suggesting the use of unified method that contemplates trade among economic, environmental and social results. This implies that sustainable practices should be introduced.

Furthermore, the model shows the main contributors to the productive SCM and the inclusive sustainable solution that reflects the culture of a company. How these problems and the 3 dimensions are dealt with can reach various 'performance' degrees of sustainability. Pagell & Wu (2009b) stress that sustainability needs to be harmonized with financial and non-financial aspects besides contributing to everyday discourse. As a result, social and environmental consequences are naturally incorporated into decisions, sustainability is becoming an orientation and responsibility expressed throughout the supply chain (Pagell & Wu, 2009b). Nevertheless, the economic factor is ultimately considered as the most vital, because the supply chain cannot stay in operation without economic success (Pagell & Wu, 2009b; Stefan Seuring, 2011).

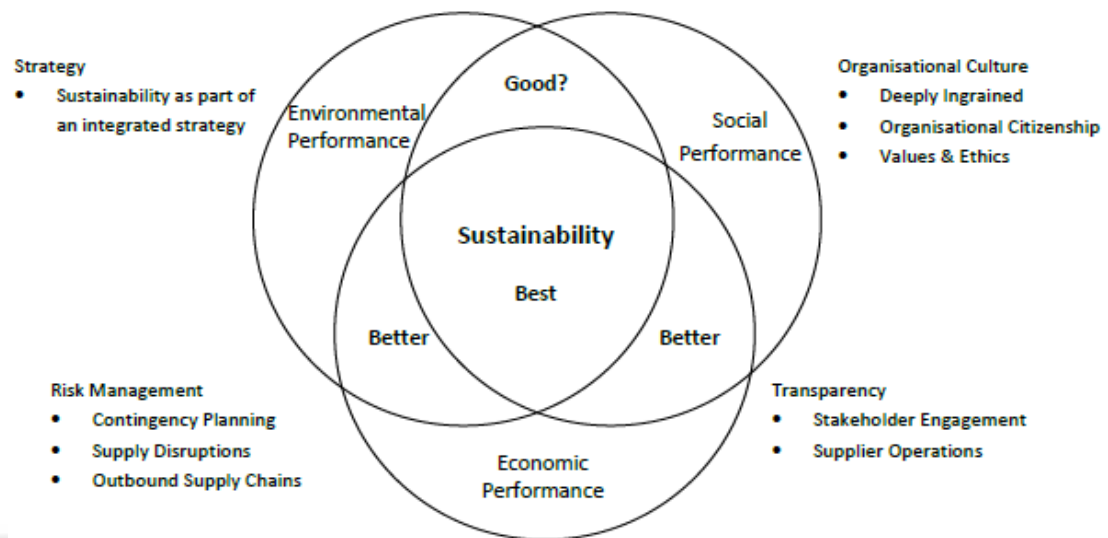


Figure 4. Sustainable Supply Chain Management Model

Source: Carter & Rogers, 2008a

It is recognized that companies have made advancements on economic and environmental aspect, but there is considered lack of important improvement of social problems, and study has, in general, neglected the social portion of sustainability to date (Krause et al., 2009; Pagell & Wu, 2009b; Sarkis et al., 2010; Schaefer, 2004; Sharma & Ruud, 2003). This element can be attributed to the especially challenging social aspects of sustainability or to an unsuitable market purpose (Lamming & Hampson, 1996; Schaefer, 2004). Sharma & Ruud (2003) have suggested that social component management and therefore the attainment of “true” sustainability can only be achieved in supply chains that work through specified geographical regions and are not “globally fractured”.

SSCM gained unequalled commitment to analysis with a focus on financial efficiency capabilities. The relation between economy and environment created significant benefits, while the interactions between the social economy and the environment are further uncertain (S. Banerjee, 2020). Social gains are believed to be less concrete, and are mostly incorporated in connection rather than processes through arbitrary, qualitative metrics and social capital (Dempsey et al., 2011). Knowing how to incorporate TBL into supplier management systems is soon in the process and the balanced application of sustainable development of supply chains presents clear obstacles (Leppelt et al., 2013). Recent documents indicate that sustainable supply chain

activities are expanding, focusing on the relationship between the economy and the environment and “easy to green” processes (Ashby et al., 2012; Vachon & Klassen, 2006). In comparison, considering the importance it has put in literature in terms of cooperation and partnership, the part of ties, a main element of social survival, has been understated (Ashby et al., 2012; Burgess et al., 2006; Siddh et al., 2017).

Followed, a brief description of scholarly work related with SSCM is provided (author, year, and dimension of SSC) along with the distribution of articles based on the SSC dimension (more detailed representation in Appendix 2):

Table 2. Work related with Sustainable Supply Chain Management (SSCM)

Author/ Year	Dimension of SSC
Tao and Yin (2014);Sheriff et al. (2012);Hazen et al. (2012)	Economic
Gaussin et al. (2013);Kronborg Jensen (2012)	Environmental
Kazancoglu et al. (2018)	Economic, Environmental
Darbari et al. (2019);Maestrini et al. (2017);Bulsara et al. (2016);Beske-Janssen et al. (2015); Tajbakhsh & Hassini (2015);Taticchi et al. (2015)	Economic, Environmental and Social
Kazancoglu et al. (2020);Jing et al. (2019); Chand et al. (2018); Qorri et al. (2018); Chatha & Butt (2015);Chin et al. (2015); Fahimnia et al. (2015); Govindan et al. (2015); Touboullic & Walker (2015); Bahrin & Veera Pandiyan (2014); Bhatia and Chand (2014); Chu et al. (2014); Demir et al. (2014); Kanonuhwa and Chimucheka (2014); Lee & Wu (2014); Patala et al. (2014); Igarashi et al. (2013); Chun and Bidanda (2013); Tang and Zhou (2012); Abbasi and Nilsson (2012); Dekker et al. (2012)	Green SCM
Zorzini et al. (2015)	Social and Economic
Khan et al. (2021); Koberg & Longoni (2019); Bastas & Liyanage (2018); Rajeev et al. (2017); Gosling et al. (2016); Ahi & Searcy (2015); Azadi et al. (2015); Boström et al. (2015); Bush et al. (2015); Meixell & Luoma (2015); Alexander et al. (2014); Beske et al. (2014); Brandenburg et al. (2014); Tachizawa & Wong (2014); Govindan et al. (2015a); Taticchi et al. (2013); Winter and Knemeyer (2013); Seuring (2013); Hassini et al. (2012); Ashby et al. (2012);	SSCM

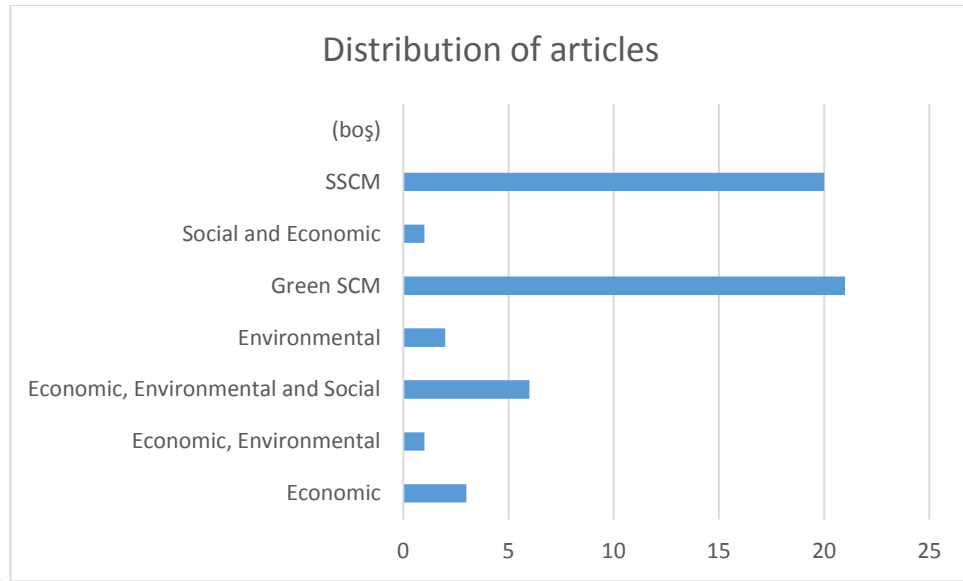


Figure 5. Distribution of Articles Based on Dimension of SSM

1.5. Defining Performance Measurement

Because of increased global competitiveness and exposure of supply chain processes, companies face difficulties in managing operations. Companies use a range of strategies to minimize risk from existing activities in the supply chain, including to secure the necessary capital allocation (Wagner & Bode, 2006). However, a solid success balance could be achieved for this risk assessment initiative. Since risk reduction can be expensive, benefits like increased performance of the supply chain must be balanced against (Wagner & Bode, 2008). The reliability of the different processes used inside the supply chain function of a firm is known as supply chain output (see figure 7) (Srinivasan et al., 2011).

Moreover “you can't control what you can't calculate” according to Sink and Tuttle (1989), thus most production and service firms use output indicators and measuring tools to evaluate their performance. According to Wouters (2009), performance evaluation is “vital in strategy development and communication, as well as in shaping diagnostic control mechanisms by evaluating actual outcomes”.

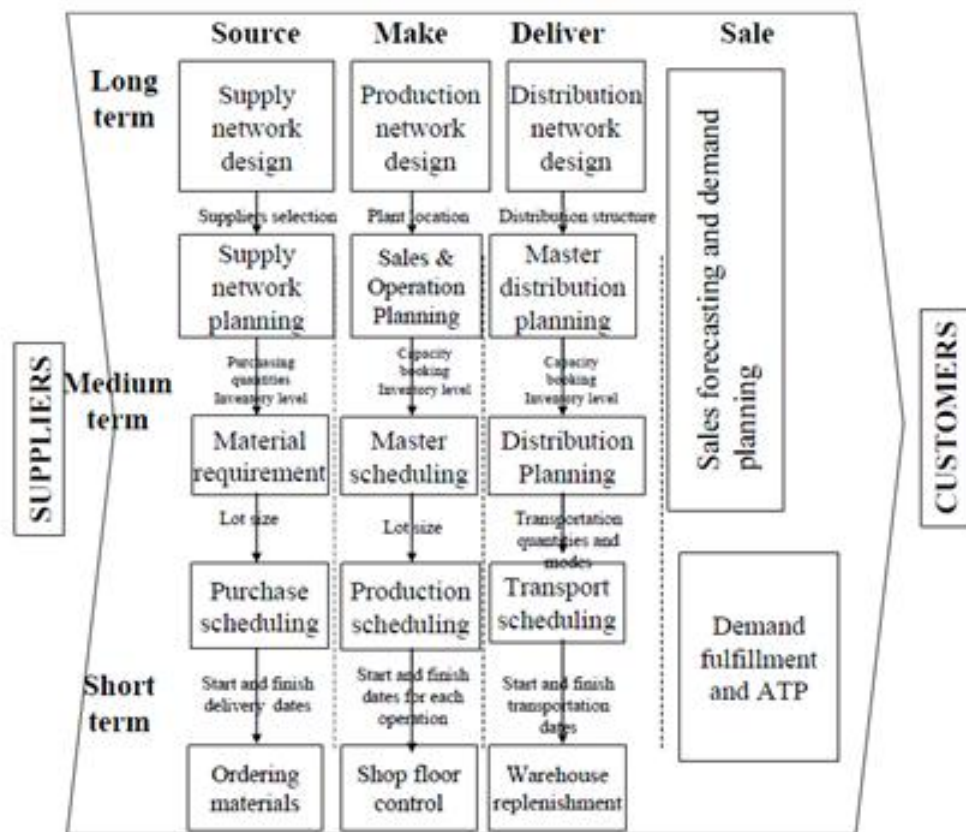


Figure 6. Different Supply Chain Decision Processes

Source: (Stadtler & Kilger, 2000)

1.5.1. Systems for Performance Measurement

The “method of quantifying the effectiveness and effectiveness of actions”, according to Neely et al. (1995), is the “output assessment”. Effectiveness tests how competently a firm utilizes its resources to deliver a respected degree of customer satisfaction, while efficiency measures how efficiently customer satisfaction resources are utilized by an organization.

A performance measurement protocol is used as the complete set of variables used to measure quality and effectiveness of the action. Browne et al. (1998) created a process-oriented top-down ENAPS methodology, which involves a joint array of success measurements and measures. It encompasses an amount of performance measurements or metrics. Hudson et al. (2001) look at performance indicators related with strategy that can boost quality management by relating performance improvements to specific changes and performance with critical strategic targets that are periodically updated and revised. A performance measurement framework helps to build a performance measurement structure by setting performance measurement margins, identifying

metrics or goals, and possibly creating relationships between performance measurement dimensions in the preliminary institutions (Rouse & Putterill, 2003). Folan & Browne (2005) suggest a number of inter-organizational performance measurement mechanisms. They are further developed with two systems of performance measurement, namely the structural-enhanced company balanced scorecard, along with the methodological system aimed at selecting and implementing the measures. They are focused on expanded business standards.

The synthesis of published work regarding performance assessment can be distributed into two periods (Dixon et al., 1990). In the first period, financial measurements like benefit, return on investment and efficiency are focused on the years leading up to the 1980s. The second period starts at the end of 1980s and coins with the adoption of innovative theories of management, such as managing the supply chain. The objective remains to emphasize the importance of using less specific and non-financial metrics in the evaluations of results. In the past decade or so the use of performance indicators has grown from typical financial performance measures to incorporate a broad scope of non-financial performance measures, according to Turner et al. (2005). The strategic evaluation and reporting approach, the ABCd Operational Performance checklist (Wight, 1992) and the European Excellence Model all lead to this growing usage of non-financial indices of progress, the Equilibrium Scorecard (Cross & Lynch, 1988; Kaplan and Norton, 1992; The European Foundation for Quality Management, 2009).

Manufacturing measures have a range of defects including absence of strategic attention (the measurement scheme does not adequately align with policy objectives, corporate culture, or bonus schemes) (Banks and Wheelright, 1979), and they inspire short termism (Hayes and Garvin, 1982). Quality appraisal systems have been established in order to respond to these and other concerns and provide a holistic outlook at the organization level (Cross & Lynch, 1988).

Neely et al. (1995) offered a very good performance measurement overview, which was commonly mentioned in recent literature on supply chains and their metrics (e.g. Beamon, (1999); Beamon & Chen, (2001); Gunasekaran et al., (2001); Gunasekaran et al. (2004)). According to these and other papers, the majority of constraints quoted by Neely and his colleagues stay applicable to supply chain measurement systems. The necessity for new approaches and metrics to tackle these faults has also been underlined.

This thesis suggests a need to concentrate further on current literature that has examined a number of key topics, even though this is an important step forward.

1.5.2. Metrics for Performance Measurement of Sustainable Supply Chain

With regard to processes, input for each system or the organization's existence is critical. In supply chain management, this input within the performance measurement framework can be undertaken through essential performance measurement indicators (Chae, 2009). The measurement of the supply chain demonstrates the gap between planning and delivery, helping organizations to consider future challenges and areas of transition. However, the creation of performance evaluation factors is recognized as challenging, while such practical procedures are not easily accessible to firms, as well as their supply chain operators (Lambert & Pohlen, 2001). Besides, the following is more nuanced once it starts calculating a sustainable supply chain's effectiveness. There are several articles on sustainability benchmarks within the supply chain, starting with a literature analysis (Hassini et al., 2012). In any related supply chain metrics report, no reference is made of sustainability initiatives.

In accordance with the papers that are mainly examined in the framework of this report, researchers determined output assessment variables for sustainable supply chain measurement as seen in Appendix 1.

According to Aramyan et al. (2007), the creation of a tool collection for assessing the results (performance factors) is a time consuming method that small businesses find challenging. A traditional organization now employs a variety of financial performance indicators, for example ROIs, but supply chain performance metrics are not commonly adopted, particularly those which are sustainable. Companies also find that few realistic benchmarks for output measurements are available (Lapide, 2000). As a consequence, this analysis will fill in the gap by constructing a supply chain measurement framework which focuses on three dimensions, namely supplier relationship management, internal supply chain control, and customer relationship management of sustainable measurement factors, with the GRI guidelines providing the business related framework.

1.6. Sustainability Reporting Business Standards

Organizations must select among a wide variation of sustainability reporting (SR) parameters. The pressure from stakeholders has given rise to SR guidelines, which provide reputable, competitive, political and market opportunities (Schaltegger & Burritt, 2014). The Global Reporting Initiative (GRI) standards constitute probably the most generally agreed practice. More than 90 percent of the G250, the world's biggest firms, are undertaking a sustainability report, according to KPMG's latest survey. Almost 34 of them have followed the GRI guidelines. The GRI standards comprise of topic-specific Standards applied to document info on an company's substantial effects associated with economic, environmental and social subjects, as shown in table 2.

Table 3. Series of GRI

GRI 200 series: Economic	GRI 300 series: Environmental	GRI 400 series: Social
GRI 201: Economic Performance GRI 202: Market Presence GRI 203: Indirect Economic Impacts GRI 204: Procurement Practices GRI 205: Anti-Corruption GRI 206: Anti-competitive Behavior	GRI 301: Materials GRI 302: Energy GRI 303: Water and Effluents GRI 304: Biodiversity GRI 305: Emissions GRI 306: Effluents and Waste GRI 307: Environmental Compliance GRI 308: Supplier Environmental Assessment	GRI 401: Employment GRI 402: Labor/Management Relations GRI 403: Occupational Health and Safety GRI 404: Training and Education GRI 405: Diversity and Equal Opportunity GRI 406: Non-discrimination GRI 407: Freedom of Association and Collective Bargaining GRI 408: Child Labor GRI 409: Forced or Compulsory Labor GRI 410: Security Practices GRI 411: Rights of Indigenous Peoples GRI 412: Human Rights Assessment GRI 413: Local Communities GRI 414: Supplier Social Assessment GRI 415: Public Policy GRI 416: Customer Health and Safety GRI 417: Marketing and Labeling GRI 418: Customer Privacy GRI 419: Socioeconomic Compliance

Source: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0234258d>

1.7. Conclusion

The aforementioned parts have presented core parts of literature which can improve the comprehension of terminology about supply chain, sustainability, sustainable supply chain management and performance, and their performance measurement metrics.

Within the framework of the literature review, the recent sustainable supply chain management and performance measurement related works provide different aspects and frames, with few of them having a holistic approach.

As a consequence, in order to fill these discrepancies, this research seeks to give a further systematic method to the examination of sustainable supply chain performance measurement systems through the integration of supply chain –macro- process, GRI

standards, and the triple bottom line sustainability approach. The recommended conceptual framework on sustainable supply chain performance measurement would include performance measurement factors, generated within the context of GRI standards, the supply chain –macro- processes that incorporate the upstream suppliers (supplier relationship management), the focal firm (internal supply chain management) and downstream customers (customer relationship management), as well as the three sustainability dimensions, namely economic, environmental and social.

The undertaken research approach is covered in the following sections. It explains the theory and technique that influenced the undertaken research plan, methods, and processes.



CHAPTER 2: METHOD - CONCEPTUAL MODEL

2.1. Introduction

The methodology used in this analysis is reviewed in this chapter. It begins with offering a summary of the research methods employed in the report. It then goes on to clarify the conceptual underpinnings of the research methodology. The thesis employs a qualitative research method with the employment of case study method, which are defined in depth on the following parts and are based on a interpretive paradigm. The details of each of the different research methods employed, as well as the data collection process during fieldwork, are then given. This report gathers data from four case study companies in the Turkish food manufacturing to achieve the research objective of understanding supply chain sustainability performance assessment. This is supplemented by a presentation of how the interviews were carried out. There is then a presentation regarding the process for data analysis, validity and reliability, as well as the shortcomings of the study. In the final section, research ethics, related with fieldwork preparation and execution, are discussed.

2.2. Stages of Study's Processes

There were three steps to the analysis phase in this report (see figure 8). Problems were first described during the research's early stages, based on a preliminary analysis of the literature. This method entailed a series of revisions to the initial concepts before gaps in the study field were found. The research problems produced a number of potential research questions. To see whether those issues have been resolved, the literature was carefully examined.

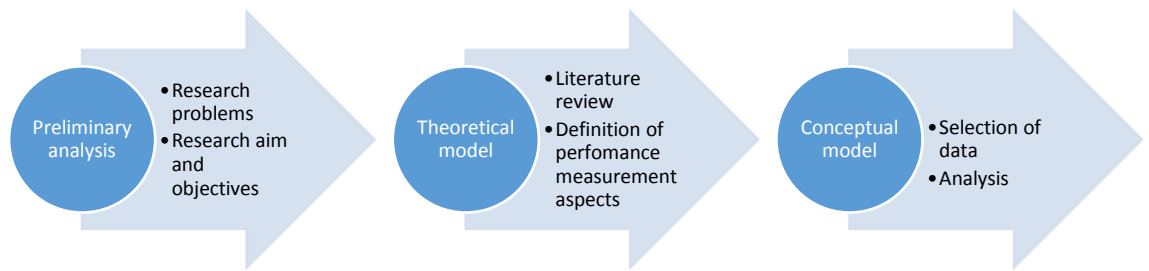


Figure 7. Processes of the Study

Formed on the final list of research problems, the research aim was decided, and the research objectives were derived from the primary goal, which was then refined several times.

Moreover, with this preliminary analysis and the definition of research problems and main aim, this study's theoretical framework was developed (presented in chapter 1). Based on the dimensions of the theoretical framework, the core principles or variables in the research subject were identified. A variety of subjects were included in the literature review. The questions concerning sustainable supply chain performance measurement, as well as incorporating a range of methods and performance measurement metrics on sustainable supply chains were first considered, followed by sustainability in SCM, thirdly, performance measurement systems, the aspects concerning the performance measurement of supply chain and incorporating a selection of contexts and performance measurement metrics on sustainable supply chains, and lastly the GRI standards.

Following that, and based on the aforementioned theoretical framework and related works on performance metrics of sustainable supply chains, a further literature assessment was conducted so that the listed factors could be eliminated to the ones relevant to the preferences of industrial representatives (Ahi & Searcy (2015); Erol et al. (2011); Hassini et al. (2012); Qorri et al. (2018); Sloan, (2010); Tajbakhsh & Hassini (2013); Taticchi et al. (2013)). In this way, the performance measurement factors of the model were identified, and the proposed conceptual was developed as shown in figure 9.

Then, as a result of the preceding phase, a range of performance assessment metrics appropriate for use in manufacturing sector companies and within the framework of GRI standards arose.

At the final part, the recommended conceptual supply chain performance assessment system was applied in four firms of the Turkish food manufacturing supply chain in the third phase of the study. The data collection process took a qualitative approach, with in-depth interviews having the role of the primary data collection tool. More detailed, the researcher collected the data via semi-structured interviews with main informants from the four case study companies of a food manufacturing supply chain. As secondary evidence, this analysis used records and reports from the case study firms, as well as other public documents. Data triangulation is a term used to describe a multi-research process. When conducting interviews with various members of the agencies, several sources of documentation was used. Triangulation allows for an answer to the issue of the research's validity by integrating data sources, informants, and methods. This research took a case study approach, with these topics being discussed in the context of Turkey. The researcher chose these four case studies that belong to the same supply chain. Within the framework of this work, qualitative data was utilised to determine the issues surrounding the Turkish food manufacturing sector's long-term sustainable supply chain success. Furthermore, after each interview, the researcher deployed few feedback related questions in order to depict the participants' impressions in order to validate the conceptual structure.

2.3. Conceptual Framework and the model

The proposed conceptual framework for sustainable supply chain performance measurement incorporates performance measurement indicators for supplier relationship management, internal supply chain management, and customer relationship management. Within the framework of GRI Standards, the related performance measurement metrics are further arranged hierarchically through all three dimensions of sustainability (financial, environmental, and social) (see figure 9).

As a consequence, the proposed system will define the overall efficiency of the sustainable supply chain. The system would allow businesses to make better choices about sustainable supply chain efficiency indicators and to quantify them appropriately. Furthermore, the research would foster cross-organizational learning.

The aim of this research is to create and implement an integrated supply chain performance assessment system. This system would be built through supply chain macro processes that combine upstream actors (suppliers, supplier relationship management), the focal firms (internal supply chain management) and downstream actors (customers, customer relationship management) with businesses), as well as GRI Requirements, and finally against all three sustainability dimensions.

In order to accomplish the ultimate study purpose, three unique research goals were considered. They were as follows:

1. Defining performance assessment indicators for all supplier chain macro processes, namely supplier relationship management, internal supply chain management, and customer relationship management in relation to business reporting standards structure for a supply chain performance measurement framework that covers all three dimensions of sustainability.
2. Creating a conceptual framework established upon the performance measurement metrics that have been proposed.
3. To examine the validity of the suggested framework through its application to the case studies that companies of the Turkish food manufacturing sector will constitute, so that the author can determine the supply chain's sustainability efficiency in relation to performance measurement indicators.

A review of previous research on sustainable supply chain management found that performance measurement for sustainable supply chains, especially in developing countries, was lacking. The aim of the study is to provide a more detailed view of sustainable supply chain measurement efficiency in developing countries, in this case Turkey, by debating the subjects related to sustainable supply chain progress as a system for performance assessment. It also enables the researchers to assess their future use in assessing the success of efficient supply chain systems in the development of other case studies firms or industry sectors. The approach is for use only in developing countries. The definition should, however, also be used for developed countries.

Many researchers' interests have often been focused on a specific area of sustainable supply chain, although findings on the overall performance of sustainable supply chain management have been widely overlooked. In light of these distinctions, the methodology developed for this research follows a systematic approach to the study of

sustainable supply chain performance measurement, based on the definition of supply chain macro processes and sustainability dimensions within the context of GRI standards. Thus, the various performance assessment metrics are linked to the topics (series) of GRI norms, supply chain macro systems, and sustainability dimensions (as shown in figure 9). These performance measurement variables are defined in the core themes of the conceptual structure as follows:

Table 4. Aspects Employed in Model

	Economic	Environmental	Social
SCM	- Costs - Quality -Procurement practices	-Supplier Environmental Assessment -Waste	- Child Labor -Forced or Compulsory Labor -Training and Education
ISCM	-Costs -Revenues	-Emissions -Natural sources' usage (energy efficiency) -Waste	-Human rights -Health care and safety -Community (compliance, volunteer, charity, and ethic
CRM	-Customer service -Customer integration	-Materials -Environmental Compliance	-Local Communities (impact) -Marketing and Labeling -Customer Privacy

*Their detailed description can be found in Appendix 3.

The conceptual model developed in this analysis is illustrated in Figure 8. The conceptual paradigm introduces the idea of an integrated value assessment methodology for assessing the holistic performance of sustainable supply chain management by integrating supply chain macro systems, GRI Standards, and sustainability. The architecture has a three-dimensional structure, implying that the interaction of these three dimensions can affect the creation of a more systematic success assessment of a sustainable supply chain system.

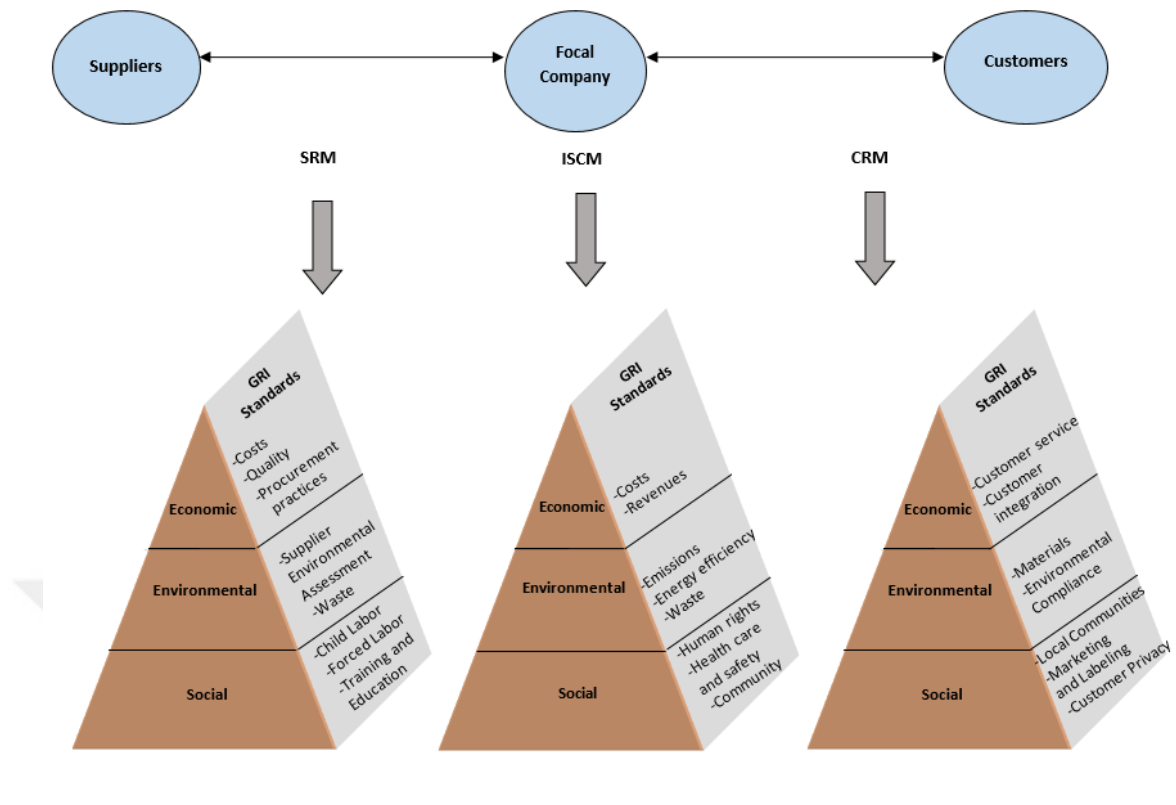


Figure 8. The Conceptual Framework Of Sustainable Supply Chain Performance Measurement

2.3.1. The application of the conceptual framework to this study

This research study includes the aim, literature review, approach, data collection and interpretation in the conceptual structure outline in the preceding fields. It was used in a number of ways in this study. It was, for example, a guide to illustrate the problems addressed in the previous chapter. Secondly, the structure was used to direct the fieldwork, in particular in the creation of topics for interviews with respondents. The questions were designed to highlight each theme's complexities. After that, the results were presented following the themes of the model.

2.3.2. The validity of the Conceptual Framework

This research used qualitative analysis and a case study method to establish a methodological way for measuring the effectiveness of the supply chain. To validate the conceptual framework, the proposed scheme was applied to four processing firms in Turkey, a developing country. After the interviews, the researcher asked verbally the participants few questions so that she can receive their feedback on the model and its

application. These questions covered topics such as: the framework's corporate usability; -the feasibility to integrate it into the firm; and the framework's potential development.

Generally, the respondents were pleased with the conceptual structure for assessing supply chain sustainability in their organization. They reckoned that it was easy to comprehend the dimensions of the model and their application, and that the conceptual model would be consistent with their business framework. They also showed that they valued the framework's systemic and cohesive structure. They did agree, however, that the established processes and the perspectives of the involved parties would be critical to the success of its implementation. They additionally said that few of the factors may not be performance metrics for them, but could be applicable for other businesses, because of organizational structures, and size. The researcher also agreed with these guidelines, noting that a systematic review of sustainable supply chain efficiency on performance evaluation measures could provide adequate material to quantify sustainable supply chain performance for the case study firms.

2.4. Foundation of research method

It is significant to visibly define the research methodology, as well as related principles, hypotheses, methods, and processes, before conducting research (Silverman, 2000). First and foremost, the research method offers a basis for how we view reality (Silverman, 2005). There are two types of research techniques in social research, both of which are related to the methods used in this analysis, the qualitative and quantitative approaches.

Qualitative and quantitative research methods are two general methodologies to a research problem, nonetheless they explore the environment in different ways, each with its own set of benefits and drawbacks. They vary in several ways and are influenced by a variety of factors like research issues, research paradigms, and processes. They must, above all, serve the research's objectives. Where a problem is primarily characterized as qualitative or quantitative, judgment aids towards the selection of appropriate methods. As shown in Table 4, Miles and Huberman (1994) parallel the elements of qualitative and quantitative research approaches.

Table 5. Elements of Qualitative and Quantitative Research Methods

Qualitative	Quantitative
“All research ultimately has a qualitative grounding” - Donald Campbell	“There's no such thing as qualitative data. Everything is either 1 or 0” - Fred Kerlinger
The aim is to describe in depth.	In order to understand what is observed, the goal is to identify characteristics, count them and build mathematical models.
Researchers may know what they are searching for approximately in advance.	Researchers obviously know what they are looking for in advance.
The design arises with the creation of the report.	Until data is collected, all facets of the sample are carefully planned.
The data collection tool is the researcher.	To gather numerical data, researchers use instruments such as questionnaires or equipment.
Words, images, and artifacts are all examples of data.	Numbers and statistics are examples of data.
Individual understanding of events is critical, as evidenced by participant assessment, in-depth interviews, and other methods.	Objective - attempts accurate evaluation and interpretation of desired concepts, such as by polls, questionnaires, and other approaches.
Qualitative data is more “rich”, takes longer to collect, and is less generalizable.	Quantitative data is more effective and may be used to evaluate hypotheses, but it can leave out qualitative information.
A researcher's emotional absorption in the subject matter is normal.	The researcher's analytical separation from the subject matter is common.

Source: Adopted by Miles and Huberman (1994)

2.4.1. Quantitative Method

The quantitative method yields large results. This method has been described as requiring the assembly of numerical data, having a deductive view of the relationship between theory and analysis, a preference for a natural science approach, and an objectivist conception of social reality (Bryman, 2004). The most popular type of research method is quantitative analysis. According to Denzin and Lincoln (2005), positivist sciences that depend exclusively on objective approaches are generally accepted as the apex in Western civilization, under which evidence may be checked and the researcher's perspective stands irrelevant for the inquiry. Within this process, there cannot be bias from researcher. The focus of quantitative analysis lies on the measurement, as well as the study of incidental interactions among factors, rather than processes (Denzin and Lincoln, 2005).

The quantitative method is generally based on positivism, and it “sets out to create a general cause-effect relationship to solving a social problem by connecting abstract ideas of the relationship to precise social world measurement” (Neuman, 1997:67). A quantitative approach could be suitable for researchers who want to explore the relative significance of social phenomena and their different causes (Bryman, 2004). Researchers that undertake quantitative method conclude that by doing so, they will be able to quantify the relationships between variables in a phenomenon, as well as entirely comprehend the current relationships. As results are identified through statistical tools, they are able to be generalized to the examined sample's entire population. The methodology of randomised trials, quasi-experiments, sample surveys, and multivariate statistical analyses, has come to be thought of as a quantitative method by researchers (Cook and Reichardt, 1979).

The aim of the study was not to discover a cause-and-effect relationship between the stakeholders and performance measurement factors for sustainable supply chain. As a result, the quantitative method was ruled out for the purposes of this research. Furthermore, a quantitative methodology was deemed unsuitable for the framework of the study, because the aim was to obtain “in-depth insights in a natural environment”, through a thorough comprehension of the phenomenon, as well as condition, and thus, there was the slight desire to pursue generalization (Denscombe, 1998).

2.4.2 Qualitative Method

The qualitative approach constitutes a challenge to describe (Denzin and Lincoln, 2005). It does not have a distinct theory or paradigm, nor does qualitative analysis have a distinct collection of techniques or procedures. It's worth mentioning that every concept of qualitative analysis must be analyzed qualitatively in the sense in which it's presented. Denzin and Lincoln (2005) describe qualitative methodology as “a situated activity that locates the observer in the world”. It's a set of explanatory and solid activities that make the environment visible. These activities have a tremendous influence on the environment. They transform the world into a collection of depictions, which include notes from field, interviews, conversations, photos, videos, and self-memo. Qualitative study at this stage entails “an interpretive, naturalistic approach” to the environment. That states that qualitative oriented scholars investigate phenomena in

their natural environments, trying to understand or perceive phenomena in relation to the meanings to which people assign.

Moreover, the qualitative method has its foundation on principles that distinguish it from the quantitative methodology (Sarantakos, 2001). Researchers may collect data on “respondent perceptions in the sense of their environment, through a process of attentiveness and empathetic understanding” using the qualitative approach (Miles and Huberman, 1994:6). By allowing the researcher to speak with respondents, this approach allows for the gathering of accurate data from small groups of participants (Veal, 1997). A qualitative approach may be appropriate for researchers who are interested in the views regarding the world from members of a specific social group, as well as the interpretations of social actors regarding their world (Bryman, 2004).

A qualitative methodology in this case is argued to be more appropriate for the goal of science. Because the role of the researcher suggests that human knowledge, values, understandings, meanings, interactions and connections are important assets of the social reality that the study questions are oriented to, a qualitative approach has been taken to investigate (Mason, 2002). The thesis examined the viewpoints of retailers on the processes of the supply chain and its sustainable supply chains.

Since the aim of this research was to discover definitions and discover the meanings of social actors in society, it took a qualitative approach. As this is an interpretative analysis of specific issues or problems, a qualitative research approach was used, with the researcher at the center of the interpretation. This qualitative approach has the following benefits over quantitative studies.

To begin with, qualitative analysis focuses on the interpretation of social classes or situations so that people understand more how and why they behave and act in their cultural context (McQueen and Knussen, 2002). In the case study companies in Turkey, this was apparent in the study of supplier perspectives. Secondly, qualitative analysis enables open-ended emerging data collection that is crucial when it comes to creating data subjects rather than "testing" thematic ones. Third, when a new topic or a group of study has never been introduced before or the investigator has no experience of the most important variables, a qualitative approach is appropriate (Creswell, 2003). The same refers to the Turkish retailers, which has never been achieved before in the way defined

here, for a calculation of the sustainable supply chain. This review would use a qualitative method for the collection of research-related evidence.

In comparison, qualitative research is investigative, and moreover is helpful if the investigator unaware what the key factors are to be examined. Since the issue was recent, this topic was never debated with a particular sample or community, or current theories are not applicable to the sample or group in examination (Morse, 1991). As all those features are applicable to the study, the best choice was a qualitative approach.

2.5. Case Study Research

According to Robson (1993), a case study stands as a method of analysis that requires an observational evaluation of a current phenomenon using many forms of data in its actual context. Case studies are used in the investigation of actual events that have no effect on the observer and are blurred in differences between context and occurrence (Yin, 1994). It requires a systematic study of one or more organizations or groups, frequently with data collected over time to provide an exploration of the meaning, as well as the processes elaborated in the underlying phenomena (Hartley, 1994). Furthermore, Stake (1995) says that by using case studies, researchers can build a widespread system, which is valid in a number of occasions. The approach of case study approach may also be utilized to create models, mechanisms or concepts that can be replicated in future in related situations. For the purpose of further understanding the sustainable supply chain performance of a Turkish food manufacturer, the main purpose of the research is a conceptual model and its application within the context of this supply chain. Supply chain management analysis is still at an early age for developing countries. Case studies can also be extremely useful because they generate a great deal of subjective results.

2.5.1. Selection of the Cases

The objective of choosing an approach to case studies was to concentrate on a specific case area in Turkey with the representatives of the Turkish food manufacturing sector. The researcher made use of four case studies firms in Turkey.

Stake (1995) states that an prompt realization of the context of a study is important in deciding the principles for case studies to be selected. After the researcher considered different criteria, four case studies were selected (all actors of the same supply chain,

previous educational and working experience, and functional viability of access to the case study firms). In addition, all names and sources of these involved firms were for purposes of research ethics excluded in order to respect the privacy rights of the case study firms (see part 2.10).

As aforementioned, all four companies belong to same supply chain of a food manufacturing firm: the Prepress Company (Second-tier Supplier), the Packaging Company (First- Tier Supplier), the Food Manufacturer Company (Focal Company-End-Product manufacturer), and the Retailer (Customer). As represented in the following figure, all companies belong to the same supply chain (see figure 10).

The choice of the specific sector, food manufacturing was based on the background of the researcher. Her studies on Food Quality Management (MSc), where the undertaken thesis “An investigation of HACCP implementation in a chilled product line of a UK food” had a small scale qualitative research on food industry, as well as her working experience within the food sector, played an important role on the selection of the specific sector. Moreover, the importance of food supply chain and its sustainability derives from several elements, but based on the principle to produce safe, healthy products in response to market demands and ensure that all consumers have access to nutritious food and to accurate information about food products.

In reality, the realistic viability of accessing case studies companies affected the case study list, apart from the above requirements. The researcher chose Turkey as it is her residence country, making it easier for her to collect data. There was also a network of connections that allowed to secure access to main informants of the case study companies.

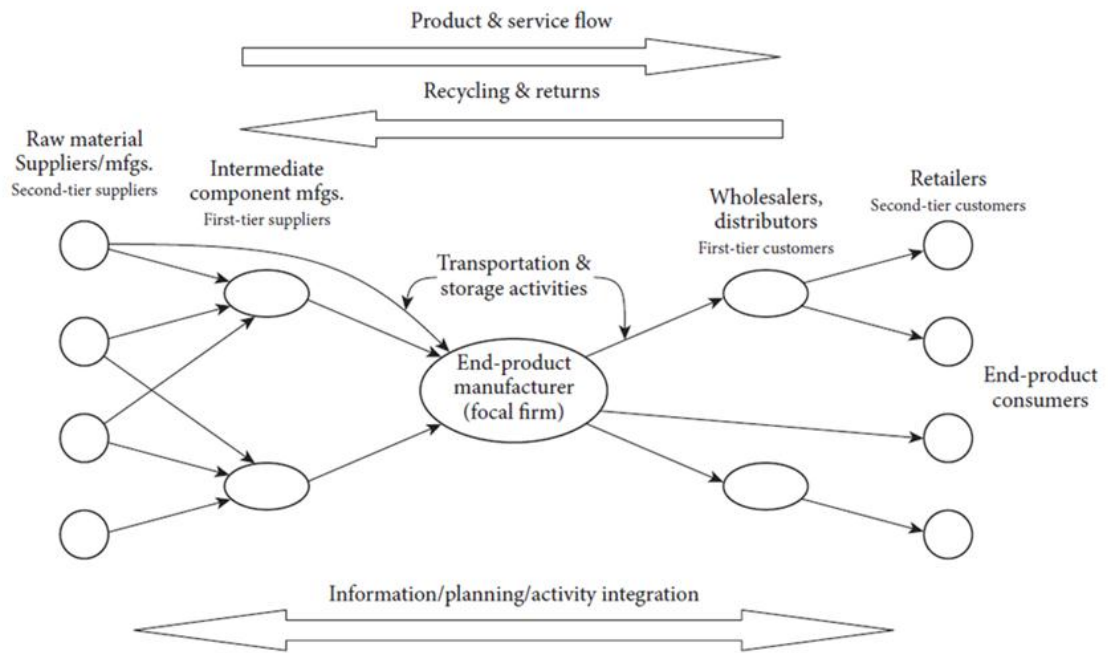


Figure 9. A Generic Supply Chain

Source: Adopted from Wisner et al., 2019

2.6. Data Collection

A case study methodology was used in conjunction with qualitative approaches in this research. Multi data collection techniques, such as interviews, observation, and secondary data collection, were established in conjunction with these techniques. This combination of methods was used to allow for process and data triangulation, improving the study's results.

2.6.1. Outline of the Research Approach

The detailed interviews will be one of the major approaches to the study's data collection to gain insights into the experiences of the respondents on competitive performance measurement indicators in the food manufacturing supply chain in Turkey with regards to sustainability. Interviews are used more and more as a mediation of successes, informed by the situations and conditions of both interviewees and participants (Fontana and Frey, 2005). According to King (1994), the purpose of an interview is to approach the research issue from the viewpoint of the interviewee, as well as to explain in what way and why the interviewee is concerned. The individual's intense concentration is a central factor in profound interviews (Legard et al., 2003).

Like this, “rich data” will be collected whereas the researchers could still answer and test responses.

This study would use a variety of data collection techniques as previously mentioned to ensure that the researcher is more confident in the legitimacy of the results. As a result, observation and secondary data processing will be employed to collect data. Bryman (2004) defines observation as a form of data collection, which permits an investigator to specifically make observation on subject behavior. It varies from interviews and polls, which provide information only on the activities of a person. Bryman (2004) also discusses the inconveniences of study activity through surveys or interviews. One is the potential difference between alleged and real behavior: the claims of those interviewed about how they should function and how they really do vary. Complex associations are found through experimentation of natural social contexts. Also in comprehensive interviews, observation is important because, in addition to their words, the interviewer documents the interviewed body language and feelings (Marshall and Rossman, 2006). In this way, the researcher can use observation to investigate how topics of interest conduct themselves in unusual conditions. The researcher may also use other remarks to test the coherence of the comments of the respondents (Marshall and Rossman, 2006).

The researcher can also use secondary data sets to gather more information. Content analysis was utilized to analyze these data. The greatest strength of content analysis, according to Marshall and Rossman (2006), constitutes the fact that it is “unobtrusive and non-reactive”: it is able to take place without disrupting the environment by any means. Minutes of meetings, records, notices, formal policy statements, letters, as well as other documents will altogether help one understand the setting or community studies (Marshall and Rossman, 2006). Business process notes, handouts, reports from the case study companies, as well as other public documents and notices from additional governmental and non-governmental organizations, were included in this study.

2.6.2. Collection of Data: Interview Approach

According to May (2001), interviews, semi-structured interviews, unstructured interviews and group interviews are the four primary forms of interviews. Half structured interviews are considered in this review more flexible than structured interviews, and consequently better for the study's purposes, especially if the researcher is not sure what and how far the interview would allow her to acquire information

(King, 1994). Structured interviews minimize distortion, but severely limit flexibility (Sarantakos, 2001). The interviewers had a list of questions to use as an interview guide by means of half-structured questions, but could ask others not on the lists and re-order the questions according to the rhythm of conversation (Bryman, 2004). In order to collect both qualitative (words) and quantitative results (numbers), half-structured interviews were used. Qualitative data were used to assess the sustainable supply chain features and results of each case study firm.

2.6.3. Collection of Data: Observation

Observation is a further “humanistic” process (Jorgensen, 1989) requiring a formal assessment and documentation of social interactions, actions and objects under research (Marshall and Rossman, 2006). One of the approaches used in this analysis was observation during the interview process. The findings of the researcher can be used to record the vocabulary and implicit emotions of the respondent, since they will provide an idea of his true feelings about the problems. Marshall and Rossman (2006) say that such suggestions need to be integrated into detailed interviews. As Legard et al. (2003) state, individuals also communicate their opinion by the sound of their speech, mode or body language. Observation helps in building an integral picture of all involved actors.

2.6.4. Collection of Data: Secondary Sources

Secondary data related to the analysis was gathered. This, along with other data collection, assisted the researcher in obtaining a detailed image and, in some cases, clarifying information gleaned from the respondents' interviews. Yin (1994) stresses the importance of paying particular attention to the social variables that affect the phenomena under review. It is valuable since it is able to complement evidence or statements, especially in the sense of a larger picture. Secondary evidence in this study were work procedure records, public reports, handouts, web sites and presentations from the case study firms.

2.7. Data analysis

This is a multiple case study research, which offers a detailed overview of the circumstances, individuals and data analysis for selected topics and problems in each case study organisation (Stake, 1995). This qualitative approach uses interviews and assumptions which can lead to a broad and difficult to examine unstructured texts. The

collected data from the case studies companies is both qualitative (words) and quantitative (numbers). The quantitative elements are used to evaluate each case study organization's supply chains characteristics and to determine the reliability of their long-term supply chain. Such data can be interpreted by thematic analysis. Both data reviews are discussed in the following section.

2.7.1 Data Analysis: Qualitative

Raw data for qualitative research can take many forms, but the most popular are verbatim transcripts of interviews, observation reports, or other types of written records (Ritchie et al., 2003b). As a result, reduction of data is a critical challenge within the framework of the qualitative analysis, and thus the researcher has to figure out how to comprehend or manage the data (Ritchie et al., 2003b). The recording of the interviews would be the first step in the study. The data will be analyzed using content analysis, a method that helps researchers to obtain new insights and gain a deeper understanding of specific phenomena. Thematic analysis is the technique of content analysis used here, and the coding scheme would depend on categories intended to capture the text's main subjects (Franzosi, 2004). Thematic analysis is a technique for using data to classify, analyze, and report on themes. The analyst begins by searching for and finding trends of significance and possible issues of interest in the data. Reporting the content and the sense of patterns or themes in the data is the endpoint (Ryan and Bernard, 2000: 780). Table 5 depicts the six stages of study.

Table 6. Phases of Thematic Analysis

Phase	Description of the process
1. Familiarizing yourself with your data:	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
2. Generating initial codes:	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3. Searching for themes:	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes:	Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
5. Defining and naming themes:	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.
6. Producing the report:	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

Source: Adapted by Braun and Clarke (2006)

Any of the thematic analytical steps are analogous to other forms of qualitative study, but they are not generally unique in thematic analysis. Patton (1990) states that, in order

to achieve the study's aims and outcomes, it is important to recognize that qualitative analytics standards need to be flexible. In addition, analysis is not a straightforward step-by-step transformation. The investigation process requires the entire data set, the encrypted data retrieve and the data interpretation to be continuously back-and-forth. This research would directly link and associate the findings of the study and the theoretical background. As it is flexible, scalable and collaborative the framework can be used as a key guide for the study of data including the arrangement and coding of qualitative data obtained by semi-structured interviews.

The analysis of data for this study will take the succeeding steps, as the processes of analysis will be focused on the conceptual framework and will also depend on Braun and Clarke's phases of thematic analysis. To begin, the researcher will read through all of the transcriptions while taking notes or marking ideas for coding. Second, the data will be used to create initial codes. Codes denote “the most basic portion, or part, of the raw data or information that can be assessed in a meaningful way regarding the phenomena” and refer to “the most basic segment, or element, of the raw data or information that can be assessed in a meaningful way regarding the phenomena” (Boyatzis, 1998: 63). The researcher will go through the entire data collection step by step, paying close attention to each data item and identifying and coding potentially interesting aspects of the data. Since one of the most common criticisms of coding is that meaning can be lost, a small amount of the surrounding data will be retained if it is important (Bryman, 2004). The different codes will be sorted into possible themes in the third and fourth stages, and all related coded data extracts will be collected within the specified themes. Some of the initial codes will become key themes, while others will become sub-themes, and even others will be discarded. These topics will also be established with the aid of the literature review and conceptual framework.

The last move is to fine-tune and name the themes. The candidate themes will be refined in this phase so that they form a logical pattern. Since coding is an organic process, if the candidate themes do not match, they will be recoded. As part of the refinement, subthemes will be defined. The researcher would then apply the final refinements to the themes and analyze the data contained within them. This method will conclude with the final review and writing of the thesis.

2.7.2. Triangulation Process

Triangulation was referred to as the use of multiple experiences to clarify a meaning and to control the accuracy of a study or explanation (Stake, 2008). According to Stake (2008), triangulation facilitates the identification of common and distinct realities. The method of triangulation includes data collection using a series of techniques from a variety of individuals and places. The possibility that the results are just the systemic prejudices and shortcomings of the particular procedure is decreased with a variation of approaches. According to Fontana and Frey (2005), people are dynamic with their lives changing continuously. Hence, the more resources one uses for research, the more likely one is to realize the way they build their lives, as well as the narratives they share about themselves (Fontana and Frey, 2005). Additionally, triangulation may help the researcher assess the relevance and generality of his or her explanations and legitimize the findings of the researcher (Maxwell, 1996). This would raise the chance of interpretations occurring in this analysis to be trustworthy using a triangulation technique. The ways of triangulation used here provide different techniques, as well as sources of data in order to add methodological precision and sophistication.

This study used a multi-method or triangulation technique (Decrop, 1999). A range of techniques, such as interviews, observer assessment and secondary data analysis shall be employed for this article. The outcomes of the interviews in this case would be comparable with the findings of the site visits as well as the report review.

Another triangulation approach used in this study involves several sources of information (Decrop, 1999). The findings of this analysis are accompanied by secondary data such as work procedure records, public reports, handouts, web sites and presentations from the case study firms, as well as primary data, such as interviews and visitor documentation. In order to assess their own quality and reliability, this selection of references allows for further control of the performance.

2.8. Validity and Reliability

It is a qualitative approach that uses a case studies methodology, as discussed above. Quality analysis has been criticized; “reliability” and “validity” are the two most frequent criticisms (Silverman, 2000). The “validity” problem is always framed by the authenticity of the factual argument. Often the relevance of an explanation is doubted because the research has not done enough to do with the reverse (Silverman, 1993). The

quality measurement by extension is focused more on lengthy descriptive narratives than on mathematical tables (Silverman, 2000). A question regarding “trustworthiness” may arise from the way a qualitative researcher classifies the described incidents or events (Silverman, 2005).

Silverman (2000) proposes two authenticity testing methods: “triangulation” and “confirmation of the correspondent”. Triangulation is defined as the attempt to obtain a “true fix” in a condition by blending various methods to interpret the effects. For eg, the use of different data sources involves data triangulation. Interviews are used as primary data and secondary data includes documents, notes and official papers from case study agencies. Data triangulation additionally includes field notes composed before and right after each interview (Decrop, 2004).

The validation of the respondent suggests that in the light of their responses, we should study the subjects with tentative conclusions. In the form of this analysis, respondents would be asked to refine their remarks in the expectation that their answers reflect the most credible. The interviewees thus have an opportunity to explain the questions the interviewer raises. It would also be said to the respondents that the names will not be included in the study in order to encourage them without fear of retaliation to express a genuine opinion.

Even though the term reliability is a notion applied for evaluating or evaluating quantitative analyzes, it is applied more frequently to all forms of testing. Eisner (1991) says the most critical measure for any qualitative study is its accuracy when we understand science to be a means of acquiring information. A strong qualitative analysis will help one to understand a mysterious or puzzling situation (Eisner, 1991). This is related to the theory of high-quality analysis, where the idea of reliability is used for the assessment and interpretation of quality in quantitative studies, while quality is used for qualitative studies (Stenbacka, 2001). According to Seale (1999), validity and reliability are central concerns for a research report.

Finally, this work collects data from various databases, on the other hand, to increase internal accuracy (i.e. semi-structured interviews, observation, work process documents, handouts and reports from the case study companies, plus other public documents).

2.9. Limitations of Study

A well-planned approach based on a basic research design was implemented in the report. Nevertheless, this article has had a few weaknesses.

First, in interviews, the interviewee was new in the field. In that case, the researcher have discovered the benefit of being a strong listener and having an inquisitive mind which has assisted the researcher to do the work. The interview must flow as expected. Legard et al. (2003) says that a capacity to listen is one of the most important traits for researchers. The researchers must hear, digest and understand the responses of the subject in order to decide how to study further. An in-depth interviewer also has an inquisitive mind or sense of curiosity. It is extremely helpful to know more about what the researcher has taught (Legard et al., 2003).

A second downside was that the study was carried out in Turkey and that as a foreigner with low Turkish language ability, the scope of the interviewed individuals was restricted. The situation was placed for selecting those who could speak in English with the researcher.

Finally, the interview process was interrupted by Covid-19's emergency. This restricted the multiple visits to the premises and ended in internet interviews.

2.10. Research Ethics

Problems related to ethics are extremely valued in academic circles. Ethical considerations constitute of great importance in science and include the moralities of human conduct. Their main duty is protecting the rights of individuals. Ethics has become more and more relevant for the majority of researchers. This thorough and user-friendly guide incorporates and encourages scholars to incorporate what they have learned about research ethics (Israel and Hay, 2006).

Qualitative scholars are tourers in private spaces in the country, according to Stake (2008). People whose lives and feelings are represented in observational research as vulnerability to danger and mockery and those in whose lives and expressions threats and uncertainty are presented (Stake, 2008). Extreme care also has to be applied to limit participants' risks (Stake, 2008). As a consequence, during the research process ethical problems are raised, including before the fieldwork, during the fieldwork, and during the evaluation and writing process.

The researchers will first clarify and tell the respondents that the information is strictly for testing purposes. Before they approach the respondents, they will. Second, justice and regard for human rights are paramount when conducting interviews. Kimmel (1988) states that mutually informed consent is the main principle governing the interaction between the researchers and participants. To receive legitimate consent for this study, the participants will be told of a fully volunteer involvement, of being able to leave any questions they have, and of being able to terminate the conversation at any moment. The respondents will again be notified that their information is kept confidential and that the findings of the analysis will be used solely for scholarly purposes. The most critical defense from non-approved ads, according to Christians (2005). Consequently, all personal information will be kept confidential and only anonymous.

Finally, during the testing period, the identities of businesses will be kept secret. The terms confidentiality and privacy are distinct since the former refers to entities, and the latter refers to data and information (Kimmel, 1988). An agreement between persons limiting access to private information by others is known as an extension to privacy (Kimmel, 1988). As a result, only the analyst has access to recorded files and the company names are protected by anonymity. Moreover, considerable attention is paid to the accurate transcription of data (whilst staying in the participants themselves) and to the accuracy and sensitivity of the findings.

2.11. Conclusion

The theory and methodology that influenced the research designs, methodology, and methods were discussed in this chapter. A constructivist methodology for identifying the realities of sustainable supply chain management, as well as the outcomes to supply chain performance regarding sustainability in Turkey strongly affected the techniques used. The use of a qualitative analysis methodology was deemed necessary for grasping social realism based on the participants' points of view, and to gather detailed and rich data. The study employed a case study approach and a range of qualitative approaches, including in-depth interviews, observation, and secondary data collection. These techniques were used to conduct process and data triangulation, thus improving the study's results. The key tool used to collect data was semi-structured, in-depth interviews, which were obtained by a purposive sampling technique. The target case study firms were drawn from the supply chain actors of food manufacturing. From

March to September 2020, interviews were held in Turkey. The study's findings were derived from the usage of a thematic analytical approach, and the Likert scale. Despite the well-planned analysis phase, this thesis encountered certain shortcomings, which were clarified. The chapter that follows identifies the creation of the conceptual structure that will be used for this analysis. The suggested method aims to clarify the logical rationale and course of this research.



CHAPTER 3: ANALYSIS OF FINDINGS

3.1. Introduction

The following section provides a comprehensive analysis of the supply chain performance concerning the sustainability aspects and metrics (as defined by the conceptual framework) in the four case study companies: the Prepress Company (Second-tier Supplier), the Packaging Company (First- Tier Supplier), the Food Manufacturer Company (Focal Company-End-Product manufacturer), and the Retailer (Customer). All companies belong to the same supply chain.

These performance metrics were specified within this study's conceptual framework as explained in previous chapter. This chapter examines the particulars of the sustainable supply chain performance that rely on the supply chain macro processes, all three aspects of sustainability and GRI Standards, and that were derived from the qualitative analysis of the actors from a Turkish Food Manufacturing Supply Chain. The outcomes are primarily based on interviews with representatives from all companies, and then the thorough examination of publicly available documentation, as it was described in Chapter 2. Chapter 3 contains four segments that follow the structure of the questionnaire's first part: the background of the interviewees and the company's background information on sustainability; Supplier Relationship management; Internal Supply Chain Management; and Customer Relationship Management segments. Thus, the input from the case studies help to understand the current performance of sustainable supply chain of Turkish food manufacturing actors.

3.2. Background of Interviewee and Company's Information on Sustainability

Within the framework of this study, the researcher selected four companies that constitute actors from the supply chain of a food manufacturer (see figure above).

Table 7. Input of Respondents Part a, Questions 1-7

	SC Actors	2 nd Tier Supplier	1 st Tier Supplier	Focal Company	Customer
Questionnaire: PART A 1-7					
Company information		-Prepress industry, approx. 200 employees; -Global representation with 28 subsidiaries in 15 countries. -Study of Turkish subsidiary.	-Packaging industry, 200 employees; - Member of holding.	-Food industry (manufacturer), approx. 1500 employees; -Member of holding.	- Retailing industry Retailer, approx. 30,000 employees.
1.Role of Interviewee		Supply Chain manager	Supply Chain Director	Supply Chain Director	Supply chain manager
2.Responsibilities in SSC activities		Under SRM and ISCM	In charge of sustainability Supply Chain in coordination with quality department	Yes	Economic aspects in sustainability
3.Company's Sustainability Policy		"Sustainability of supply chain is one of the most important topics for our firm regarding ISCM and CRM aspects"	Focus: Quality- Costs- Performance	Not a selling point, focus more on a good life cycle aspect	Get role in three way, economic, environmental and social
4.Importance of sustainability		Answer of this question above	Focus on ISCM and environmental aspect	Not a selling point, focus more on a good life cycle aspect; new generation more interested in sustainability so in future that may change. As industrial player, very strong on sustainability with focus on related research and projects	It's important in all way, economic performance, procurement practices, effluents and waste, energy, employment...etc.
5.Are all TBL dimensions equal		Actually No. Generally, economic issues are given consideration more.	No. More focus on economic and environmental.	Equally treated	Yes
6.SCM vs ISCM vs CRM		In all honesty, they are not considering equally. If needed ascending sort, first given importance is CRM, second ISCM and then SCM.	Priority on ISCM and CRM.	Not equally handled	Yes
7. Company's Standards		We don't have ISO or GRI yet. In the near future we would like to achieve ISO 9001 and have just started to work on it	ISO	ISO, BRC, environmental certification	ISO

3.3. Supplier Relationship Management

Supplier Relationship Management (SRM) gives the framework to establish and maintain ties with suppliers (Croxtan et al., 2001). This supplier relationship management method encompasses all processes that revolve around the company's relationship with its suppliers (Chopra & Meindl, 2007). Based on the conceptual framework that was presented in Chapter Two, the following sections will present the status of each company regarding its SRM performance measurement in relation to the Triple Bottom Line (TBL) approach (namely economic, environmental and social), and the GRI Standards.

Based on the feedback that was derived from the part A of the questionnaire, SCM is the dimension of the macro processes within the sustainability of supply chain that all participating companies are putting the less importance.

Regarding both suppliers (1st Tier and 2nd Tier), among the supply chain macro processes, the sustainability practices for upstream (SCM) activities are the least considered. Especially for 2nd Tier this is more obvious, when tables 5.2, 5.3 and 5.4 are considered, where the metrics of SSC in use are shown. As far as the focal company is concerned, the selection of the suppliers is filtered, but in a limited level since the packaging suppliers in Turkey are few, a fact that restricts scrutinization.

3.3.1. Economic Dimension: Quality- Costs- Procurement Practices

2nd Tier:

“Approved Supplier List, specifying minimum level of stock (for material), Evaluation of Supplier Procedure, Automatically Reminder on ERP System when the material amount is in minimum level of stock” are few of the points that were mentioned during the interview. A more detailed description is followed:

Despite the fact that there are enough options to meet the demands of customers, the second tier does not have a big number of vendors. The current suppliers' raw material consistency and distribution results are adequate. However, the emerging global economic recession has influenced the company's executive team to change its approach. One of its strategies is to look for new suppliers from other countries, especially those in Asia. The raw materials obtained from these new manufacturers are

of higher quality and at a lower cost. This also helps in the company gaining a strategic edge.

Within quality aspect, on receipt of the materials, an order-by-order inspection is performed. The selection is based primarily on the capability of human capital and machines, as well as the potential to produce goods on schedule. One of the firm's strategy is a flexible manufacturing system (FMS) that focuses on a customer-oriented approach with swift response.

The company does not have a procedure in place for measuring supplier output. However, there have been parameters such as distribution speed, usable quantity of supplied raw materials, amount of damaged raw materials, and number of errors in partnership. The company's supplier success is sufficient because one of the 2nd tier's assets is maintaining “strong and long-term relationships with suppliers”. The important approach that the company is concerned with is that the “provider must supply raw products on schedule”. Furthermore, stockpiling raw materials and finished products is not a practice.

The 2nd tier does not have a structure for choosing suppliers, but there is a simple mechanism in place. The business prefers suppliers based on “commodity quality, distribution performance, competitive pricing, and supplier efficiency” based on past experience and financial position. The main output of the 2nd tier is made-to-order, and the company will deliver commodity mix in the event of order fluctuation. The issue of late administration can be caused by a supplier selection procedure.

“The importance of quality considerations in selection cannot be exaggerated”. The standards for quality control systems, such as ISO 9001, are also essential for supplier screening. The company obtains a “quality certificate” from each of its manufacturers. Furthermore, the research and manufacturing branch carefully inspects material requirements. The business must monitor the raw material issue from the outset, since it is the most critical condition in the supplier selection process. In short, the company chooses only ISO-accredited vendors, and this is a mutual understanding. This will serve to reduce risk as goods are sold to markets with trade barriers. After evaluating the requirements in each perspective, a qualified supplier will be chosen. These considerations include arrival time (on time or ahead of schedule), raw material quantity and cost. However, the requirements are not too rigorous, which is appropriate because

it can help the company retain strong ties with its vendors. The company has also considered international vendors. Thus, the regulation of foreign trade, relevant rules, and government funding are key concerns that the firm has carefully discussed.

While the organization does not have a standard instrument for assessing supplier performance, the purchasing manager uses his experience to determine the performance of important suppliers. There is no formal method for measuring supplier efficiency.

Via appropriate contractual relationships, the company has formed a strategic partnership with its major suppliers. The firm collaborates extensively with its main vendors. The corporation works with its vendors to make strategic decisions such as inventory specification and production preparation.

The purchasing department collects requests for products from the manufacturing department from a legacy information technology-based structure, which includes comprehensive information on material specifications, distribution conditions, and potential suppliers. Coordination and cooperation occur between the purchasing and manufacturing departments. In order to make things correct for each case, the production manager will adjust the procedure or delay a production. To implement the above procedure, the production manager employs a modular manufacturing method, which most rivals are unable to use. As a consequence, the production manager is a central figure in both internal and external cooperation within the company.

The production manager must provide raw material information to each supplier in terms of quantity, mode of supply, and distribution deadline. Although the current communication system is adequate for dealing with usual requirements, it falls short of dealing with any contingency, which necessitates strong cooperation among suppliers, procurement, and production departments.

1st Tier:

“Costs and quality” the main driver.

When working with vendors, the company faces two issues: pricing and distribution performance. Despite the fact that these problems have been reported as troublesome on a continuous basis, the organization remains capable of addressing them successfully. Since the company's primary goal is to provide high-quality goods for its clients, it places a greater emphasis on supply quality than on distribution efficiency. The

management assumes that even though the goods are shipped on schedule, the low quality of the materials would create significant delays for the company and, most significantly, its customers. However, if the consumers need timely distribution, the company will closely track the vendors to ensure that it is under control.

The 1st Tier chooses suppliers based on product, operation, distribution performance, and price. According to the firm, the selection requirements are so strict that if suppliers pass the 1st tier level, they will market their goods to any company in the industry.

The philosophy of the 1st tier regarding the procurement process is to use many vendors. The corporation hopes that by taking this path, it would be able to reduce the risks associated with relying so much on a single provider. This strategy also boosts its bargaining power. To comply with this regulation, the company will be required to purchase goods at a higher cost from such suppliers. As a result, the company will improve its relationships with several vendors. The firm expects that when it really wants any supplies, it will always be in decent condition.

Over all, the corporation is capable of keeping its promises to its clients. The last but not least significant consideration when negotiating with vendors is to pool demand with its joint venture partners. The firm thus achieves greater economies of scale than its rivals.

The 1st Tier maintains positive relationships with its vendors. Nonetheless, the organization is an active participant in the relationship. For eg, the firm still has an eye on the material price. If the organization discovers that the price of supplies will rise in the next month and the company requires them, the firm will request a quota of such products in advance from its suppliers.

Suppliers also work well together. This is because the firm often imports products in large quantities. Suppliers can go to whatever length to meet the order specifications. The manufacturers also cordially tailor their goods to suit the requirements of the first tier. Often vendors agree to change their policies in response to the firm's appeal.

According to its multiple supplier policies, the organization often requests offers from two or three vendors. The best possible proposal is then selected by the organization based on quality and price. Despite this, the organization is nevertheless worried about the partnership. As a result, the firm provides these manufacturers with consistent orders.

Focal Company:

To ensure long-term growth and performance, a comprehensive operating framework has been developed by the focal company within the framework of the group it is operating, taking into consideration all of the factors that may influence the quality of operations. Supplier and business associates selection is recognized as one of the most critical aspects of the method owing to its direct influence on the consistency of the company's goods and services. In accordance with the company group's approach of "Promoting fair practices in products' natural, social, and economic impacts over their life-cycle", the Group has adopted a supplier policy and improved its partnerships with its supplier network stakeholders. Manufacturing and supply sourcing processes are driven by well-established principles, such as realistic selection requirements, purchase arrangements, uniform practices. These practices and protocols apply to supplier reviews in the fields of human rights, workplace health and safety, labor affairs, animal care, the climate, raw material procurement, and social impacts.

Through undertaking sustainability studies with and including its vendors, the company hopes to expand its influence base. This connection has become a shared language for company to share its sustainability research as a consequence of aligning their priorities and practices with the Sustainable Development Goals.

As part of an undertaken Supply Management System Research that was conducted in the past with the involvement of all related companies, the existing situation was analyzed, and a supplier relations strategy was created to completely engage suppliers in sustainable activities. The aim of this study for the manufacturer is to communicate its "decent job" understanding, which it highly values, with all of its suppliers and to ensure that suppliers carry out their business practices in accordance with this context.

The firm has always believed in growing with its suppliers and vendors, becoming a global brand by engaging with its consumers, adhering to legal and ethical laws, and producing with an environmental and social conscience. It deals with structural values to gain this appreciation and guarantees that vendors share the same point of view. In this regard, the substructure of the "Enhancing Supplier Performance" Initiative has been completed for suppliers in selecting new suppliers and business associates for competitive and quality procurement in order to expand and grow supplier expertise. The "Firm's Supplier Guidelines," together with the "Laws and Legal Compliance,

Human Rights, Fair Work Standards, Environmental Responsibility, and Corruption Fighting” provisions, and the Global Compact specifications, began to be signed as part of this initiative in 2018. The aim of the “Supplier Principles Guideline” is to define the requirements that its suppliers must conform to in business partnerships, as well as the ideals that must be adhered to.

The “Supplier Values Guidelines” have few of the following conditions:

- Regulations and Regulatory Compliance: The retailer meets national and international laws, directives, protocols, and requirements.
- Anti-Corruption: Stop dishonest commercial relations with suppliers. Suppliers do not offer, pay for, order, or authorize bribery. In all circumstances, the supplier must retain the specifics (such as new product, new design, product development, and so on) of the firms in whom it collaborates strictly confidential and act in a strictly confidential manner. Without a doubt, the retailer will not disclose this knowledge to a third party.

Suppliers are regularly required to meet the requirements established in this document and to guarantee that their suppliers do the same. The group that the company belongs to initiated a “Supplier Portal”, which began operations in 2018 with the aim of offering an open, quick, and easy contact environment, as well as sharing a reliable and up-to-date data flow. This program would control and record management processes such as vendor details monitoring, offer selection, purchasing, and logging, recording of loading alerts, DFS tracking, and supplier assessment on a single device.

Since the company is a food package manufacturer, it carefully chooses all of its vendors in accordance with the “Group's Standard Criteria” in order to supply their consumers with high-quality and nutritious products. Through choosing vendors focused on manufacturing, R&D, and quality assurance criteria, this procurement process helps to promote long-term cooperation.

Primary suppliers sign the “Group's Supplier Standards Guide” to guarantee “compliance with laws and regulations, civil dignity, fair working conditions, environmental protection, and contractual integrity,” which are all Global Compact provisions. Suppliers must thus adhere to the standards stated in the guide at all times in order to guarantee that their suppliers do as well.

Every year, raw content, auxiliary material, and packaging material suppliers are evaluated on a regular basis based on specifications (quality, price, deadline, quantity, and service) within the context of the “Supplier Assessment Procedure”, and efforts are made to develop them by corrective and preventive action.

The firm conduct routine alternative supplier/material review, as well as joint studies with the R&D and Quality Assurance Directorates, in order to establish alternative materials and increase the number of suppliers by investigating different and secure supply sources.

With this acknowledgement of its trade partners' position in providing consumers with “safe and hygienic products” the company continues its procurement policy.

Customer:

“We manage our supply chain in the most effective way possible in order to maintain our operational excellence and to keep the same quality-price balance level while we extend our service network. Within the scope of the Supply Chain Policy, we select suppliers who comply with our social and corporate principles and who meet our quality standards and we offer safe, high-quality, and healthy products according to customer needs through collaborative efforts”.

“As a domestic food retailer, we prioritize local supply in order to render our supply chain sustainable and contribute to the local economy”.

The organization expects high quality requirements from suppliers due to the character of the commodity, retailing.

The firm therefore requires a supplier who is willing to transmit the products that conform with the relevant international norm. It is therefore a matter of export control, product protection and materials on schedule. The corporation calculates supplier delivery output by the delivery time, as the operating management and the finished goods are affected. The delivery time must also be timely and the products must be correct. The standards are also the consistency level of goods. For each form of goods, the firm has set a specific norm.

The output measuring protocol is developed for the supplier. The company defined the explicit requirements. In order to make an initial assessment and test of the products, the organization still has contact with the manufacturer. In short, in eligible documents

under the ISO framework, the company can place the characteristics and include additional indicators.

The firm places great importance on the overall efficiency of manufacturers when they manufacture food items. Product consistency, distribution performance and suppliers' overall reliability should be outstanding.

The Customer chooses suppliers from supply consistency, price and suppliers' reliability. A basic protocol has been developed. The manual for quality and training has been set up in accordance with ISO 9001. The company has reviewed and developed its system continuously.

The product protection and quality processes are handled in compliance with the firm's Integrated Management Framework, which includes the ISO 9001:2015 Quality System Management standard. They expect their suppliers to receive at least one of the BRC International Food Safety Standard and FSSC 22000 Food Safety System certificates, as well as to engage in all applicable audit processes. The company inspects current suppliers at least twice a year and assist them in addressing perceived efficiency gaps. Furthermore, the audits that they are performed comply with the Turkish Food Codex Legislation of the Ministry of Food, Agriculture, and Husbandry, as well as inspections on halal food issues and some other areas depending on the form of product: weight, packaging, labeling, and so on.

The firm also has a common agreement with all providers. The acquisition process begins with the receipt of a buying request from buyers by the sales department. This requirement is then forwarded to the purchasing department. Next, the procurement department will issue and deliver the order to the supplier. The procurement department shall supply the monitoring document two days before the due date of distribution in order to validate delivery.

In order to minimize expense and improve reliability, the firm takes direct purchases from leading manufacturers. Some essential vendors struggle in time to supply products that impact overall performance. Every day, the company monitors the security of these vital goods to maintain their security inventory levels. The firm has manufacturers for critical materials and also has an additional supplier for emergency supply of critical goods. It also uses the authorized vendor list to update the providers data base every

month (AVL). The approval list shall include each supplier who passes the preliminary standard. Then every month it assesses them.

3.3.2. Environmental Dimension: Supplier Environmental Assessment- Waste

2nd Tier:

According to the input from the interview and the secondary data, as long as the above table, 2nd Tier has no metrics in place for the supplier assessment within the framework of the environmental dimension of sustainability. The company relies on the legal requirements that are imposed from the countries where their suppliers are operating, and they are complying with.

1st Tier:

The company establishes the requirements that relate to the ISO 14000 Environmental Management Standard (EMS). The government, including environmental authorities, strictly regulates the first tier's industry. The company was accredited ISO 14001 EMS, and the company adheres exclusively to ISO 14000 EMS. The organization's environmental policies are the environmental awareness and legal frame of the company. Legislation conformity is the primary requirement for selecting vendors. If the suppliers are able to meet the regulation requirements, they will become qualified suppliers to the company. Waste management is handled by recycling and reusing materials used in the process, as well as proper waste treatment and disposal.

Focal Company:

The firm's "Supplier Guidelines," together with the "Laws and Legal Compliance, Human Rights, Fair Work Standards, Environmental Responsibility, and Corruption Fighting" provisions, and the Global Reporting Initiative specifications, constitute the framework for supplier assessment when it comes to environmental aspect. The aim of the "Supplier Guidelines" is to define the requirements that its suppliers must conform to in business partnerships, as well as the ideals that must be adhered to. The "Supplier Guidelines" have the following conditions regarding environmental dimension:

- Environmental Responsibilities:
 - Encourages positive responses to environmental challenges.
 - Aids a wide variety of environmental stewardship programs and organisations.

-Encourages the creation and spread of environmentally sustainable technology.

Suppliers are regularly required to meet the requirements established in this document and to guarantee that their suppliers do the same.

Primary suppliers sign the “Supplier Standards Guide” to guarantee “compliance with laws and regulations, civil dignity, fair working conditions, environmental protection, and contractual integrity,” which are all GRI provisions. Suppliers must thus adhere to the standards stated in the guide at all times in order to guarantee that their suppliers do as well.

Moreover, contracts with raw milk producers guarantee water quality security as well as compliance with environmental health and animal welfare legislation.

The focal company frequently organizes training programs for its suppliers on important topics such as raw milk purity, animal health, animal nutrition, and preventive medicine to assist them in their growth.

The firm started SCM route optimization, a SAP-based program that has been used in raw milk tanker operations. The tanker route software seeks the shortest course, the maximum tanker load rate, the best engine, and the least amount of fuel and carbon emissions.

Customer:

“By supplying 100% of our products from domestic suppliers, we not only support the development of the local producers, but also protect regional products. Working with domestic suppliers also helps us reduce our carbon footprint arising from transportation”.

The environmental policies of the firm must be environmentally sustainable. The Customer is accredited for environmental issues according to ISO 14000 environmental protection standard (EMS). Purchases are one of the main procedures analyzed by ISO 14000 EMS since the purchasing process is liable, at the end of its usable life, not just in the procurement of the goods. The company seeks to select suppliers and submit also ISO 14000 EMS to ensure that suppliers meet the environmental and ecological manufacturing processes of the Customer. Not all providers have ISO 14000 EMS certification. The corporation would then provide manufacturers with environmental knowledge and ask them to address the environmental problem. In addition, as suppliers

provide the firm with goods, the Quality Assurance Department approves the items supplied and ensures that they meet the environmental standards of the organization.

3.3.3. Social Dimension: Child Labor - Forced or Compulsory Labor - Training and Education

2nd Tier:

According to the input from the interview and the secondary data, as long as the above table, 2nd Tier has no metrics in place for the supplier assessment within the framework of the social dimension of sustainability. The company relies on the legal requirements that are imposed from the countries where their suppliers are operating, and they are complying with.

1st Tier:

Although there was no recorded proof of assessing the suppliers regarding the social dimension of sustainability, the respondent mentioned that the 1st Tier pays attention on specific elements regarding the suppliers' status on child labor, forced or compulsory labor and training and education. Specifically, the manager put more emphasis on child labor related issues.

Similarly though, as 2nd Tier, the company relies on the legal requirements that are imposed from the countries where their suppliers are operating, and they are complying with.

Focal Company:

As part of the “Focal industry Supply Management System Research” conducted the previous years with the involvement of all corporation companies, the situation was analyzed, and a supplier relations strategy was created to completely engage suppliers in sustainable activities. The aim of this study for the Focal company is to communicate its “decent job” understanding, which it highly values, with all of its suppliers and to ensure that suppliers carry out their business practices in accordance with this context.

The firm has always believed in growing along with its suppliers, and becoming a global brand by engaging with its consumers, adhering to legal and ethical laws, and producing with an environmental and social conscience. It deals with structural values to gain this appreciation and guarantees that suppliers share the same point of view. The

firm's "Supplier Guidelines," together with the "Laws and Legal Compliance, Human Rights, Fair Work Standards, Environmental Responsibility, and Corruption Fighting" provisions, and the GRI specifications, set the frame for assessment of suppliers regarding the social sustainability. The aim of the "Supplier Guideline" is to define the requirements that its suppliers must conform to in business partnerships, as well as the ideals that must be adhered to. The "Supplier Guidelines" have the following conditions regarding social sustainability:

- Regulations and Regulatory Compliance: The retailer meets national and international laws, directives, protocols, and requirements.
- Human Rights: The retailer must respect and maintain globally accepted human rights principles aimed at protecting human rights.
- Workplace Speech and Collective Bargaining: Promotes workplace expression and collective bargaining.
- Forced or compulsory labour is not allowed.
- Child labour is banned.
- Discrimination in hiring and placement is strictly forbidden.
- Provides a safe and enjoyable working environment.
- Complies with current rules and legislation.
- Service hours and monetary reward
- Anti-Corruption: Stop dishonest commercial relations with suppliers. Suppliers do not offer, pay for, order, or authorize bribery. In all circumstances, the supplier must retain the specifics (such as new product, new design, product development, and so on) of the firms in whom it collaborates strictly confidential and act in a strictly confidential manner. Without a doubt, the retailer will not disclose this knowledge to a third party.

Suppliers are regularly required to meet the requirements established in this document and to guarantee that their suppliers do the same.

Primary suppliers sign the "Supplier Standards Guide" to guarantee "compliance with laws and regulations, civil dignity, fair working conditions, environmental protection, and contractual integrity," which are all GRI provisions. Suppliers must thus adhere to

the standards stated in the guide at all times in order to guarantee that their suppliers do as well.

Customer:

Although there was no recorded proof of assessing the suppliers regarding the social dimension of sustainability, the respondent mentioned that the Customer pays attention on specific elements regarding the suppliers' status on child labor, forced or compulsory labor and training and education. Specifically, the manager put more emphasis on training element.

Similarly though, as 2nd and 1st Tiers, the company relies on the legal requirements that are imposed from the countries where their suppliers are operating, and they are complying with.

3.4. Internal Supply Chain Management

The internal supply chain management (ISCM) process covers all of the company's internal operations (Chopra and Meindl, 2004). This internal supply chain management strives to meet consumer demand as quickly as possible and at the lowest possible cost (Chopra and Meindl, 2004). The internal supply chain management mechanism must align the needs of the consumers with the company's supply capability (Vollmann et al., 1997). Based on the conceptual framework that was presented in Chapter three, the following sections will present the status of each company regarding its ISCM performance measurement in relation to the Triple Bottom Line (3BL) approach (namely economic, environmental and social), and the GRI Standards.

3.4.1. Economic Dimension: Costs - Revenues

2nd Tier:

“We do not choose the KPIs according to ISO due to not have ISO in our factory. But generally, we are choosing the KPIs according to our needed by making brainstorming with our colleagues. In order to improve something, we need to measure some numeric data”.

2nd Tier sets its economic indicators based on internal processes. The performance assessment is based mainly on internal auditing, although they perform independent auditing too. Publicly there is no available documentation on financial reporting,

besides information provided on main corporative web site regarding yearly revenues. Their main concern lies on procurement costs of raw materials, followed by equipment efficiency that affects production, production costs with less importance on labor cost. The peculiar input on the importance given on revenues could be interpreted by the position of the participant (middle manager and not strategic position).

1st Tier:

The 1st Tier describes its vision and mission for all of its associates as “world-market compatible corporate activity through sustainable operational profitability”.

“We work in way that will be valuable to all stakeholders by effectively utilising the experience of management and professionals in our main business areas”.

With investing on upgrading infrastructure, targeting increased resource – use, and efficiency, and greater adoption of sound technologies and industrial processes, the firm is aiming at increased revenues that can derived by enhanced productivity, and decreased raw materials and production costs. The usage of an effective ERP system is used as a tool for ensuring that resources are efficiently used.

Focal Company:

The Focal company has been accomplishing increased advancements in their operations, retaining their stable market position and experiencing a steady and sustainable growth in revenue, whilst achieving performance in all business lines.

The firm has seen a growth of 17%, while contributing to the exports of the group which constitutes of produced 142 million USD in foreign sales, as a result of exports to over 70 countries and the operations of its overseas subsidiaries.

Because of the rise in raw material costs as a consequence of the exchange rate increase, the company retained its gross profit, concentrating on cost management and productivity in all business lines and processes.

In line with its market-oriented growth strategy, the company continued to develop new products. Projects developed by strong R&D teams when adhering to international quality criteria help to realize efforts to add value for individuals, society, and the environment.

Long-term added-value collaboration with producers, suppliers, and the retail sector is a top priority for the business. Although the firm searches for success in its respective markets, they are mindful of their corporate responsibilities and aspire for prosperous and environmentally responsible results. In this regard, the company takes into account the employment, work opportunities, and steady profits generated by economic performance among our stakeholders.

The Group pioneered the development of the sector where agriculture and industry integration are appropriately supported as one of the sectors of which the Group is active. The Group that the firm belongs to, particularly as a meat and milk producer, provides a steady source of income for a large portion of society. They provide job prospects to local farmers as a part of cooperative agreements with vendors in the supply regions.

Farmers are provided job opportunities through establishing contracts with producers in the regions where suppliers are located, with the aim of caring for animal health and development while offering added value to producers by healthy, high-quality feeds and innovative products.

Customer:

“Inventory control, because out of stock is not acceptable”

Thanks to its customer-oriented market strategy, the company has been raising its net revenue, something that they have consolidated with their sustainability strategy. By opening 851 new locations, the firm has expanded operations across Turkey and raised the number of the stores to 7,215.

The firm has put on place mechanisms for both internal and external assessment (audit) regarding financial status.

From within the organisation, the Audit Committee is in charge of assisting the Board of Directors in its oversight of the accuracy and quality of the company's financial statements and related disclosures; the implementation and effectiveness of the company's accounting system; the qualifications and independence of independent auditors; the selection of the independent audit company; and the approval and review of the contract between the Company and the independent audit company.

One main element when it comes to financial indicators and specifically costs, are related with inventory control and product quality. For the firm, out of stock means loss. The collaboration with manufacturers to supply products must be swift and focused on a continuous inventory strategy. The firm assesses inventory management efficiency based on inventory turnover.

3.4.2. Environmental Dimension: Emissions – Energy efficiency - Waste

2nd Tier:

The firm pledges to be environmentally conscious. In its divisions, they follow the mandatory protection provisions as well as international recommendations on wastewater neutralisation as best practice.

Through doing so, the company protects its workers' welfare, ensure the industry's continued survival, and contribute to the preservation of a liveable climate. The firm uses cutting-edge technology in all fields of manufacturing to reduce energy consumption and pollution into the air and water.

The buildings are cutting-edge, and they are routinely updated and modernized to the highest standards. Furthermore, environmental conservation is a top priority when improving its process technology.

1st Tier:

“The firm's core market goals reflect the three facets of sustainability in economic, environmental, and social dimensions”.

The company, with the aim of being a “part of the solution” within the context of a sustainable approach, retains and develops its studies and activities related to the conservation of scarce natural resources by collaboration with its corporate environmental related foundation. The firm has been awarded an environmental award by the Chamber of Industry of Aegean Region for their industrial success on the topic.

As a consequence of today's accelerated loss of natural capital, the company adheres to the philosophy of “Respect to Nature”, believing in the significance and benefit of recycled output for nature, and proceeds to generate added value for society and the economy by growing its recycled production tonnage per year. The firm also raised its

recycling utilization levels to 30% as an environmentally friendly organization with ISO 14001 approval. The "Zero Waste" strategy is its next move.

Moreover, the company is well conscious that lowering greenhouse gas pollution, mitigating its possible harmful environmental effects, and reducing its carbon footprints for a prosperous future are essential components of its environmental policies and its primary obligations.

Controls and limits on greenhouse gas pollution from its operations are the most critical aspects of its environmental perception. Thus, the firm monitors and records all greenhouse gas emissions and environmental impacts associated with all of its activities, and it builds and manages its investments and strategies within this scope (e.g. a solvent processing facility).

At the foundation of being an “environmentally sustainable organization”, it has been working towards the goal of reducing its carbon footprint by 30% across a variety of environmental responsibility projects. Regarding energy usage, in the last two years, the firm has improved by more than 10% and reduced its energy usage to 0.9 KW-h/kg.

The regulated use of plastic and liquid use in its productions, as well as the elimination of general manufacturing wastes, have become a realization in its operations. More specifically, through its solvent recovery system will be able to extract waste solvent content in the firm's business operations from a range of liquids using a new and automated distillation device and reuse it repeatedly.

Focal Company:

The focal company develops priorities for water and energy saving, natural resource use, climate change, and biodiversity, and focuses all of its operations on these goals. All the members of the Group that the firm belongs to are conscious that, in addition to a management strategy that guarantees the sustainable use of resources, applications aimed at minimizing waste created by the group's operations and activities must be handled effectively.

The firm therefore has developed environmentally sustainable strategies in its business and operations, as well as encourages environmental investments through its responsible management strategy, in order to reduce the environmental effects of its operations. In

this regard, it implements a comprehensive, long-term sustainability approach based on the ISO 14001 Environmental Management System methodology.

The organization tracks global sustainability patterns and changes its strategies accordingly. Furthermore, the firm works closely with its partners on development, while also collaborating with numerous international programs such as the UNGC and CDP in terms of platform implementation, assessment, and appraisal processes. Its priorities have been consistent with global objectives, and it has been moving towards this direction.

The firm has undertaken specific steps within the energy and environment management aspect:

- Changing the packaging (usage of recycled paper elements instead of plastic ones, less used corrugated cardboard) has reduced the annual greenhouse gas emissions;
- With coordination of manufacturing and distribution between the three of its plants, the firm achieved a logistics advantage and CO₂ emissions were reduced.
- Usage of clean and green energy, and promotion of the agenda for generating renewable and green energy. The firm adheres to the best applicable energy management practices on national and international forums in order to reduce the environmental effect of its operations and activities.
- The firm actively tracks and upgrades energy saving practices in all buildings, as well as creates the requisite infrastructure by renewing existing ones, and chooses and executes its activities with the economic and environmental benefit impact in mind.
- Activities to better electricity usage and saving of energy (e.g. investment on equipment)

Regarding the waste aspect, through systematic waste management plans, waste from the plants may be used as a fresh raw material through systematic waste management plans. The waste management scheme of the firm covers waste diversion at the source, waste reuse and recycling, waste energy recovery, and waste disposal. Recycling is carried out in accordance with the related Ministry's goals. The firm has provisions for both hazardous and non-hazardous wastes, produced as a result of processing, repairs, and everyday activities at the plants (separation, deposition, recycling or recovery).

Then, by upgrading cleaning technologies in manufacturing processes, both water consumption and wastewater submitted to treatment is reduced.

Although the firm has attempted to meet specific goals regarding the average carbon emissions, it has struggled to meet them because of several factors, such as “new investments, sectoral dynamics, product diversity, and variability of production forms in different time periods and variability in sales volumes”.

Customer:

“We believe that maintaining the sustainability of our activities and leaving a livable world to future generations is only possible through good and effective environmental management. We are working to decrease our environmental impact and enhance our environmental performance for a better world”.

“We contribute to the realization of Climate Action and Life on Land among the Global Goals thanks to our efforts to manage our environmental performance.”

The organization abides by national and international environmental standards and is devoted to quality development in order to control and minimize the environmental effects of our activities. Its operations are driven by the ISO 14001: 2015 Environmental Management System Standard.

The business updates its performance devised within the framework of environmental regulation on an annual basis and shares it with the public.

“We assess the environmental impacts of our activities and carefully manage these impacts to be an environmentally friendly company. We are making investments in order to decrease our carbon emissions and increase energy efficiency to combat the climate crisis, and we aim to reduce our impact on the environment and natural resources by developing effective water, waste and packaging management practices”.

The firm's Environmental Policy form the basis of its environmental management approach. Having been created based on its impacts in the sector, the Environmental Policy enables the company to approach practices for reducing its environmental impact with a holistic viewpoint. In addition to this, the Policy has an important place in terms of consolidating its corporate perception and achieving competitive advantage. Thanks to its environmental management approach, the firm aims to provide long-term value

for all its stakeholders in line with national and international Environmental Impact management standards.

The firm conducts audits in this area every year on a regular basis. Its aim is to manage all of the stores with ISO 14001: 2015. The company has recently made an environmental investment for improving its environmental performance after a related fine. Also, the firm has allocated budget for energy efficiency projects and on investment for the placement of energy regulating and consumption reducing systems to the compressor groups in cold chambers of the storages with high power consumption.

Moreover, the company has developed energy efficiency practices in order to decrease energy consumption-related costs and carbon emissions. These practices that increase efficiency and savings also indirectly contribute to the decrease in external dependence for energy. As part of the “Store Energy Efficiency” project, related equipment was installed in a group of stores. Through the automation of applications (e.g. turning on-off the store equipment, air-conditioner temperature control, active consumption and reactive tracking), the firm saves energy. The firm aims to decrease energy costs and environmental footprint with extension of this project to all stores. In order to calculate its carbon and energy intensity, the firm divides its revenues with values that refer to energy consumption and CO₂ emissions.

Also the firm considers waste and packaging management as its fundamental responsibility in order to decrease environmental pollution. It aims to decrease air pollutants, as well as solid waste caused by its activities in order to minimize its environmental impact. The Overall Loss Prevention Committee shows efforts to decrease the food waste by preventing any kind of loss caused by business processes in order to ensure operational excellence. Playing an essential role in reducing its waste-related environmental impact, the firm has undertaken related project towards the adoption of reusable boxes for fresh products instead of single use plastic or cardboard boxes. With the same means, the firm extends its goals to include the decrease of waste packaging and environmental impacts, product display standardization, ergonomic transport and transportation facilitation, and decreasing of costs.

The company additionally has made digital developments on its Enterprise Resource Planning (ERP) system and track inventory at the stores and storages in order to monitor the positive environmental performance of the project.

3.4.3 Social Dimension: Human Rights - Health Care and Safety - Community (compliance, volunteer, charity, and ethic)

2nd Tier:

2nd Tier pledges to be socially conscious. In its divisions, the firm follows the mandatory safety provisions. Through doing so, the company protects its employees' welfare. So the main focus is on health care and safety.

The management and technical departments have introduced a zero-accident program for workers who work directly with machinery. This promotes workplace safety, increases worker motivation, and reduces the chance of damage. The firm has applied operation and safety standards mandated by the government. For yearly reduction of the accidents, the firm employs Kaizen projects.

The safety unit inspects all safety devices and guards and normally reports to the administration team. There is a straightforward strategy for preventing accidents and working it out.

Emergency drills, such as a fire, carrying an injured worker, and so on, are often used. This simulated scenario gives staff the confidence they need to deal with the uncertainty of an emergency situation.

1st Tier:

The company abides by the constitution and all laws of the country where operations are carried out by either a legal body or a particular citizen is active and related rules and center of the society's ethical principles.

No undue benefits can be given to individuals or legal bodies, and no bribery is tolerated or granted for any reason. All of the corporation's knowledge, skills, and experiences are used for the greater good of humanity, universal humanitarian benefits, cultural heritage preservation, and human welfare enhancement.

Although the respondent has selected metrics from other social aspects regarding sustainability, it is obvious that the main care is on occupational health and safety. For the rest of the elements, the company relies on legal framework imposed by government.

The company's safety protocol for maintaining working conditions is notifying safety laws and implementing them with constraints. Ample safety equipment is installed.

The Turkish government's protection legislation is implemented in all facilities and is strictly enforced. The organization has applied for ISO 45001, which guarantees a high degree of workplace welfare. Per year, the company sets safety goals in order to raise the level of safety to “zero accident”.

Focal Company:

In the key and sub-texts of the United Nations and the GRI standards, the idea of “decent work” is one of the most basic principles that control how the focal company Community functions. As a result, the firm prioritizes its workers' human rights and prioritizes their fitness, welfare, and stability.

The group that the firm belongs to is has been one of the first companies to recognize trade union opportunities within its organizations.

For long-term growth, the company is searching for and promoting its employees' personal and career advancement, and has arranged trainings and activities, as well as educating its employees about workplace health and safety.

The firm places a premium on providing its workers with the ability to operate in a stable and safe environment, as well as improving protection in terms of both culture and procedures. According to the Occupational Health and Safety Policy, the group prepares and executes programs in all of its operations with staff trained in occupational safety and health professions in compliance with national and international regulations. With a zero-accident objective in mind, the group provides staff with the requisite preparation to follow OHS procedures and respond accordingly to incidents. Activities carried out within the framework of OHS are tracked at the Board level, as is success in this area. Occupational Health and Safety Boards, which are mandated by law to be included in all of the group's businesses, meet on a regular basis to discuss agenda items. OHS Boards of corporations serve all permanent workers.

Via its anti-discrimination policy, inclusive understanding, and expansive working environment, the firm places a premium on high levels of motivation and commitment for its workers.

The firm prioritizes employee retention in all of its processes and events, and it provides its workers with suitable working conditions. Its group claims to have a working atmosphere in which all employee rights stated in the Standard ILO Conventions are

protected. The human resources activities are governed by Labor Legislations and Collective Labor Agreements.

The firm, which promotes workforce training and advancement, offers equal opportunity to all workers, with religion, ethnicity, age, and marital status not being included in all human resource processes such as remuneration, performance assessment, promotion, appointment, training, and development. In the recruiting process, the skills and competencies needed for a job are measured on the basis of the applicant's suitability; there is little distinction in recruitment and remuneration between men and women. The firm has engaged in the “Equality at Work Platform”, which was launched by the World Economic Forum and is now headed by the Ministry of Family and Social Policies. Moreover the firm under the umbrella of its group has engaged in several initiatives that at regional and international level that promote women's empowerment.

Towards the Empowerment of Female Workers, female employees make up 19% of executive level promotions. In specialist workers, this figure is 50%. Female undergraduate students and female high school students make up 70% and 40% of the internship programmes, respectively, and are seen as a significant labor pool for recruiting. Employees in the firm who are pregnant or breastfeeding work under the time limits defined by statute, and a woman continues to work in her remaining role after returning from maternity leave.

Regarding child employment, the company follows the related Labor Law (No. 4857), but despite the fact that there is no legal obligation, the firm has followed the policy of not hiring anybody under the age of 18.

Working days and times are communicated to workers by specifying public, general, and weekly holidays. If extra days of work is required this has to be approved by employees. These provisions are defined in the written conditions of the labor agreements, and the payments are charged in the manner specified.

With its jobs, supply chain, and export volume, the firm adds value to the local economy and promotes its growth by prioritizing the selection of local labor resources (“employment on-site” scheme) and raw materials needed for the goods and services it offers.

The company works in compliance with the legislation and in accordance with national and international market norms, with the goal of “adding value to life”, and often prioritizes consumer and customer welfare (e.g. organic products, reduction of harmful ingredients). In order to achieve this aim, the firm introduces best practices that would serve as a model for the industry in order to increase consumer and customer wellbeing.

The company makes all of its goods and services available to its customers through labels on product packaging, commercials, its website, and social media. The provisions of the Turkish Food Codex Labelling Regulation are being implemented one by one in order to share information about food products with buyers through labelling. Moreover, the company complies with the legislation governing the promotion and marketing of its products, prioritizes transparency in selling products to customers through marketing tools, and completely complies with the Advertising Self-Control Board Principles issued by the “Association of Advertisers,” of which its Group is a member.

Customer:

The firm is focused on providing our employees a dynamic work environment that is just, healthy, that cares for equality and diversity, and is powered by inclusion. It invests in employee development in order to ensure that they continue to improve with the new opportunities offered by the digitalizing world throughout their professional career.

The firm stands up against all kinds of discrimination with the a Human Resources Policy that it developed to manage the human resources processes. The company supports women’s employment and aims to increase the percentage of women in decision-making positions. Contributing to the empowerment of women through their participation in socioeconomic life, and supporting women who have taken a break from business life in returning to working life, are among its gender equality goals. Within this goal, the firm has been increasing the number of female employees (45% of total employees are women and 79% of the women employees returned to work after maternity leave).

Occupational health and safety is among the matters the firm focuses on in terms of sustainability. The Director of Human Resources reports directly to the CEO on a regular basis as the most senior of directors when it comes to occupational health and safety issues. The firm complies with the relevant legislation in terms of occupational

health and safety, managed with a risk-based and systematic approach. Furthermore, the company is on a preparation stage to adapt its approach to international standards, and to receive the ISO 45001 Occupational Health and Safety certificate. By using different methods in order to manage the occupational health and safety risks, the company prepares Risk Assessment Reports for every location. It performs detailed analyses regarding accidents, near misses and related statistics, and take measures to prevent similar cases. Also, the firm conducts evaluations in various areas such as types and breakdown of accidents, positions of affected employees, place, date and time of the accidents and near miss statistics. Plus, the company organizes training sessions for its employees in order to prevent accidents, support the formation of an occupational health and safety corporate culture and comply with the legal legislation.

One of the firm's primary aim is to offer to its customers safe and of high quality products. To achieve this, the firm only works with the suppliers who meet the national and international food safety and quality standards, as well as the conditions of its Integrated Management Policy. As aforementioned at the Supplier Chain Management part, the firm works closely with suppliers and set its quality, labelling standards on them based on related national and international legal frameworks and certificates.

Besides the undertaken audits to suppliers only; the firm also audits its own operations. The stores and warehouses are also subject to audits. They conduct a minimum yearly audit also for the suppliers which provide exclusive the products under the brand's name. 100% of these special products are produced at premises with international food safety management certification and checked in terms of whether they satisfy consumer health and safety requirements.

Finally, the firm aims to engage in projects within its corporate social responsibility policy, and especially the ones that involve women's empowerment.

3.5. Customer Relationship Management

Customer relationship management (CRM) establishes the framework for developing and maintaining customer partnerships (Croxtan et al., 2001). This customer relationship management method covers all procedures that are associated with the engagement between the organization and its customers (Chopra and Meindl, 2004). Consumer experience management is a macroprocess that seeks to create customer demand and make order placing and monitoring simpler (Croxtan et al., 2001). Based

on the conceptual framework that was presented in Chapter three, the following sections will present the status of each company regarding its SRM performance measurement in relation to the Triple Bottom Line (3BL) approach (namely economic, environmental and social), and the GRI Standards.

Some elements of CRM are overlapping with aspects of the other macro processes when it comes to supply chain sustainability issue and the policies- activities of the four case studies. So for the researcher to avoid repetition on the input that has already been mentioned to previous sections, the specific segment will be presented as a consolidated outcome with reference to aforementioned parts.

3.5.1. Economic Dimension: Customer Service - Customer Integration

2nd Tier:

The production of the product is mainly concerned with the needs of the buyers. The machine's adaptability is crucial in setting a product design. Thus, the company turned to a more digitalized (automatic) production line. This helps the company to adapt to a wide range of orders while simultaneously retaining current customers. Sales representatives also work closely with buyers to assist them in customizing their products. As a result, the company's willingness to adapt to different customer demands allows it to compete with its rivals.

The firm, on the other hand, needs a more complex integrated customer relationship management (CRM) structure to incorporate consumers into its architecture, planning, manufacturing, and procurement processes.

The company processes customer expectations in a structured way regarding receiving of orders, adjustment to specifications and delivery.

The majority of customers are repeat customers, and most of the industry is built on trust between the 2nd Tier and its customers. As a result, there have been relatively few concerns. However, for potential clients or in some cases, complaints are directed to the sales field in the marketing department, and these complaints are then sent to the administration staff. A monthly workshop is held to identify case-by-case solutions to consumer issues.

In order to deal with customer orders shifts, the firm employs several means such as constant contact, teamwork in the search for appropriate raw materials, and consistent

product quality growth. Such partnerships will also assist in the acquisition of current clients.

During the ordering process, the company interacts with customers through formal channels. During the development cycle, both the formal and informal networks assist them in staying in touch. During times of uncertainty, both formal and informal networks may assist in working out problems. In order to bring value to its clients, the company could benefit from incorporating structured information management methods.

1st Tier:

Made-to-order offerings are the company's exclusive selling point. The company supports the principle by being responsive to consumer demand. The firm also employs salespeople with extensive business expertise. These salespeople are well-experienced in industry dynamics. As a result, these perceptive salespeople recognize the customer's need and are able to adapt to it quickly.

Another value proposition of the firm is its consistency. When compared to other companies, the 1st Tier can take longer to fill customer orders. This is attributed to the fact that the company does not store finished goods in advance. However, this is not a risk for the firm since its buyers need stability rather than speed. In reality, after a customer order is requested, the firm seldom loses it. The company excels in satisfying the needs of its clients.

In certain situations, where a buyer may need products out of schedule, the company may consider whether it is feasible to change the production schedule. This is simple due to the company's highly automated information infrastructure. The firm knows whether to merge the productions or cancel other productions without disrupting the machine as a whole.

Customers have mostly complained over two issues: waiting time and return of products. To avoid the extensive harm caused by the previous problem, the firm attempts to contact clients in advance to get concession on the delivery time.

The aforementioned issue seems to be less critical than the return of orders. The company often aims to please consumers by bringing back goods and rechecking or changing them as desired. To avoid this problem, salespeople must also check order requirements before proceeding to the production line.

Focal Company:

Focal company places a high value on user and customer loyalty and is actively conducting research to develop its goods and services by analyzing input from daily surveys. The requisite steps, including complaint and perception processes, have been taken by assessing shareholder input through market and customer surveys.

Customer loyalty is measured by the firm's Communication Center for products, which is at very high percentages. Within this framework, the company conducts a customer satisfaction survey in order to assess and increase the level of customer service. The marketing department conducts the survey once a year and divides it into product and service categories. Based on these reviews, the communications department will create an executive summary.

The Communication Center has been serving its customers for many years with its fast, secure, and customer-oriented approach by constantly keeping up with technological advances. It takes demands, grievances, and questions online seven days a week, including weekends and holidays, by embracing a consumer-oriented attitude and devoting attention to their requests and feedback, responding with a CRM system modified with the latest technologies to ensure their satisfaction. Requests and recommendations directed to the center are carefully reviewed and discussed.

The firm's market practices include delivering goods on schedule, offering a set price, and customizing products to suit the needs of consumers. In order to increase service efficiency, the firm has invested in automated production systems. Due to the high level of competition, the company must schedule and forecast the needs of its consumers.

The firm places a high value on consumer integration. It aids the organization in improving its product creativity and quality efficiency through the collection of input from consumers that is used to optimize goods.

Customer:

The firm aims to make our highly diverse product portfolio comprised of good and safe products accessible for everyone, without compromising on quality. In line with its goal to achieve high customer satisfaction with our customer-focused approach, the firm wants to ensure that its products are all accessible and to inspire its customers towards healthy eating with the products it offers.

In line with its vision to become the “most preferred modern food retail business in Turkey”, the company provides high-quality, diverse products, and affordable price to its customers with its advanced service approach and provide them with the most suitable shopping experience. As required by its customer-focused approach, the company cares about the needs of the customers with the offered products and services. There is a diversification of its product portfolio with its own brands and national brands, and a focus on making the products and services reachable and accessible throughout Turkey. This diversification is based on the needs of customers while providing affordable price and high-quality products.

The concept of the firm is for the customers to be able to obtain all the products they need from a single point at the nearest location. The different channels and a rich product diversity are means towards this direction

Additionally, the firm offers different product alternatives in line with the changing consumer needs in different seasons. The aim is to provide a comfortable shopping experience to meet the various expectations and needs of its customers in line with an advanced service approach.

In order to achieve the aforementioned, the firm has broadened the store network, and worked towards the improvement and adjustment of store planning for the convenience of the consumers.

Through its Call Management system, the firm prevents products with supplier-related quality issues from reaching customers. Any defective products reported by the stores to the Call Management system are tracked by the quality team and product checks are conducted. By identifying product issues, the necessary procedures and actions are carried out. Thanks to this system; in collaboration with the quality team, the firm protects the health and safety of customers, decrease customer complaints and product disposal rates, and develop the quality security systems of the suppliers. With this management system in place, the company ensures a higher customer satisfaction and save on costs and time.

3.5.2. Environmental Dimension: Materials - Environmental Compliance

2nd Tier:

The topic was addressed at the environmental dimension of ISCM.

1st Tier:

The topic was addressed at the environmental dimension of ISCM.

Focal Company:

The topic was addressed at the environmental dimension of ISCM.

Customer:

The topic was addressed at the environmental dimension of ISCM.

3.5.3. Social Dimension: Local Communities (impact) - Marketing and Labeling - Customer Privacy

2nd Tier:

The topic was addressed at the social dimension of SCM and ISCM.

1st Tier:

The topic was addressed at the segment of ISCM

Focal Company:

The firm addresses the interests of all geographies and communities while providing goods and services from a creative and equal viewpoint in line with the consumer and public health principles. The company's market strategy is science-based and quality-oriented, in line with presence and capable of fulfilling social needs. The company also operates in line with the set corporate priorities for “Caring for society,” and these activities are aligned with the sustainable development goals.

The firm additionally supports domestic suppliers with “100 percent raw milk and 88.7 percent other ingredients” sourced from producers inside Turkey's boundaries.

The group that the firm belongs to carries out social investment programs in their operational regions in accordance with the needs of the region, leading to the growth of society as well as activities in which the group is directly or indirectly involved.

Adhering to the philosophy of consumer and public wellbeing, the firm works with all of its partners to raise awareness by sharing its expertise. Furthermore, it closely

monitors and promotes social causes, as well as observes the communities in which it works and attempts to communicate with them.

Through its educational and cultural oriented foundations, it carries out its socially beneficial activities by supporting new, high-quality education and offering cultural services.

Finally, the firm's community is actively working to develop agriculture and animal husbandry within the context of sustainable agriculture and animal husbandry.

Customer:

As a domestic food retailer, the firm prioritizes local supply in order to render its supply chain sustainable and contribute to the local economy. By supplying 100% of its products from domestic suppliers, the company supports the development of the local producers, and protects regional products.

3.6. Conclusion

This chapter analyzed the four case studies of a Turkish food manufacturing sector in depth to help understand their supply chain efficiency. These firms include the Prepress Company (Second-tier Supplier), the Packaging Company (First- Tier Supplier), the Food Manufacturer Company (Focal Company-End-Product manufacturer), and the Retailer (Customer).

The thorough analysis of supply chain efficiency was based on the performance assessment variables provided in the study's conceptual model, as described in Chapter Three. The performance measurement metrics for the three supply chain macro systems, as well as the three decision making stages, were established. As a result, this chapter was divided into three major parts. Part one dealt with supplier partnership management. Part two was about internal supply chain management, and Part three was regarding customer relationship management.

CHAPTER 4: CONCLUSION

4.1. Introduction

This chapter contains the research's final findings as well as other observations. It is divided into six parts. It begins by going through the theoretical intent and consequences of the conceptual structure as they apply to first two Objectives. Then it reflects on the key conclusions of the analysis based on the application of the conceptual structure, which are applicable to the third objective. The conceptual framework's contribution is discussed in the following section. The research's strengths are then explored, supplemented by a summary of the research's shortcomings. Following that, proposals for future study are made, and the paper concludes with some closing remarks.

4.2. Theoretical Goal and Use of the Conceptual Structure in This Analysis

Within the framework of this study, and in order to accomplish the first objective, the literature about supply chain performance measurement systems and performance measurement considerations for sustainable supply chain performance measurement was critically checked. In Chapter Two, the specifics of the literature review was discussed. The conceptual framework was then created based on core principles from the literature review, in order to achieve second objective .

A review of previous studies on supply chain management revealed a lack of concern for sustainable supply chain performance assessment. The research is expected to contribute to a further thorough comprehension of supply chain performance measurement regarding sustainability, specifically Turkey, by searching the themes related to sustainable supply chain performance as a method of performance measurement.

Many researchers' interest has often been centered on a particular field of performance measurement, although they have largely ignored studies on the overall efficiency of sustainable supply chain management. Regarding these differences, the methodology built within this research took an approach to the study of comprehensive supply chain output assessment based on a three- aspect principle of namely sustainability dimensions, GRI standards and supply chain macro processes. From one aspect, the

three dimensions of sustainability were used to examine success in a vertical perspective. These dimensions are further grouped based on the TBL frame, depending on the context that they target, such as profit, people, and the planet. The second aspect was the internationally recognised GRI standards, within whose topics (that are widely used by firms for sustainability reporting) the performance measurement aspects were selected. Then, the aspect of the supply chain macro processes was applied to examine success in a horizontal perspective. The macro processes of a supply chain can be separated into three categories, namely, supplier relationship management (representing all processes that concentrate on the interaction between the business and its suppliers) ; internal supply chain management (representing all processes that are internal to the company); and customer relationship management (representing all processes that focus on the interface between the company and its consumers).

Regarding the second objective, which was to create an innovative conceptual framework focused on the aforementioned perspectives, the researcher intended for it to be more embedding, systematic, as well as more business oriented than those created by other scholars. The rationale behind that was for the framework to take a more comprehensive look at the sustainable supply chain performance assessment. It aided in the direction of the fieldwork, especially in designing the topics for the questions used to collect data from the participants in the interviews. The questions mirrored the framework's comprehensive elements for each theme. The process aided in the organization of the results analysis, outlining the topics in the analysis chapter, and informing study recommendations. Furthermore, the conceptual framework aided in analyzing the sustainability of the supply chain performance regarding sustainability in the four case studies in Turkey of food manufacturing sector, and hence it has prospective relevance for extension to other industry sectors in the country, as well as possibly elsewhere in other countries.

4.3. Results Derived from the Conceptual Framework's Application

This section presents the key findings from the application of the conceptual model on the four case studies from the Turkish food manufacturing sector with regards to the third objective of this thesis. The model has served as a guide to identify the parts of the analysis that is following.

4.3.1. Sustainable Supply Chain Performance

As a starting point, the author will provide the general point for each macro process and then proceed to a more defined approach.

Overall, the firms seem to treat the different macro processes regarding sustainability practices within their supply chain not in an equally way. The ISCM and CRM are more attended to compared to the SCM. The only exception is the Customer (Retailer) that puts equal importance on all of the SC macro processes.

With regards to SRM, the quality of materials was of outmost importance. The consistency of raw materials was the key criteria shared by all four businesses in choosing their suppliers. However, as these businesses chose their vendors, delivery efficiency, competitive pricing, and supply reliability all played important roles.

To mitigate supplier control, the 1st Tier attempted to provide several suppliers for all necessary raw materials. Furthermore, a strategy of multiple suppliers would reduce the risks that exist when a business depends exclusively on one supplier. On the other hand, the 2nd Tier had only a few suppliers, was on the lookout for potential overseas vendors that could deliver high quality at a low cost. The limited number of suppliers for the focal company regarding packaging has driven the firm to lower the criteria of assessment, and set hygiene and commercial factors for supplier selection.

With regards to ISCM, the main focus lies on the economic dimension with only cacophony the input metrics significance from of 2nd Tier, which has been interpreted by the fact that the input came from managerial level (in question 6 the respondent claimed exactly the opposite actually). Then, the environmental aspect takes too much attention by all firms, with social aspect last again, but more enhanced compared to the one of the SCM, since occupational health and safety matters for all companies.

Then, regarding the CRM, the financial aspect was again the most tendered one, followed by environmental and then social dimension. The firms have customer service and loyalty at significant level of importance. As a result, the firms makes efforts to sustain an efficient system that will respond to all customer needs or handle complaints. Also, the firms seem to utilize the input from customer to improve their processes and products.

Another observation relies on the size of the companies that took part in this study. As it was understood SMEs are struggling to deal with the sustainability aspect or all of its dimensions, thus it is not included in their standard or business strategy, something that it is not the case for the large companies. The input from the respondents was that this attitude is under a gradual changing process. The change of attitude towards sustainability from the younger generation will be a motivation to adapt accordingly. Within the same context, SMEs seem to associate sustainability with environmental practices only.

Then, economic and environmental dimensions are the ones that they attract the most attention by the firms, with social dimension being left behind. For the economic aspect, the costs (especially related with raw materials and production) are of great concern and dealt with through supplying network or investment and production planning (towards their reduction). Regarding the environmental dimension, besides the 2nd Tier that has obviously shown a focus on economic assessment, the other three firms have an efficient performance measurement system for it, with more significant metrics under the ISCM first, then CRM and finally SCM. As far as the social dimension is concerned, it constitutes no priority for the 2nd Tier, while the focal company and the Customer were more open to the notion, and engage into several social related projects. Here, the more significant used metrics were under the umbrella of ISCM and specifically the Occupational Health and Safety (e.g. number of fatalities as a result of work-related injury, the number of high-consequence work-related injuries, the number of recordable work-related injuries etc.); then the ones under the frame of SCM and CRM. Under these last two, 2nd Tier did not declare any metrics and there was no proof of related assessment.

On another point, the sustainable supply chains of the case studies are being affected by the governmental legal framework. This aspect is more obvious when it comes to the supplier assessment, the occupational health and safety and the child related metrics. The Turkish laws set the framework on this specific issues, so there were occasions that the firms were just following the requirements of the law without any additional initiative (2nd Tier for environmental and social dimension of SCM). For the firms that they export their products, like the Focal company and the 1st Tier, the legal requirements of the countries of export should be taken into consideration, and especially when those are more strict than the national ones.

Furthermore, the role of applied standards played a crucial role on the development of performance measurement of the firms' sustainable supply chain. Their assessment mechanisms reflected the fact that the focal company and the customer have already ISO, BRC and environmental certification, while the 1st Tier ISO and the 2nd Tier none of the aforementioned. Also it is worth mentioning that the Focal company and the Customer are the ones that they assess their sustainable performance based on the GRI standards, something that could additionally explain their comprehensive framework.

Then, another observation has to do with the position of the firms in relation to the final end user, and how this may have affected the implemented metrics and an overall sustainability policy. The increasing awareness of consumers regarding environmental and social aspects, sets more pressure on firms to act towards this direction. The Customer and the Focal company gives this indication with their enhanced sustainable social scheme. On the other hand, although the 2nd Tier is a customer-oriented firm, their customers being other firms and not individual consumers proves a subversive factor. So the nature of the sell-side supply chain (business-to-business or business-to-consumer) may affect the importance that firms are giving in order to decide on their sustainability strategy. This also indicates that sustainability related practices and elevated performance can be utilised as a very effective marketing tool for the end users.

To conclude the session, the researcher has seen that the business mentality (initiatives on waste, water, and carbon footprint) met the expanded academic focus on the green supply chain management.

4.4. Input of the Conceptual Framework

The segment assesses the conceptual framework's inputs, which are linked to the work's core assets. It addresses the framework's future relevance to additional sectors in Turkey, as well as in other countries. Initially, several of the framework's main contributions are explored.

First, the conceptual framework made an integrated conceptual contribution to supply chain performance measurement regarding sustainability, by using the three dimensions of sustainability, GRI standards and supply chain macroprocess approaches. Scholars have most frequently concentrated on a specific field of performance measurement, with no attention paid to studies on an integrated method for assessing the overall

performance of sustainable supply chain management. In addition to these research gaps, the methodology created for this study underwent a sustainable supply chain performance measurement across three aspects, namely dimensions of sustainability, GRI standards and supply chain macro processes. This method contributed towards a detailed understanding of supply chain efficiency. The system offered a holistic view of supply chain efficiency from both the horizontal (cross-process) and vertical (dimensions of sustainability), as well as a more corporate (GRI standards) perspectives. Notably, there is relatively little current literature in the area of supply chain performance measurement regarding sustainability that employs these combined perspectives.

Then, the researcher planned for the concept to be wide enough to be relevant in other circumstances. This research avoided more static and context-specific ideas and principles. As a result, the methodology used in this study is broad, loose, and very versatile, allowing it to be extended to other business sectors in Turkey, as well as other countries with different cultures, societies, and economies.

Moreover, in terms of realistic contribution, this study offered a more systematic approach to assessing the sustainable supply chain performance by integrating the abovementioned three perspectives for enhancing the Turkish food manufacturing's supply chain performance in terms of sustainability. A collaborative supply chain aims to achieve a strategic edge by enhancing total efficiency by assessing its sustainability aspect holistically. As a result, for industrial firms, the suggested system will have a composed horizontal (cross-process) and vertical (sustainability dimensions) view, within the framework of their business norms (GRI standards), and assess the output of the whole supply chain regarding sustainability. Turkish manufacturing firms can use the conceptual framework to define performance measurement factors against each supply chain macroprocess; it allows businesses to take better sustainable supply chain management decisions towards an economic, environmental and social sustainability strategy; and it tests the efficiency of case study firm alongside each performance measurement factor.

4.5. Constraints of Study

The study followed a well-planned analysis method, with great care taken at each point. However, there were several shortcomings that restricted the analysis.

First, since the study was based in the Turkey at the time of the observational studies, and with the researcher not being a native speaker, only a certain amount of participants could be participate for the interviews because of limited English knowledge. Moreover, because of the emergency of Covid-19 during the fieldwork timing, there were strict regulations that restricted the time and numerical availability of the respondents (heavy working load due to shift rotation). However, consideration and attention were placed into each interview to ensure that the time allocated for each interview was used wisely and that all important subjects were discussed. Furthermore, and for the same reason, only two on site visits were possible, since the firms had banned visitors from their premise for health safety issues. The researcher had the opportunity to conduct these interviews online, and use secondary data sources to compensate the missing elements.

Second, the researcher's small previous practice doing qualitative analysis work posed a challenge. Much effort had to be expended in improving the context and methods to compensate for previously lacking expertise on this topic. The challenge, on the other hand, inspired extra work, which was something rewarding. In addition, a valuable academic consultation along the qualitative research helped the researcher in improving her expertise and the outcome.

Another disadvantage was that it was impossible to question respondents regarding the effectiveness of their own businesses' success in terms of sustainable supply chain management. In Turkish culture, tone can observe a strong mood of preventing confrontation, through avoiding direct criticism, controversies, discord, as well as dispute, and as a result, some respondents were very reserved about giving criticisms on these matters. This means that consideration had to be taken when asking about certain subjects, which meant that it took a long time to get to the point of addressing a particular question. Furthermore, the researcher told the participants that the obtained information would be utilized solitary for testing purposes and would be kept strictly confidential. Those promises allowed them to chat more freely.

4.6. Suggestions for Potential Study

The following suggestions could support future research on supply chain efficiency assessment variables and structure.

To continue, future studies might concentrate on a comparative analysis of the subject through the extension of the conceptual framework to various business sectors in

Turkey, or abroad (other developing and developed countries). Therefore, variations that could occur from area to region and nation to country could be recognized, and the framework's importance across various cultures and contexts (legal especially) could be assessed. Within the same direction, in future studies, the role of the government as a key actor and influence on sustainable supply chains legal requirements should be taken into consideration and further explored. Another suggestion is that prospective studies involve further participants in the research (other suppliers and customers of the supply chain) so that one can collect more insight on their involvement in, or indifference in, differentiating through the sustainable supply chain success of the participating business. The same stands for increase of the numbers of participants within each case study firm, so that a potential future research could expand towards the decision making level of the firm, and the specific metrics that could be employed in every decision level of an organisation re (4 dimensional level conceptual framework). Finally, the conceptual model could include other contemporary factors within the sustainability framework, such as digital transformation, a concept that has recently emerged in the business reporting and is nowadays more relevant than ever because of the Covid-19 emergency.

4.7 Closing Remarks

This segment ended with a critical review of the study. The author revisited the core goals and primary results, as well as the key contributions of the methodological structure and the study's assets. Limitations and possible research directions were similarly established. The study on sustainable supply chain performance measurement factors and framework offered fresh perspectives regarding methods and principles that were previously unknown in the supply chain performance measurement on sustainability literature. After being integrated to establish the foundation for the work and its conceptual model, the three aspects of the model were critically examined. The findings provided new viewpoints and observations into the analysis of supply chain performance assessment in terms of sustainability in Turkey and elsewhere in relation to performance measurement variables and framework.

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APPENDIX

APPENDIX 1: PERFORMANCE MEASUREMENT FACTORS FOR SUPPLY CHAIN PERFORMANCE MEASUREMENT

Author	Metrics
Vachon and Klassen (2008)	<i>Solid waste disposal, air emissions, water emissions</i>
Vachon and Mao (2008)	<i>Waste recycling rate, energy efficiency, greenhouse gas emissions, environmental innovation, Environmental performance, Corporate environmental practices, Number of ISO 14000 certified facilities, Participation in responsible care, Prevalence of green corporatism, Fair labor practices, Corporate social involvement</i>
Searcy et al.(2007)	<i>Level of trust by stakeholder category, openness to stakeholder participation, effectiveness of engagement process, meeting expectations, aboriginal satisfaction with the decision making process, no. of public consultation opportunities, no. of attendees to public consultations, public awareness of consultation opportunities, percent of past commitments fully met, average response time to requests for publicly available information, adequacy of reporting and information provided to the public, resources devoted to aboriginal participation in the consultation process, status as an employer of choice, staff preparedness to represent the company in public, percent of workers who report complete job satisfaction, effectiveness of capturing staff feedback, average employee turnover by classification, effectiveness of staff training programs, effectiveness of staff training programs, perceived clarity of expectations, perceived opportunity for advancement, perceived ability to influence decisions, perceived access to necessary resources, staff sense of team, internal and external salary ratios, percent of employee development plans completed, non-entry level positions filled with external candidates, investment in staff education and training, public attitude factor, investment in community outreach, charity and education, percent of electromagnetic field information requests promptly followed up on, in-kind contributions to community and other local programs,</i>

	<i>participation in voluntary programs, existence of cultural awareness training for employees, perceived risk of electromagnetic field to humans and livestock, number of staff hours directed to electromagnetic field education and awareness initiatives, annual change in right of way by type, transmission intensity, % right of way under secondary land use, no. of requests for adjustments to development plans, Hectares of right of way (ROW) required, loss of alternate land use by type, total electricity transmitted, % lines on protected environmental or cultural areas, no. of complaints related to dust, noise, and visual, Average compensation paid, contribution to fragmentation of the landscape, net change in forest cover per, percent of lines for which vulnerable, threatened, or endangered species have been identified and action has been taken, existence of an up-to-date biodiversity policy, change in affected media due to line installation, hectares of forest cover cleared per year, hectares of trees planted per year, hectares of critical habitat affected by operations, effect on aquatic organisms, percent of lines where mitigation of edge effect is pursued, properties of area media prior to line installation, properties of area media after line installation, cost of reducing vegetation in critical zone vs. cost of outages, relationship between outages and dollars spent, cost of increasing intensity of vegetation management, percent of right of way with vegetation in critical zone, minutes of system outages caused by vegetation, dollars spent on vegetation management per year, cost per hectare managed by practice, percent of hectares managed by practice, cycle time by method of vegetation management, percent of lines with up-to-date vegetation management, existing reliability vs. cost of upgrading plans, existing efficiency vs. cost of upgrading, megawatts transferred per value of fixed assets, transmission line efficiency, average system outage frequency, average system outage time, waste poles, line,</i>
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	<i>and other hardware recycled or reused, cost per kilometer of line, number of regulatory violations by type, total kilometers of line by voltage, export/import ratio and capability, percent of time that the system has 100% transfer capability, percent of time capable of meeting demand, percent of in-service dates met, Average lifetime of infrastructure, Variance in expenditures from budget, Investment in R&D by type, reportable and non-reportable spills including unintended releases, percent of wood used that is treated, percent of wood used that is treated, workforce representative of provincial demographics, classification of employees (full-time, part time, temporary), ratio of lowest wage to provincial minimum, net employment creation, percent of contracts with provincial suppliers, stakeholder satisfaction with programs to mitigate effects of transmission line installation, benefits shared with affected communities, percent of employment sourced from local communities, percent of purchase orders placed with aboriginal companies, percent of suppliers with an up-to-date sustainable development policy</i>
Clemens (2006)	<i>Environmental policy, Investment in Environmental responsiveness, Environmental consciousness</i>
Sarkis (2006)	<i>Water consumption, energy usage, organics emitted, and sludge emitted by the facility</i>
Hervani et al.(2005)	<i>Fugitive non-point air emissions, stack or point air emissions, discharges to receiving streams and water bodies, underground injection on-site, releases to land on-site, discharges to publicly owned treatment works, other off-site transfers, on-site and off-site energy recovery, on-site and off-site recycling, on-site or off-site treatment, non-production releases, source reduction activities, spill and leak prevention, inventory control, raw material modification, process modifications, cleaning and decreasing, surface preparation and finishing, product modifications, pollution</i>

	prevention opportunity audits, materials balances audits, employee and participative management, publicly available missions and values statement(s), management systems pertaining to social and environmental performance, magnitude and nature of penalties for non-compliance, number, volume, and nature of accidental or non-routine releases to land, air, and water, costs associated with environmental compliance, environmental liabilities under applicable laws and regulations, site remediation costs under applicable laws and regulations, major awards received, total energy use, total electricity use, total fuel use, other energy use, total materials use other than fuel, total water use, habitat improvements and damages due to enterprise operations, quantity of non-product output returned to process or market by recycling or reuse, major environmental, social, and economic impacts associated with the life cycle of products and services, formal, written commitments requiring an evaluation of life cycle impacts, programs or procedures to prevent or minimize potentially adverse impacts of products and services, procedures to assist product and service designers to create products or services with reduced adverse life cycle impact
Zhu and Sarkis (2004)	Reduction of air emission, reduction of waste water, reduction of solid wastes, decrease of consumption for hazardous/harmful/toxic materials, decrease of frequency for environmental accidents, improve a enterprises environmental situation, increase of investment, increase of operational cost, increase of training cost, increase of costs for purchasing environmentally friendly materials, decrease of cost for materials purchasing, decrease of cost for energy consumption, decrease of fee for waste treatment, decrease of fee for waste discharge, decrease of fine for environmental accidents

Gunasekaran et al. (2004) and Shepherd and Günter (2006)	<i>Asset turns, Autonomy of planning, Horizon of business relationship, Information carrying cost, Order lead time, Product development cycle time, Productivity ratio, Profit to productivity ratio, Profit, Rate of return on investment, Ratio of profit to total assets, Sales, Sensitivity to long-term costs, Total cash flow time, Total cycle time, Total supply chain management costs, Variations against budget, Accuracy of forecasting techniques, Capital tie-up costs, Customer response time, Expansion capability, Order entry methods, Perceived effectiveness of departmental relation, Percentage decrease in time to produce a product, Planning process cycle time, Product development cycle time, Total supply chain response time, Use of new technology, Value-added productivity, Cash-to-cash cycle time, Cost of goods sold, Fill rate, Human resource productivity, Incentive cost and subsidies, Intangible cost, Mix flexibility, New product flexibility, Number of new products launched, Order flexibility, Overhead cost, Percentage sales of new product compared with whole sales for a period, Perfect order fulfillment, Source Buyer-supplier partnership level, Distribution of decision competences between supplier and customer, Information availability, Mutual trust, Satisfaction with knowledge transfer, Satisfaction with supplier relationship, Supplier cost-saving initiatives, Extent of mutual assistance leading in problem-solving efforts, Extent of mutual planning cooperation leading to improved quality, Level of supplier's defect-free deliveries, Percentage of late or wrong supplier delivery, Supplier assistance in solving technical problems, Supplier lead time against industry norm, Supplier's booking-in procedures, Efficiency of cash flow method, Efficiency of purchase order cycle time, Information accuracy, Information timeliness, Purchase order cycle time, Quality and frequency of exchange of logistics information between supplier and customer, Quality of perspective taking in supply</i>
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	<i>networks, Storage costs per unit of volume, Supplier ability to respond to quality problems, Supplier pricing against market, Supplier rejection rate, Make Capacity flexibility, Disposal costs, Capacity utilization, Economic order quantity, Average backorder level, Cost per operation hour, Inventory investment, Inventory range, Inventory turnover ratio, Production flexibility, Range of products and services, Stock capacity, Volume flexibility, Work in process, Effectiveness of master production schedule, Inventory accuracy, Inventory obsolescence, Manufacturing lead time, Number of backorders, Number of stock outs, Percentage of wrong products manufactured, Planned process cycle time, Stock-out probability, Total cost of resources, Inventory cost, Inventory flow rate, Manufacturing cost, Number of items produced, Number of tasks worker can perform, Percentage of defects, Percentage of excess/lack of resource within a period, Time required to produce a particular item or set of items, Time required to produce new product mix, Warehouse costs, Deliver Delivery efficiency, Delivery flexibility, Delivery lead time, Delivery performance, Delivery reliability, Effectiveness of enterprise distribution planning schedule, Flexibility of service system to meet customer needs, Total logistics costs, Transport flexibility, Delivery costs, Delivery reliability performance, Distribution costs, Driver reliability for performance, Effectiveness of delivery invoice methods, Effectiveness of delivery invoice methods, Effectiveness of distribution planning schedule, Frequency of delivery, Number of on-time deliveries, Percentage of on-time deliveries, Percentage accuracy of delivery, Percentage of finished goods in transit, Quality of delivered goods, Responsiveness to urgent deliveries, Shipping errors, Transport costs, Achievement of defect-free deliveries, Average earliness of orders, Average lateness of orders, Delivery reliability performance, Effectiveness of delivery invoice</i>
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	<i>methods, Information richness in carrying out delivery, Number of faultless delivery notes invoiced, On-time delivery of goods, Percentage of urgent deliveries, Personnel costs per unit of volume moved, Product lateness, Quality of delivered goods, Quality of delivery documentation, Transport costs per unit of volume, Transport productivity, Return Customer satisfaction, Level of customer perceived value of product, Customer complaints, Customer query time, Rate of complaint, Flexibility of service systems to meet particular customer needs, Product quality, Warranty/returns processing costs</i>
Hervani et al. (2005) and Patlitzianas et al. (2008)	<i>Dependence on imports, Dependence on imports of solid fuel, Dependence on natural gas imports, Dependence on oil imports, Differentiation of energy fuel, Differentiation of fuel of electrical energy production, Differentiation of primary fuel, Process modifications, Publicly available missions and values statements, Raw material modification, Source reduction activities, Strategic oil supplies, Competitive market, Adjustment of energy pricelist, Dividing of public enterprise, Efficiency of electrical energy production, Efficiency of energy conversion, Energy intensity, Energy law for the reforming and privatization of energy enterprises, Habitat improvements and damages due to enterprise operations, Independent energy regulator, Level of competition, Major awards received, Per capita electrical energy consumption, Per capita energy consumption, Per capita fuel consumption, Per capita fuel consumption, Private participation, Quantity of non-product output returned to process or market by recycling or reuse, Total electrical energy consumption, Total energy consumption, Total fuel consumption, Total water consumption, Transformation of energy sector, Environmental protection, Application of Kyoto protocol, Emitted CO2 per capita, Emitted CO2 per electricity and steam production, Emitted CO2 per GDP, Emitted CO2 per gross</i>

	<i>domestic energy consumption, Environmental liabilities under applicable laws and regulations, Formal, written commitments requiring an evaluation of life cycle impacts, Indicators of intensity of emitted CO₂, Non-production releases, On-site and off-site energy recovery, On-site and off-site recycling, On-site or off-site treatment, Percentage of renewable energy sources in the electrical energy production, Percentage of renewable energy sources in the primary energy production, Procedures to assist product and service designers to create products or services with reduced adverse life cycle impact, Programs or procedures to prevent or minimize potentially adverse impacts of products and services</i>
Norman and MacDonald (2004)	<i>Existence of equal opportunity policies or programs, Percentage of senior executives who are women, Percentage of staff who are members of visible minorities, Percentage of staff with disabilities, Percentage of employees represented by independent trade union organizations or other bona fide employee representatives, Percentage of employees covered by collective bargaining agreements, Number of grievances from unionized employees, Evidence of substantial compliance with international labor organization guidelines for occupational health management systems, Number of workplace deaths per year, Existence of well-being programs to encourage employees to adopt healthy lifestyles, Percentage of employees surveyed who agree that their workplace is safe and comfortable, Number of children working, Whether contractors are screened (or percentage screened) for use of child labor, Percentage of pre-tax earnings donated to the community, Involvement and/or contributions to projects with value to the greater community, Existence of a policy encouraging use of local contractors and suppliers</i>
Zhu et al. (2005), Wang	<i>Capacity utilization, Cost variance from expected costs, Inventory levels, Labor efficiency, Supplier cost-saving initiatives, Amount of</i>

(2012) and Bai et al. (2012)	environmental penalties, Cost for energy consumption, Cost of purchasing environmentally friendly materials, Energy efficiency of systems, Environmental cost performance variance, Environmental costs savings, Fee for waste treatment, Frequency for environmental accidents, Scrap rate, Training costs, Amount of goods delivered on-time, Efficiency of purchase order cycle time, Efficiency of the production lines, Information timeliness, Percentage of late deliveries, Purchase order cycle time, Supplier lead time against industry norm, Supplier's booking-in procedures, Communication speed on environmental issues to supplier's suppliers, Length to time to implement environmental programs, Meeting environmental program implementation period, Speed of acquiring environmental information, Buyer-supplier partnership level, Delivery reliability, Distribution of decision competences between supplier and customer, Extent of mutual assistance leading in problem solving efforts, Extent of mutual planning cooperation leading to improved quality, Information accuracy, Information availability, Level of supplier's defect-free deliveries, Mutual trust, Percentage of wrong supplier delivery, Quality and frequency of exchange of logistics information between, Quality of perspective taking in supply networks, Satisfaction with knowledge transfer, Satisfaction with supplier relationship, Supplier and customer, Supplier assistance in solving technical problems, Supplier rejection rate, Air emission, Consumption for hazardous/harmful/toxic materials, Environmental information accuracy, Environmental information availability, Environmental relationship and cooperation level, Exhaust emissions, Mutual assistance for environmental improvements, Mutual planning for environmental improvements, Mutual trust on environmental issues, Percentage recycled material, Recycling efficiency of the abandoned materials, Solid wastes, Supplier rejection rate, Waste
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	generated from products and materials, Waste water, Materials variety (number of materials available), Product and service variety, Product development time, Product volume variability capabilities, Response to product changes, Supplier ability to respond to quality problems, Amount of environmentally safe alternatives, Rate of the new green products development, Response to environmental programs for suppliers, Response to environmental product requests, Involvement in new product design, Introduction of new processes, Satisfaction with knowledge transfer satisfaction, Technological capability levels, Environmental knowledge transfer satisfaction, Environmental technology levels,, New environmentally sound product development, New environmentally sound processes introduced, Proceeds of the recycled materials to be used
Adivar et al. (2010)	Fill rates, Delivery performance, Order fulfillment, Lead times, Supply chain response times, Production flexibility, Total cost, Costs of goods sold, Value-added productivity, Warranty costs or returns processing cost, Cash-to-cash cycle time, Inventory turnouts, Distribution cost, Inbound-outbound freight costs, Overhead cost, Procurement cost, Delivery performance, Fill rate, Number of beneficiaries reached, Variety of aids provided, Increase in the social welfare, Total cost, Distribution cost, Cost of supplies, Number of relief workers, Amount spent per aid recipient, Donor amount received per time period, Total amount of disaster supplies, Target fill rate achievement average response time, Minimum response time, Units of supply provided, Number of different types of items provided
Farrell (1996), Veleva and Ellenbecker (2001), Krajnc	Fossil fuel consumption, Perceived access to necessary resources, TUR chemicals used at the facility, Energy consumption, Material consumption, Percentage of energy consumption from renewables, Percentage of material consumption from renewables, Water

and Glavič (2003), Yakovleva (2007), Huang and Keskar (2007), Searcy et al. (2007), Cetinkaya et al. (2011), Erol et al.	<i>consumption percentage of water reused, Quantity of each type of energy used, Ratio of total mass to value of product sold, Total annual reduction of fossil fuel consumption, Total annual reduction of water consumption, Amount of annual acid rain, Percentage of change in specific local resources, Average costs of each energy source, Energy consumption per warehouse, Total energy costs, Total material costs, Total water costs energy consumption including transportation and embedded energy in used material, Total energy consumption over the life cycle of a product, Total vehicle miles traveled, Consumption for recycling, Percentage of renewable materials used at a rate lower or equal to the rate of renewal, Total volume of water recovered and reused, Area of contaminated sites, Total CO2 emission air emissions amount permitted, Fraction of suppliers certified under ISO 14000, Number of environmental reports, Number of reportable releases, Number of sites certified under ISO 14000, Tons of TRI releases, Amount of waste generated before recycling (emissions, solid, and liquid wastes) amount of hazardous waste generated, Cost of increasing intensity of vegetation management, Exposure to hazardous substances, Fraction of facilities using HFC powered units, Hectares of forest cover cleared per year, hectares of trees planted per year, Quantity of toxic chemicals released, Total NO and SO emission, Volume of BOD discharge, Volume of nonregulated materials recycled, Amount of greenhouse gases emissions, Amount of PBT chemicals used, Global warming potential, Acidification potential, Total annual reduction of CO2 emission, Average compensation paid, Conventional pollutants released to water, Heavy metal equivalents, Nutrification potential, Photochemical ozone creating, Summer smog potential, CO2 produced per unit delivered, Out of date items in warehouse, Reduction</i>
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	of cargo damage, Total waste costs, Amount of hazardous materials used by contracted service providers, Amount of waste generated by contracted service providers, Costs fraction of purifying air, Percentage of contracted suppliers chosen for environmental reasons, Recycling mass fraction of liquid wastes, Recycling mass fraction of solid wastes, Amount of endocrine disrupting substances used, Amount of POPs used, Ecotoxicity metric, Activities created at industrial zones, Number of accidents, Number of notices of violation, Number of recordable illnesses, Number of recordable injuries, Safety audits, Lost workday injury and illness case rate, Noise level, Number of near misses, Percentage of accident-free workstations, Percentage of work stations with high noise level, Number of fatal accidents, Recordable incident rate, Percentage of workers with some level of hearing loss, Percentage of workers with work-related disease, Costs of health protection of employee, Percentage of suppliers receiving safety training, Annual reduction of accident probability, Human health metric, Incidence of specific diseases compared to the national average, Stress level compared to the healthy level, Costs associated with EHS compliance, Costs attributable to fines and penalties, Environmental liabilities, Environmental responsibility costs, Number of claims for worker compensation, Organization's openness to stakeholder review and participation in decision-making process, Rate of customer complaints and returns, After tax income, Company market share, Growth in shareholder value, Revenue growth, Total annual EHS capital costs, Total EHS operating costs, Customer response time, Order cycle time, Order fulfillment lead time, Amount invested in EHS and community projects, Number of positive/negative press reports on the organization's environmental and social performance, NPV/ROI of each project, Number of stock outs, Inventory carrying cost, Order fulfillment costs, Cost of expediting
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	<i>delivery and transfer process, Foreign exchange rate fluctuation, Number of innovations created through supplier partnerships, Percentage of distributors supporting/implementing take-back policies, Percentage of errors during release of finished product, Percentage of suppliers participating in raw material or packaging LCA, Percentage of suppliers without EHS violations, Total logistics cost, Total value of investments in sustainable development, Warranty costs, Company's image, Investment in sustainability R&D, Truck fill rate, Community development and social justice, Political stability, Aboriginal satisfaction with the decision-making process, Land in the local community used by the company for waste disposal, Number of regulatory violations, Percentage of past commitments fully met, Community spending and charitable contributions, Number of community – company partnerships, Number of employees per unit of product, Average response time to requests for publicly available information, Implementation of a program to improve community outreach efforts, Number of community outreach activities, Social and recreational benefits provided to community, Production flexibility to human needs, Time to market, Concentration of specific contaminants in ambient air at selected monitoring locations, Concentration of specific contaminants in ground waters or surface waters, Percentage of days with poor air quality as result of a facility production, Population growth in the local area, Return policy efficiency, Value fraction of investments in ethical activities, Charity investments, Diversity of market, Importer products vs Domestic products, Local price control efficiency, Percentage of products consumed locally, Percentage of products with explicit product stewardship plans, Percentage of suppliers from the local area, Poverty deduction rate, Revenue fraction of sustainable products, Establishing new employment opportunities, Community</i>
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	quality of life, Income disparity within company and compared to local community and industry, Level of trust by stakeholder category, Quarantine/hold time, Return product velocity, Workforce stability and job security, Number of OSHA citations, Number of OSHA 200 Log entries, Staff sense of team, Average number of hours of employee training per year, Rate of employees' suggested improvements in quality and social and EHS performance, Turnover rate or average length of service of employees, Number of employees receiving EHS training, Percentage of employee suggested EHS improvements implemented in practice, Percentage of workstations with elimination of the hazards through primary (engineering) controls, Percentage of workers reporting complete job satisfaction, Effectiveness of capturing staff feedback, Employee retention rates, Percentage of employees trained in anti-corruption policies and procedures, Percentage of employees who believe that company offers equal opportunities to its staff, Staff preparedness to represent the company in public, Employment rate, Number of workers on long-term contracts, Payment ratio, Absenteeism rate, Number of contracts canceled because of non-compliance with EHS standards, Number of suppliers from developing world communities, Number of suppliers that have been screened against ethical policy; Ratio of basic salary of men to women by employee category, Investments in employee development, Time of employee education, Annual number of applied innovative ideas generated by employees, Average time of an employee illness, Number of suggested improvements by employee, Employee suggested EHS improvements implemented in practice, percentage of workstations with elimination of the hazards through primary (engineering) controls, Equal opportunities to its staff, Staff preparedness to represent the company in public, Suppliers that have been screened against ethical policy, Ratio of basic salary of men to women by
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	employee category status compared to other companies in the industry, Product durability in process failure rate, Percentage of products with updated and complete MSDS, Inventory level, Percentage of biodegradable packaging, Percentage of products designed to be recycled, Percentage of products from recycled material, Rate of defective products, Mass fraction of reusable packaging, Customer satisfaction level, Percentage of products involving use of endocrine disrupting substances, Percentage of products involving use of GMOs, Product lateness, Percentage of products designed for disassembly, Reuse, or recycling, Percentage of products with take-back policies in place, Average life cycle cost of products, Delivery reliability, Number of units of energy consumed during use of product, Percentage of products reused or recycled at the end of the life cycle, Sustainable value-added productivity, Increase in product durability, Percentage of products leased opposed to sold, Total delivery cost
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APPENDIX 2: SCHOLARLY WORK RELATED WITH SSCM

Author/ Year	Topic	Dimension of SSC
Khan et al. (2021)	Supply chain management, Sustainable supply chain, Systematic review, Triple bottom line	SSCM
Kazancoglu et al. (2020)	Fuzzy ANP, green supply chain, operational excellence, performance assessment, sustainability	Green SCM
Darbari et al. (2019)	Closed loop supply chain, AHP–TOPSIS, Triple bottom line, Fuzzy goal programming	Economic, Environmental and Social
(Koberg & Longoni, 2019)	Sustainable supply chain management, Global supply chains, Governance mechanisms	SSCM
Jing et al. (2019)	Green supply chain management, corporate performances	Green SCM
Bastas & Liyanage (2018)	Review, Quality, supply chain and sustainability management practices	SSCM
Chand et al. (2018)	Green supply chain management, ANP	Green SCM
Kazancoglu et al. (2018)	Circular economy, Green supply chain management, GSCM framework, Performance measures	Economic, Environmental
Qorri et al. (2018)	Sustainable supply chain management, Green supply chain management, Performance measurement	Green SCM
Dubey et al. (2017)		
Maestrini et al. (2017)	Review, Distinguish the different components of internal and external SCPMSs	Economic, Environmental and Social
Rajeev et al. (2017)	Review, Sustainable supply chain management, Green supply chain management	SSCM
Bulsara et al. (2016)	Review, Articles are categorized into three groups: scope of the study, research methodology and the sustainability focus of the study	Economic, Environmental and Social
Gosling et al. (2016)	Sustainable supply chain management, Supply chain learning, Supply chain leadership	SSCM
Ahi & Searcy (2015)	Metrics development, Review of various metrics used in Green SCM and SSCM	SSCM
Azadi et al. (2015)	Sustainable supply chain management,	SSCM

Author/ Year	Topic	Dimension of SSC
	Sustainable supplier selection	
Beske-Janssen et al. (2015)	Review, It is focused on the evolution of PM in SSCM	Economic, Environmental and Social;
Boström et al. (2015)	Governance, Explore challenges in governance of global supply chains and networks which prevents them from becoming sustainable and responsible SSCM	SSCM
Bush et al. (2015)	Review, Reviews the integration of sustainability governance in literature on sustainable supply chains and networks	SSCM
Chatha & Butt (2015)	Manufacturing strategy, Manufacturing strategy discipline with a focus on thematic developments	Green SCM
Chin et al. (2015)	Green strategy, Review of the relationship between environmental uncertainty, external integration, and firm performance	Green SCM
Fahimnia et al. (2015)	Review, Thorough bibliometric and network analysis	Green SCM
Govindan et al. (2015)	Green purchasing, Green supplier selection process	Green SCM
Meixell & Luoma (2015)	Sustainable strategy Stakeholder pressure in SSCM	SSCM;
Tajbakhsh & Hassini (2015)	Review, The study proposes a framework with focus on metrics	Economic, Environmental and Social;
Taticchi et al. (2015)	Review, The focus is in the intersection of decision support tools and performance measurement	Economic, Environmental and Social
Touboulic & Walker (2015)	Green strategy Theoretical perspectives used in SSCM research	Green SCM
Zorzini et al. (2015)	Social purchasing, Socially responsible sourcing	Social and Economic
Alexander et al. (2014)	Sustainable strategy, Decision theory concepts used in SSCM	SSCM
Bahrin & Veera Pandiyan (2014)	Green manufacturing, Review on green manufacturing	Green SCM
Beske et al. (2014)	Sustainable strategy, Use of dynamic capabilities in SSCM in food industry	SSCM

Author/ Year	Topic	Dimension of SSC
Bhatia and Chand (2014)	Review, Issues studied in Green SCM literature	Green SCM
Brandenburg et al. (2014)	Review, Review of studies in forward supply chains using quantitative methods that focus on social and environmental factors	SSCM
Chu et al. (2014)	Green manufacturing, Green technology development in Green SCM	Green SCM
Demir et al. (2014)	Green distribution, Review of research in green road transportation	Green SCM
Kanonuhwa and Chimucheka (2014)	Green marketing, Green marketing methods and their impact on purchase behaviour of Generation Y consumers	Green SCM
Lee & Wu (2014)	Green distribution, Review of green vehicle routing problems	Green SCM
Patala et al. (2014)	Green strategy, Review various forms of eco-industrial networks for improving environmental sustainability	Green SCM
Tachizawa & Wong (2014)	Sustainable strategy, Management of sustainability of multi-tier sub suppliers and supply chains SSCM	SSCM
Govindan et al. (2015a)	Closed loop supply chain, Review of recently published papers in closed-loop supply chain and reverse logistics in academic journals	SSCM
Tao and Yin (2014)	Closed loop supply chain, General review of the reverse logistics network literature	Economic
Gaussin et al. (2013)	Green strategy, Environmental footprint methods of manufactured products	Environmental
Igarashi et al. (2013)	Green purchasing, Green supplier selection methods	Green SCM
Taticchi et al. (2013)	Performance measurement, Performance measurement methods in SSCM	SSCM
Winter and Knemeyer (2013)	Review, Review the recent state of thought development across three disciplines (operations, social, and environmental management)	SSCM

Author/ Year	Topic	Dimension of SSC
Chun and Bidanda (2013)	Green purchasing, Sustainable manufacturing published in IJPR	Green SCM
Seuring (2013)	Review, Paper summarizes research on quantitative models for forward supply chains	SSCM
Hassini et al. (2012)	Review, Review of SSCM with focus on matrices	SSCM
Tang and Zhou (2012)	Review, Review of operations research/management science (or/ms) research developments in SD	Green SCM
Abbasi and Nilsson (2012)	Review, A systematic review of five major areas of supply chain management: complexity, costs, mindset, operationalization, and cultural changes and uncertainties	Green SCM
Ashby et al. (2012)	Review, Literature review to understand SSCM structures, processes, connections, and limitations	SSCM
Kronborg Jensen (2012)	Green strategy, Product carbon foot printing development in GrSCM,	Environmental
Dekker et al. (2012)	Green distribution, Review of design, planning, and control in a supply chain regarding decisions of inventory of products, transportation and facility decisions	Green SCM
Sheriff et al. (2012)	Closed loop supply chain, Framework to classify the impact of strategic level decisions on various issues/parameters in reverse logistics	Economic
Hazen et al. (2012)	Closed loop supply chain, Suggests a decision framework by identifying the critical components of the reverse logistics decision-making process	Economic

APPENDIX 3: ASPECTS EMPLOYED IN MODE- DETAILED DESCRIPTION

SUPPLIER RELATIONSHIP MANAGEMENT	
Economic Dimension	
Costs	Various costs are associated with the above benefits. A massive commitment is required by both buyers and suppliers in order to achieve a truly valuable partnership. Buyers may need to put extensive work into the purchasing process. For example, in order to receive the benefits of supplier design suggestions, both the supplier's engineering team and the buyer's product designers must be integrated into the decision-making process. This collaboration can be costly and time consuming. In addition, firms can become captive to their strategic supply partners, due to excessive switching costs. Finally, firms run the risk of partners leaking information gained in a long-term buyer-supplier relationship to competitors or using the information themselves to forward integrate and become a potential competitor
Quality	Quality supplier selection refers to key criteria to select the suppliers that qualify the company's standard of quality. They are supplier performance, selection process and green supplier. While it can be difficult to quantify the quality of a product, this should always be a central component of a supplier evaluation. ISO BS/EN ISO 9001:2000 certification remains the industry standard here, which indicates that the supplier excels in management responsibility, resource management, product realization, and measurement, analysis, and improvement.
Procurement practices	<i>GRI 204</i> addresses the topic of procurement practices. This covers an organization's support for local suppliers, or those owned by women or members of vulnerable groups. It also covers how the organization's procurement practices (such as the lead times it gives to suppliers, or the purchasing prices it negotiates) cause or contribute to negative impacts in the <u>supply chain</u> . The disclosures in this Standard can provide information about an organization's impacts related to procurement practices, and how it manages these impacts.
Environmental Dimension	
Supplier Environmental Assessment	<i>GRI 308</i> addresses the topic of <u>supplier</u> environmental assessment. An organization might be involved with impacts either through its own activities or as a result of its business relationships with other parties. <u>Due diligence</u> is expected of an organization in order to prevent and mitigate negative environmental impacts in the <u>supply chain</u> . These include impacts the organization either causes or contributes to, or that are directly linked to its activities, products, or services by its relationship with a supplier.
Waste	<i>GRI 306</i> addresses the topic of effluents and waste. This includes water discharges; the generation, treatment and disposal of waste; and <u>spills</u> of chemicals, oils, fuels, and other substances. The impacts of water discharges vary depending on the quantity, quality, and destination of the discharge. The unmanaged discharge of effluents with a high chemical or

nutrient load (principally nitrogen, phosphorous, or potassium) can affect aquatic habitats, the quality of an available water supply, and an organization's relationship with communities and other water users. The generation, treatment and disposal of waste – including its improper transportation – can also pose harm to human health and the environment. This is of particular concern if waste is transported to countries lacking the infrastructure and regulations to handle it. Spills of chemicals, oils, and fuels, among other substances, can potentially affect soil, water, air, biodiversity, and human health.
Social Dimension
Child Labor <i>GRI 408</i> addresses the topic of child labor. Abolishing child labor is a key principle and objective of major human rights instruments and legislation, and is the subject of national legislation in almost all countries. Child labor is work that 'deprives children of their childhood, their potential and their dignity, and that is harmful to their physical or mental development including by interfering with their education. Specifically, it means types of work that are not permitted for children below the relevant minimum age.' Child labor does not refer to youth employment or to children working. It refers to a universally-recognized human rights abuse. The internationally-agreed understanding of the meaning of child labor is set out in the International Labour Organization (ILO) Convention 138 'Minimum Age Convention'. The minimum age for hazardous work is 18 years for all countries. Hazardous child labor is defined by Article 3 (d) of ILO Convention 182 'Worst Forms of Child Labour Convention' as 'work which, by its nature or the circumstances in which it is carried out, is likely to harm the health, safety or morals of children.' Due diligence is expected of an organization in order to prevent the use of child labor within its activities. It is also expected to avoid contributing to, or becoming complicit in, the use of child labor through its relationships with others (e.g., suppliers, clients).
Forced or Compulsory Labor <i>GRI 409</i> addresses the topic of forced or compulsory labor. Not to be subjected to forced or compulsory labor is a fundamental human right. According to International Labour Organization (ILO) Convention 29 'Forced Labour Convention', forced or compulsory labor is defined as 'all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily.' Forced and compulsory labor affects all world regions, countries, and economic sectors, and includes workers in both formal and informal employment. Some of the most common forms of forced labor include forced labor in prisons (except for prisoners that have been convicted in a court of law, and whose labor is under the supervision and control of a public authority), human trafficking for the purpose of forced labor, coercion in employment, forced labor linked to exploitative labor contract systems, and debt- induced forced labor, also known as 'debt-bondage' or 'bonded labor'. The victims are most likely from groups subject to discrimination or performing work on an informal or precarious basis. This can include women and girls forced into prostitution, migrants trapped in debt bondage, and sweatshop or farm workers, among other groups. Due diligence is expected of an organization in order to prevent and combat all forms of forced or compulsory labor within its activities. It is also expected to avoid contributing to

or becoming linked to the use of forced or compulsory labor through its relationships with others (e.g., suppliers, clients).
Training and Education
<i>GRI 404</i> addresses the topic of training and education. This includes an organization's approach to training and upgrading employee skills, and performance and career development reviews. It also includes transition assistance programs to facilitate continued employability, and the management of career endings due to retirement or termination.
INTERNAL SUPPLY CHAIN MANAGEMENT
Economic Dimension
Costs
<i>GRI 201</i> addresses the topic of economic performance. This includes the economic value distributed (EVG&D) by an organization: operating costs, employee wages and benefits, payments to providers of capital, payments to government by country, and community investments.
Revenues
<i>GRI 201</i> addresses the topic of economic performance. This includes the economic value generated by an organization. An organization can calculate revenues as net sales plus revenues from financial investments and sales of assets. Net sales can be calculated as gross sales from products and services minus returns, discounts, and allowances. Revenues from financial investments can include cash received as: • interest on financial loans; • dividends from shareholdings; • royalties; • direct income generated from assets, such as property rental. Revenues from sale of assets can include • physical assets, such as property, infrastructure, and equipment; • intangibles, such as intellectual property rights, designs, and brand names.

Environmental Dimension
Emissions <i>GRI 305</i> addresses emissions into air, which are the discharge of substances from a source into the atmosphere. Types of emissions include <u>greenhouse gas (GHG)</u>, <u>ozone-depleting substances (ODS)</u>, and nitrogen oxides (NOX) and sulfur oxides (SOX), among other <u>significant air emissions</u>. <i>GHG emissions</i> GHG emissions are a major contributor to climate change and are governed by the United Nations (UN) ‘Framework Convention on Climate Change’ and the subsequent UN ‘Kyoto Protocol’. This Standard covers the following GHGs: - Carbon dioxide (CO₂) - Methane (CH₄) - Nitrous oxide (N₂O) - Hydrofluorocarbons (HFCs) - Perfluorocarbons (PFCs) - Sulphur hexafluoride (SF₆) - Nitrogen trifluoride (NF₃) Some GHGs, including methane, are also air pollutants that have significant adverse impacts on ecosystems, air quality, agriculture, and human and animal health.
Natural sources’ usage (energy efficiency) <i>GRI 302</i> addresses the topic of energy. An organization can consume energy in various forms, such as fuel, electricity, heating, cooling or steam. Energy can be self-generated or purchased from external sources and it can come from <u>renewable sources</u> (such as wind, hydro or solar) or from <u>non-renewable sources</u> (such as coal, petroleum or natural gas). Using energy more efficiently and opting for renewable energy sources is essential for combating climate change and for lowering an organization’s overall environmental footprint. Energy consumption can also occur throughout the upstream and downstream activities connected with an organization’s operations. This can include consumers’ use of products the organization sells, and the end-of-life treatment of these products. The disclosures in this Standard can provide information about an organization’s impacts related to energy, and how it manages them.
Waste <i>GRI 306</i> addresses the topic of effluents and waste. This includes water discharges; the generation, treatment and disposal of waste; and <u>spills</u> of chemicals, oils, fuels, and other substances. The impacts of water discharges vary depending on the quantity, quality, and destination of the discharge. The unmanaged discharge of effluents with a high chemical or nutrient load (principally nitrogen, phosphorous, or potassium) can affect aquatic habitats, the quality of an available water supply, and an organization’s relationship with communities and other water users. The generation, treatment and disposal of waste – including its improper transportation – can also pose harm to human health and the environment. This is of particular concern if waste is transported to countries lacking the infrastructure and regulations to handle it. Spills of chemicals, oils, and fuels, among other substances, can potentially affect soil, water, air, biodiversity, and human health.
Social Dimension

Human rights <i>GRI 412</i> addresses the topic of human rights assessment. The international standard that establishes the expectations of responsible conduct for organizations with respect to human rights is the United Nations (UN) ‘Guiding Principles on Business and Human Rights’, endorsed by the UN Human Rights Council in 2011. An organization can impact human rights directly, through its own actions and operations. It can also impact human rights indirectly, through its interactions and relationships with others, including governments, local communities and suppliers, and through its investments. Organizations are responsible for their impacts on the entire range of internationally recognized human rights. These rights include, at a minimum, all rights set out in the International Bill of Rights and the principles set out in the International Labour Organization (ILO) ‘Declaration on Fundamental Principles and Rights at Work’. The International Bill of Rights includes the following three instruments: • the UN Declaration, ‘Universal Declaration of Human Rights’, 1948; • the UN Convention, ‘International Covenant on Civil and Political Rights’, 1966; • the UN Convention, ‘International Covenant on Economic, Social, and Cultural Rights’, 1966. In addition to these three key instruments, the international legal framework for human rights includes more than 80 other instruments, from declarations and guiding principles to binding treaties and conventions. They also range from universal to regional instruments. In order to identify, prevent and mitigate negative human rights impacts, an organization can undertake human rights reviews or impact assessments of its operations. It can also implement specialized training that equips employees to address human rights in the course of their regular work. In addition, an organization can integrate human rights criteria in screening, or include human rights criteria in performance requirements when making contracts and agreements with other parties, such as joint ventures and subsidiaries.
Health care and safety <i>GRI 403</i> addresses the topic of occupational health and safety. Healthy and safe work conditions are recognized as a human right and addressed in authoritative intergovernmental instruments, including those of the International Labour Organization (ILO), the Organisation for Economic Co-operation and Development (OECD), and the World Health Organization (WHO): see References. Healthy and safe work conditions are also a target of the Sustainable Development Goals, adopted by the United Nations (UN) as part of the 2030 Agenda for Sustainable Development.¹ Healthy and safe work conditions involve both prevention of physical and mental harm, and promotion of workers’ health. Prevention of harm and promotion of health require an organization to demonstrate commitment to workers’ health and safety. They also require the organization to engage workers in the development, implementation, and performance evaluation of an occupational health and safety policy, <u>management system</u> and programs that are appropriate to the organization’s size and activities. It is essential that workers are <u>consulted</u> in the development of an organization’s occupational health and safety policy, and <u>participate</u> in the processes necessary to plan, support, operate, and continually evaluate the effectiveness of the occupational health and safety management system and programs.

<u>Hazard</u> identification and <u>risk</u> assessment, worker training, and <u>incident</u> identification and investigation are also key to planning, supporting, operating, and evaluating the occupational health and safety management system. In addition to preventing harm, an organization can promote workers' health by offering healthcare services or voluntary <u>health promotion</u> services and programs, which, for example, help workers improve their diet or quit smoking. These additional services and programs cannot serve as a substitute for occupational health and safety programs, services and systems that prevent harm and protect workers from <u>work-related injuries and ill health</u>. All services and programs that aim to prevent harm and promote workers' health are expected to respect workers' right to privacy. Organizations are expected not to use workers' participation in such services and programs, or the health data derived therefrom, as criteria for their decisions regarding employment or engagement of workers, including termination, demotion, promotion or offering of prospects, compensation, or any other favorable or unfavorable treatment.
4.4.2.3.3 Community (compliance, volunteer, charity, and ethic) <i>GRI 413</i> addresses the topic of local communities. In the GRI Standards, local communities are defined as persons or groups of persons living and/or working in any areas that are economically, socially or environmentally impacted (positively or negatively) by an organization's operations. The local community can range from persons living adjacent to an organization's operations, to those living at a distance who are still likely to be impacted by these operations. An organization's activities and infrastructure can have significant economic, social, cultural, and/or environmental impacts on local communities. Where possible, organizations are expected to anticipate and avoid negative impacts on local communities. Establishing a timely and effective stakeholder identification and engagement process is important to help organizations understand the vulnerability of local communities and how these might be affected by the organization's activities. Due to the heterogeneous nature of local communities, an organization is expected to consider the differentiated nature of communities and the distinct and specific vulnerabilities these groups can suffer as a result of the organization's activities.
CUSTOMER RELATIONSHIP MANAGEMENT
Economic Dimension
Customer service Customer service refers to the provision of labour and other resources, for the purpose of increasing that value that buyers receive from their purchases and from the processes leading up to the purchase (Aramyan <i>et al.</i>, 2007). Under customer service, there are four performance measurement factors in tactical decision making level. They are responsiveness, customer order processing and delivery, handling customer complaints and value added services. Responsiveness relates to the way it takes for a firm to respond to a customer query with the required information. It is not unusual for a customer to enquire about the status of order, potential problems on stock availability or delivery. A fast and accurate response to those requests is essential in keeping customers satisfied (Gunasekaran <i>et al.</i>, 2004). The details of supply chain performance for each case study company are discussed in turn.

Customer integration
Customer integration refers to a collaborative relationship between company and customer which recognises some degree of interdependence and cooperation on a specific project or for a specific order agreement (Ellram, 1991). Under customer integration, there are four performance measurement factors in tactical decision making level. They are extent of cooperation to improve quality, information integration, organizational relationship and use of information technology.
Environmental Dimension
4.4.3.2.1 Materials
The inputs used to manufacture and package an organization's products and services can be <u>non-renewable materials</u> , such as minerals, metals, oil, gas, or coal; or <u>renewable materials</u> , such as wood or water. Both renewable and non-renewable materials can be composed of virgin or <u>recycled input materials</u> . The type and amount of materials the organization uses can indicate its dependence on natural resources, and the impacts it has on their availability. The organization's contribution to resource conservation can be indicated by its approach to recycling, reusing and reclaiming materials, products, and packaging. The disclosures in this Standard can provide information about an organization's impacts related to materials, and how it manages these impacts.
4.4.3.2.2 Environmental Compliance
<i>GRI 307</i> addresses the topic of environmental compliance, covering an organization's compliance with environmental laws and/or regulations. This includes compliance with international declarations, conventions and treaties, as well as national, sub-national, regional, and local regulations. The disclosures in this Standard can provide information on an organization's compliance with applicable laws and regulations, and with other instruments concerned with environmental protection.
Social Dimension
4.4.3.3.1 Local Communities (impact)
<i>GRI 413</i> addresses the topic of local communities. In the GRI Standards, local communities are defined as persons or groups of persons living and/or working in any areas that are economically, socially or environmentally impacted (positively or negatively) by an organization's operations. The local community can range from persons living adjacent to an organization's operations, to those living at a distance who are still likely to be impacted by these operations. An organization's activities and infrastructure can have significant economic, social, cultural, and/or environmental impacts on local communities. Where possible, organizations are expected to anticipate and avoid negative impacts on local communities. Establishing a timely and effective stakeholder identification and engagement process is important to help organizations understand the vulnerability of local communities and how these might be affected by the organization's activities. Due to the heterogeneous nature of local communities, an organization is expected to consider the differentiated nature of communities and the distinct and specific vulnerabilities these groups can suffer as a result of the organization's activities.

4.4.3.3.2 Marketing and Labeling
<i>GRI 417</i> addresses the topic of product and service information and labeling and marketing communications. This includes customer access to accurate and adequate information on the positive and negative economic, environmental, and social impacts of the products and services they consume – both from a product and service labeling and a marketing communications perspective. Fair and responsible marketing communications, as well as access to information about the composition of products, and their proper use and disposal, can help customers to make informed choices.
4.4.3.3.3 Customer Privacy
<i>GRI 418</i> addresses the topic of customer privacy, including losses of customer data and breaches of customer privacy. These can result from non-compliance with existing laws, regulations and/or other voluntary standards regarding the protection of customer privacy.

APPENDIX 4: QUESTIONNAIRE

Questionnaire for studying the overall supply chain sustainability performance and measuring the performance of sustainable supply chain on proposed framework

PART 1: To study overall supply chain sustainability performance

Background information of interviewee

1. Please describe what do you do in your job or position?
2. Do you have any responsibilities in sustainable supply chain activities?

Background information on Sustainability

3. What is your company's sustainability policy?
4. How important is sustainability to your company (is it a unique selling point)?
5. Are environmental, social and economic issues given equal consideration?
6. Are you equally considering the sustainability practices for upstream (SCM), within the company (ISCM) and downstream (CRM) activities?
7. Do you follow specific standards (ISO, GRI, etc.)? If so, which ones and why? If not, why?

Supplier Relationship Management

8. Do you use indicators related to the following aspects of economic dimension in your overall sustainability performance measurement:
 - a. Costs
 - b. Quality
 - c. Procurement practices
 - d. Any other main dimension that is not mentioned above?If so, which metrics?
 9. How are they chosen? (Relative to certain standards (ISO, GRI, etc.)? Why?
 10. How are they developed and measured?
 11. Do you use indicators related to the following aspects of environmental dimension in your overall sustainability performance measurement:
 - a. Supplier Environmental Assessment
 - b. Waste
 - c. Any other main dimension that is not mentioned above?If so, which metrics?
 12. How are they chosen? (Relative to certain standards (ISO, GRI, etc.)? Why?
 13. How are they developed and measured?
 14. Do you use indicators related to the following aspects of social dimension in your overall sustainability performance measurement:
 - a. Child Labor
 - b. Forced or Compulsory Labor
 - c. Training and Education
 - d. Any other main dimension that is not mentioned above?If so, which metrics?
- How are they chosen? (Relative to certain standards (ISO, GRI, etc.)? Why?

Internal Supply Chain Management

15. How are they developed and measured?
16. Do you use indicators related to the following aspects of economic dimension in your overall sustainability performance measurement:
 - a. Costs
 - b. Revenues
 - c. Any other main dimension that is not mentioned above?

If so, which metrics?

17. How are they chosen? (Relative to certain standards (ISO, GRI, etc.)? Why?
18. How are they developed and measured?
19. Do you use indicators related to the following aspects of environmental dimension in your overall sustainability performance measurement:
 - a. Emissions
 - b. Natural sources' usage (energy efficiency)
 - c. Waste
 - d. Any other main dimension that is not mentioned above?

If so, which metrics?

20. How are they chosen? (Relative to certain standards (ISO, GRI, etc.)? Why?
21. How are they developed and measured?
22. Do you use indicators related to the following aspects of social dimension in your overall sustainability performance measurement:
 - a. Human rights
 - b. Health care and safety
 - c. Community (compliance, volunteer, charity, and ethic)
 - d. Any other main dimension that is not mentioned above?

If so, which metrics?

23. How are they chosen? (Relative to certain standards (ISO, GRI, etc.)? Why?
24. How are they developed and measured?

Customer Relationship Management

25. Do you use indicators related to the following aspects of economic dimension in your overall sustainability performance measurement:
 - a. Customer service
 - b. Customer integration
 - c. Any other main dimension that is not mentioned above?

If so, which metrics?

26. How are they chosen? (Relative to certain standards (ISO, GRI, etc.)? Why?
27. How are they developed and measured?
28. Do you use indicators related to the following aspects of environmental dimension in your overall sustainability performance measurement:
 - a. Materials
 - b. Environmental Compliance
 - c. Any other main dimension that is not mentioned above?

If so, which metrics?

29. How are they chosen? (Relative to certain standards (ISO, GRI, etc.)? Why?
30. How are they developed and measured?
31. Do you use indicators related to the following aspects of social dimension in your overall sustainability performance measurement:
 - a. Local Communities (impact)
 - b. Marketing and Labeling
 - c. Customer Privacy
 - d. Any other main dimension that is not mentioned above?

If so, which metrics?

32. How are they chosen? (Relative to certain standards (ISO, GRI, etc.)? Why?
33. How are they developed and measured?

BIOGRAPHY

Ourania Areta completed her secondary education at the High School of Etoliko, Greece, and went on undertaking undergraduate studies at Agricultural University of Athens. She then completed her MSc degree at Salford Business School, UK.

