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**SUPPLY CHAIN MANAGEMENT AND SUSTAINABILITY.  
THE CASE STUDY OF A FOOD INDUSTRY**

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**Dedicated to my mother, Vasiliki**

## **Special thanks**

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## **Abstract**

The prevailing approach nowadays is that in order to preserve global resources for future generations – an underlying concept of “sustainability” – business companies must assume an important role in this process. Environmental, economic and social challenges do not stop at the level of single companies but have to be considered alongside the supply chain around which material and information are organized. Through this qualitative research (a case study method was selected), the scope was to analyze a series of crucial variables which are related to sustainable supply chain management. Factors as pressures, barriers, performance were researched. As a case study a food industry with a strong presence both in Greece and on a global level was selected. The results, which emerged, are of great interest and may be used in new academic studies on sustainability issues even outside the food sector. A general conclusion is that a company’s size as well as the culture and commitment of senior management are defining factors for the number, the kind and the successful implementation of sustainable supply chain management practices which will be selected. Also, regarding the correlation between sustainable supply chain management practices and sustainable performance, the results showed that only few of the practices implemented have a positive impact on the economic performance of the company, with most of them affecting positively the social and environmental performance of the company. However, a large-scale quantitative survey is considered necessary, involving more partners of the supply chain and more industries in order to build up a more complete image.

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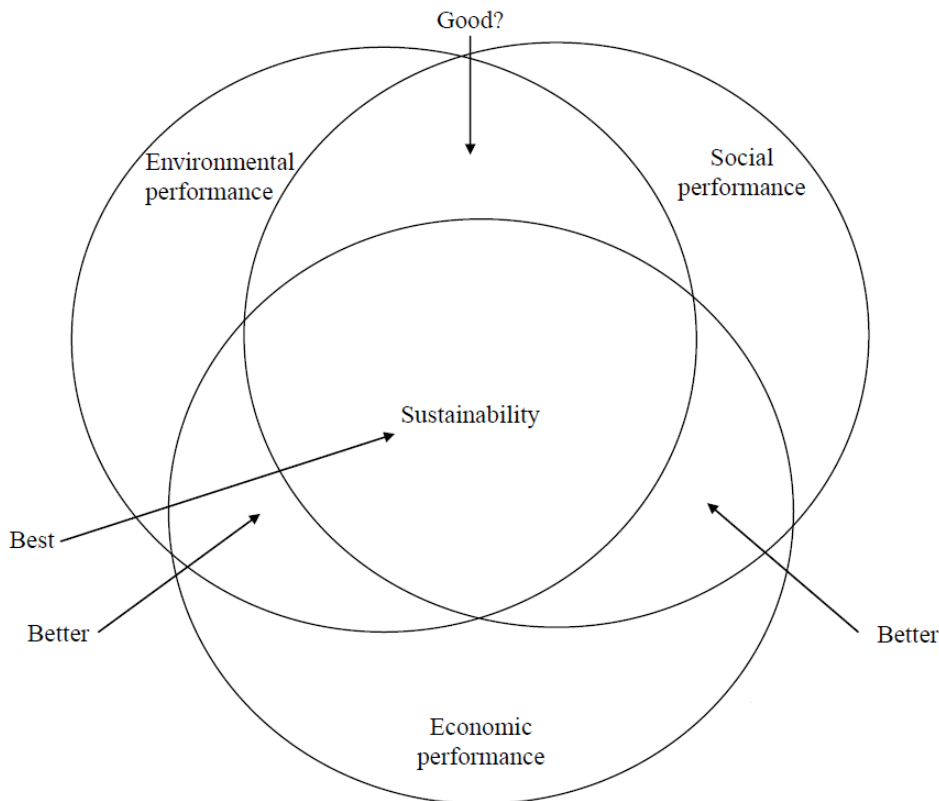
## 1. Introduction

Over the years, firms have been operating globally in a competitive market with a growing need for integrating economical, ecological and social aspects of the Triple Bottom Line (3BL) approach across a supply chain (SC) (Padhi et al., 2018).

Two definitions that are used to define this integration which is called sustainable supply chain management (SSCM) are the following (Ansari and Kant, 2017; Chardine-Baumann and Botta-Genoulaz, 2014; Beske and Seuring, 2014) :

1. *“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”.*
2. *“The strategic, transparent integration and achievement of an organization'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”.*

Sustainability is conceptualized as an outcome of sustainable management. Sustainability (**Figure 1**) can be defined as *“the combination of its economic, social and environmental performance”* (Chardine-Baumann and Botta-Genoulaz, 2014)



**Figure 1.** Sustainable supply chain management and sustainability (Carter and Liane, 2011)

Sustainability has become a huge buzzword nowadays, both in today’s business world and within the broader facets of society. It is difficult, for instance, to walk by a news stand

without seeing at least one magazine cover featuring alternative sources of energy, climate change issues, or the polar bear floating on a thin sheet of ice. Sustainability in the supply chain management plays a critical role for the success of the whole supply chain management (Ageron et al., 2012) and is receiving an increasing level of attention at both local and global levels with more and more companies setting up sustainable structures testing on how to integrate sustainability (Zailani et al., 2012; Ageron et al., 2012).

There is a series of pressures for this rising necessity of sustainable practices implementation, including supply and demand characteristics around energy consumption, an increased understanding of the science relating to climate change, and greater transparency concerning both the environmental and the social actions of organizations (Carter and Liane, 2011). According to Walmart, over 90% of its total emissions related to its operations come from its supply chain. The interesting fact is that more than 20% of global greenhouse gases emissions are made by about 2,500 largest global companies, and their supply chains are responsible for a major proportion of emissions resulting from corporate operations. Due to globalization, distribution channels of goods and services have become very complex and subsequently the socio-economic conditions of the respective regions are a determinant factor success of supply chain networks. Hence, the competition between corporates based on sustainability-oriented innovations has greatly increased (Ageron et al., 2012).

However, the sustainable development does not consider a simple path with barriers being multiple and potentially including top management, financial issues, location, system capacity, culture, type of business etc. (Ageron et al., 2012). Hence, it is important to identify these barriers in the sustainable supply management, either they exist in the focal company or in another supply chain partner.

The connection of the food industry with the sustainable development goals is an important one. Since food consumption and production trends and patterns have a high pressure on the environment, changes in the way food is produced, processed, transported, and consumed have to be considered in order to achieve sustainable development.

To ensure compliance with sustainability, firms increasingly realize the relevance of their supply chain and their dependence on suppliers' and sub-suppliers' environmental or social practices (Grimm et al., 2016). To understand this, take as an example the publicly discussed environmental misbehavior by Nestle's sub-supplier Sinar Mas. This case study shows how a focal firm's (company that usually rules or governs the supply chain, provides the direct contact to the customer and designs the product or service offered) brand can suffer from reports about sub-supplier non-compliance with the brand's practices. Similarly, brands such as Nike and Mattel faced extensive media coverage and public debate due to sub-supplier non-compliance with the brand owner's sustainable practices (Grimm et al., 2016).

Certainly, it is evident that apart from the sustainable management focusing on suppliers, a firm must invest in practices which concern the firm as individual such as environmental, social, sustainable design practices etc. Hence, purchasing and supply chain managers have seen the integration of environmental and social issues, including those embedded in related standards (e.g., ISO 14001) into their daily tasks (Seuring and Müller, 2008).

A series of researchers have explored the relationship between the adoption of SSCM practices and performance outcomes, including environmental social and economic

performance. Therefore, the contemporary knowledge of SSCM has been mixed on the relationships between environmental, social and economic performance and adoption of SSCM practices, reporting inconclusive findings (Esfahbodi et al., 2017; Zailani et al., 2012; Ageron et al., 2012; Ansari and Kant, 2017; Ameer and Othman, 2012; Wang and Sarkis, 2013).

Realizing the importance of SSCM, a systematic research through literature review and empirical analysis has been carried out with the scope of determining the main factors that influence SSCM, the obstacles of implementation, the main sustainable practices implemented in an organization and finally how they affect firm's performance.

## **2. Pressures and barriers in the implementation of sustainable supply chain practices**

Recent studies highlight the increasing pressures from stakeholders for the establishment of sustainable supply chain practices both in the organizations and the supply chain members (Gold et al., 2010). These pressures have caused manufacturing firms to adjust their traditional supply chains to incorporate sustainable inputs in order to provide more and more sustainable products (Esfahbodi et al., 2017). Companies are out of pressure to improve the social and environmental standards whether they can, for instance at their suppliers and further along the supply chain (Zailani et al., 2012). Stakeholders influence SC decision areas differently with some stakeholders being more predominant in certain SC decisions than others (Meixell and Luoma, 2015). In particular, it was found that stakeholders' pressures may create awareness of sustainability issues and influence the adoption of sustainability goals, affecting significantly sustainability implementation (**Figure 2**). The stakeholders' pressures can be classified as internal and external.

### *2.1. External pressures*

- Government regulatory requirements and legislation via penalties, trade barriers and fines in the firms that do not respect regulations is the main coercive driver and one of the most powerful institution which lead manufactures to pursue SSCM practices (Esfahbodi et al., 2017, Gold et al., 2010). The government's role is to provide a long-term vision and a consistent policy framework with the target of producing sustainable products and place them available on the marketplace (Govindan, 2018). Government's target should include encouraging dialogue to support community initiatives in order to challenge the sustainability of current consumption patterns. In this way, it can offer motivation to other participants such as economic instruments and education campaigns that can reinforce value and monitor the success of their act. Finally, government can also contribute by having legal compliance, cleaner production and resource efficiency. Take for example, the UK government. In order to improve sustainable distribution and better design of processes and logistics, has



enacted stringent regional and national environmental regulations to limit the use of non-renewable resources such as diesel and petrol (Esfahbodi et al.,2017).

- Non-governmental organizations (NGOs) pressures is also a significant factor which affects radically the sustainable development more in the social part of sustainable supply chains than the environmental (Meixell and Luoma, 2015). Certainly, NGOs have played an important role in identifying and reporting unsustainable labor practices in factories in third world countries. Indeed, support in information sharing which comes from non-governmental organizations can create awareness and involvement to help an organization in the achievement of best practices. The role of NGOs extends beyond that of a “guardian” and into that of a collaborative partner to firms. The skills and abilities of NGOs and other non-traditional supply chain partners are especially important in helping overcoming institutional barriers and gaps between the focal companies and communities. An example of a focal company which collaborates with NGOs is Starbucks (Argenti, 2004). Starbucks is committed in doing business responsibly and in working with no profit organizations to help communities’ prosperity such as The Philippine Educational Theater Association (PETA) and Teach for the Philippines (TFP) to meet the standards at the area of social responsibility.
- Costumer market sustainability expectations and awareness play an important role as many customers pay special attention and prefer products that have been produced with low levels of harmful emissions (low inputs of land, water, energy, low transportation distances etc.), (Govindan, 2018). Take for example firms such as Nike, Disney, Levi Strauss, Benetton, Adidas or C&A. They have been blamed in recent years for problems occurring during the production of their clothing due to intensive environmental contamination (Seuring, S., & Müller, M. (2008). In the U.S. 80% of the consumers were willing to pay more money for they products if they were produced more environmentally friendly (Govindan, 2018).
- Successful competitors actions lead a company to mimic these practices to succeed itself (benchmarking) (Li et al., 2004). The globalization is one reason for this, since developing countries such as China can learn from their foreign competitors how to implement environmental management practices and then expand to share their experiences to other organizations (Govindan, 2018).
- Investors' coercions constitute a determining factor for the establishment of sustainable practices as they are the market leaders who will lead to a potential increasement of a company's profitability.
- The development cooperation agencies may integrate SC patterns into their sector projects. The building of green economies requires close cooperation between countries with the aim of establishing a new global economic order, reducing conflict-related provisions of the World Trade Organization (WTO) rules and multilateral environmental agreements, promoting green products and services and eliminating all kinds of unreasonable green trade barriers (Fues and Ye,2014).
- The media also influence consumer preferences. Through the traditional ways (e.g. television) and contemporary social media messages, sustainable “philosophy” can

be transmitted to a consumer and sensitize him/her on sustainable lifestyle with vital information including climate change, social responsibility and working conditions in global level.

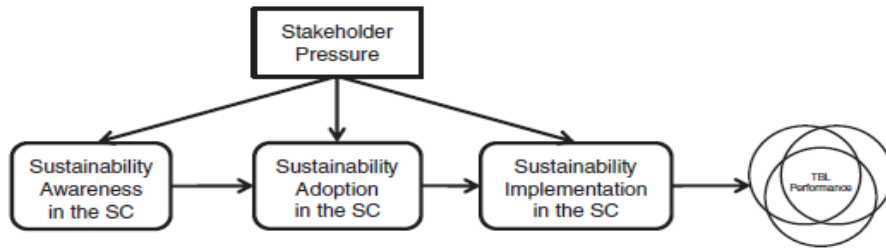


Figure 2. Supply chain management for ‘sustainable’ products. (Seuring and Müller, 2008)

## 2.2. Internal pressures (organizational factors)

- In general, management support and vision consist critical elements for the adoption and implementation of innovations in an organization, especially regarding environmental practices. Organizational innovations may remain stuck at the initial idea stage in the absence of dedicated champions. Top management support can affect new initiatives success by promoting a series of actions. Some of these are employee empowerment and facilitating employee involvement, promoting a cultural shift and an increased commitment by the organization’s employees (Zhu et al., 2008). Top management may also apply practices involving instituting rewards, training and incentives systems with the scope of affecting employee behavior and increasing communication across units by encouraging teamwork in the organization (Zhu et al., 2008).
- Middle management or employees’ commitment (labor sustainability) also play a significant role: To maintain high employee morale and loyalty labor sustainability must be imitated, by ensuring proper working conditions, the health and well-being of employees (Ageron et al., 2012). The level of employee involvement, demands and loyalty play a critical point for the success of sustainable initiatives (Dubey et al., 2017).

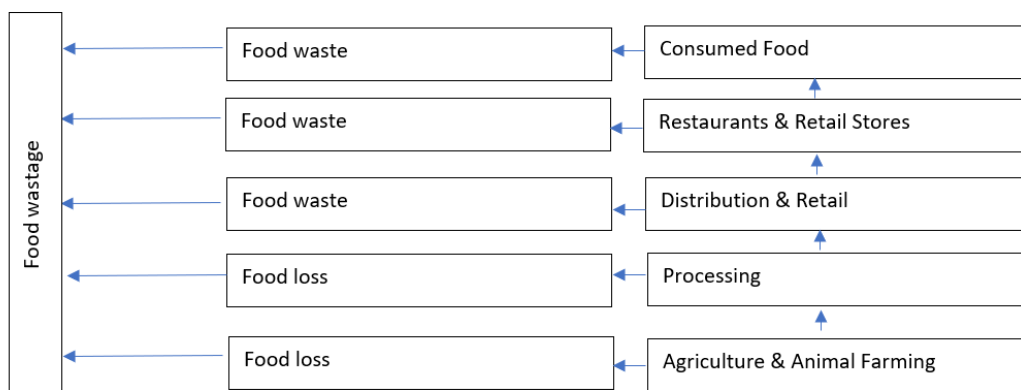
## 2.3. Implementation obstacles

Apart from the pressures that motivate or obligate a firm to implement sustainable supply chain practices, it is clear that a series of barriers make their execution difficult. Many firms fight to engage in SSCM due to high costs and a lack of financial resources (e.g. green investments), (Seuring and Müller, 2008; Ageron et al., 2012). Also, SSCM practices such as conducting audits or running supplier development programs are costly and time consuming. Beside costs and financial factors, product characteristics in combined with personnel related factors such as competences, skills, organizational culture, firm’s top management commitment (which was mentioned above as a pressure of implementation) can lead to the failure of a firm's SSCM initiative (Ageron et al., 2012). Thus, firms need to assure

that their personnel receive required training and build up the necessary competences and skills to address sustainability factors, realizing how these factors are embedded within supply chains. Certainly, in the protentional barriers are included lack of commitment and trust between supply chain partners, lack of supplier competences, lack of information and transparency, cultural and language differences and geographical distance (Grimm et al., 2016).

### 3. Sustainable supply chain management practices

Before researching the main sustainable practices referred in the literature, it would be useful to mention that different sustainable issues are faced in different industries, by different companies in the same business sector and by different SCs (Bourlakis et al., 2014). Retailers in the food industry, for example, must be prepared to demonstrate responsible sustainable practices in addition to offering more environmentally friendly products. Regarding the European food industry, it is made of about 310,000 companies of which 99% are small and medium sized enterprises (SME). The food sector plays a vital role to satisfy the needs of consumers and contributes annually more than 600 billion Euros to the EU economy (Ageron et al., 2012), accounting 2% of European GDP and 13.5% of the European construction sector (Manzini and Accorsi, 2013). The Union is a major exporter of food products with more than 450 billion dollars of products value per year and it has increased its exports by 5% in 2010. Food supply chains are growing and cross-border linkages become necessary, but larger quantities of food production are required to feed the population (Govindan, 2018). A typical agri-food supply chain may consist of a few entities linked from “farm to fork”, such as farmers, input suppliers, co-operatives, transporters, exporters, importers, packhouses, transporters, wholesalers, retailers, and finally consumers (Matopoulos, 2007). Sustainable food supply chain has been constantly a global challenge in the industry. It is estimated that approximately one third of the global food production is wasted or lost annually (**Figure 3**).



*Figure 3. Stages of food wastage (Govindan,2018)*

Nowadays, basic questions are becoming more and more crucial to debate; whether food can be supplied, distributed and consumed in a more sustainable way. Hence, it is essential for stakeholders in the food industry to look beyond their organizational boundaries and to

develop a sustainable food supply chain involving environmental, scientific, market, technology, and social-economic factors (Li et al., 2014).

**After an intensive research in the SSCM literature the main practices which will be analyzed in this study are:**

- Sustainable procurement
- Sustainable design
- Social practices
- Sustainable distribution / storage
- Life cycle assessment (LCA), Life cycle inventory (LCI) & investment recovery
- Sustainable packaging
- Traceability
- Sustainable diets

### *3.1. Sustainable procurement*

Recent surveys reveal that only about 10-15% of corporations require proof that sub-suppliers comply with certain sustainability standards. Much of this ‘proof’ is restricted to formal partners by signed codes of conduct or certifications, e.g. ISO14001 or SA8000 (Grimm et al., 2016). However, the supplier selection process is a critical point for companies as it radically influences organization’s concerns and increases the performance about sustainability. Suppliers must be carefully evaluated and selected Because of their contribution to performance and their essential role in supply chain functioning (Ageron et al., 2012). Initially, companies have to analyze supplier characteristics in order to determine suitable strategies, techniques, operational policies and tools for SSM. Some of the criteria for choosing suitable suppliers should include the relative importance for the company of multinational enterprises, strategic partnerships with suppliers, supplier’s geographic profile, supplier size, non-strategic partnerships, and supplier’s location etc.

The sub-supplier management literature shows that focal firms may apply managerial practices to sub-suppliers to grow up the level of compliance. These sub-supplier management practices can be classified into the two dimensions: assessment (e.g. informal site visits, audits, certifications) and collaboration (e.g. trainings, workshops, corrective action plans) (Grimm et al., 2014) (**Figure 4**). Supplier monitoring (audits) refers to the more informal type of auditing with the purpose of continuously observing suppliers' performance (Grimm et al., 2016). On the other way, collaboration refers to these development programs which are means for corrective actions to support the respective supplier in developing its capabilities (Grimm et al., 2016). Whereas assessment practices have a more unidirectional focus characterized by gathering information and evaluating suppliers' sustainability performance, collaboration practices include interactions with suppliers aiming at a constructive integration of knowledge and a joint development of sustainability solutions (Grimm et al., 2016).

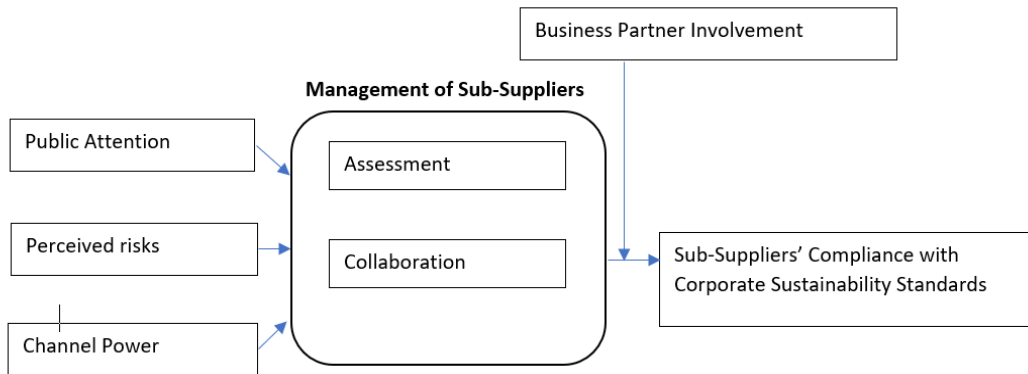


Figure 4. A framework for understanding sustainability compliance in sub-supplier management (Grimm et al., 2016)

Environmental purchasing is a powerful agent for sustainable compliance of suppliers and includes the set of purchasing policies held, actions taken, and relationships formed in response to concerns associated with the natural environment. These concerns relate to the acquisition of raw materials, including supplier selection, evaluation and development, suppliers' operations, inbound distribution, packaging, recycling, reuse, resource reduction and final disposal of the firm's products (Zailani et al. 2012). More specifically, some environmental purchasing activities are:

1. Supplier questionnaires: asking suppliers to provide information about their environmental aspects, activities and/or management systems.
2. Supplier environmental management systems: requesting suppliers to develop and maintain an environmental management system (EMS) though buyer does not require supplier to certify the system.
3. Supplier certification: buyers require suppliers to have an EMS that is certified as fully compliant with one of the recognized international standards, such as ISO 14001 from the International Organization for Standardization (ISO) and the European Union Eco-Management and Audit Scheme (EMAS).
4. Supplier compliance auditing: buyers audit suppliers to determine their level of compliance with environmental requirements.

Furthermore, practices concerning social evaluation of a supplier which are associated with working conditions, labor rights and society will be analyzed later.

### 3.2. Sustainable design

The sustainable design is referred to a firm's individual sustainable practices and it is the philosophy of designing products that comply with principles of sustainability. Sustainable product design plans the importance of the entire life cycle of a product from its raw material selection, conceptual and structural formation, manufacturing, and usage to its end-of-life, reuse, and recycle. No matter where in the product life cycle lies, most of the environmental influence is focused into the product at the design stage when materials and processes are

selected (Howarth and Hadfield, 2006). The main objectives of sustainable product design are to reduce a product's resource use and emission to the environment, as well as improve its socio-economic performance throughout its life cycle, from cradle to grave (Ahmad et al., 2018). The designer first needs an awareness and understanding of complex and issues when applied to a new product. It is also important to be aware of the views and concerns of the people involved with the product. These are the interested parties or stakeholders. Sustainable design is a helpful, emerging tool to improve company's environmental performance by addressing product functionality while simultaneously minimizing life-cycle environmental impacts. The success of sustainable design requires the internal cooperation among the entire company and the external cooperation with other partners throughout the supply chain. (Zhu and Sarkis, 2006).

### *3.3. Social practices*

The importance of the social dimension of sustainable development has increased significantly with more and more stakeholder pressures associated with social topics. Many global initiatives and indices, such as the UN Global Compact, the GRI, the DJSI and the SAM Corporate Sustainability Assessment (SAM) involve social elements and indicators that can be modified and adapted to the plant-level assessments. The social sustainability components of these instruments are presented in the table below (**Table 1**). The main topics usually cover, for instance, health and safety, employee training, human rights, good governance, risk management and local communities. Except from the components presented in the table, it is reported in the research of Grimm et al., 2016 that many organizations require from the suppliers to pass the BSCI Code of Conduct. The BSCI is a division of the Foreign Trade Association (FTA) and "open to all retail, brand and importing companies committed to improving working conditions in the global supply chain". The BSCI's code comprises factors concerning child labor, forced labor, fairness of working contracts, anti-discrimination, working conditions, solidarity, appropriate wages, humane working hours and is in line with commonly accepted standards and principles, i.e. the International Labor Organization (ILO) and the OECD guidelines for multinational enterprises etc. ILO Declaration on Fundamental Principles and Rights at Work includes a series of key principles and rights such as: Freedom of association and the effective recognition of the right to collective bargaining, elimination of all forms of forced or compulsory labor, effective abolition of child labor, elimination of discrimination in respect of employment and occupation (Grimm et al., 2016). Furthermore, a firm may proceed (or ask from the suppliers') compliance with certifications like ISO 26000 (social responsibility), SA8000 (social accountability international), or OHSAS 18001 (health and safety management system), etc. Finally, concerning society, principles about business ethics, code of conduct policies and political contributions policies may be established or/and requested as documented information from the suppliers.

Table 1. Social sustainability components (Husgafvel et al., 2011).

UN Global Compact	<p>Human rights            Principle 1. Businesses should support and respect the protection of internationally proclaimed human rights            Principle 2. Make sure that they are not complicit in human rights abuses            Labor            Principle 3. Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining            Principle 4. The elimination of all forms of forced and compulsory labor            Principle 5. The effective abolition of child labor            Principle 6. The elimination of discrimination in respect of employment and occupation            Anti-corruption            Principle 10. Businesses should work against corruption in all its forms, including extortion and bribery</p>
GRI	<p><i>Labor practices and decent work</i>            Performance indicator aspects: employment, labor/management relationships, occupational health and safety, training and education, and diversity and equal opportunity  <i>Human rights</i>            Performance indicator aspects: investment and procurement practices, non-discrimination, freedom of association and collective bargaining, child labor, forced and compulsory labor, security practices and indigenous rights  <i>Society</i>            Performance indicator aspects: community, corruption, public policy, anti-competitive behavior and compliance  <i>Product responsibility</i>            Performance indicator aspects: customer health and safety, product and service labelling, marketing communications, customer privacy and compliance</p>
SAM Corporate Sustainability Assessment	<p><i>Social dimension</i>            Components: social reporting, labor practice indicators and human rights, human capital development, talent attraction and retention, corporate citizenship and philanthropy, and stakeholder engagement</p>

### 3.4. Sustainable distribution / storage

Logistics plays a crucial role in food supply chain (FSC) from the procurement to the distribution activities. Logistics optimization can be explained as the improvement of the speed, route, load and nature of transport using alternate fuels instead of fossil fuels (energy efficient logistics) and reverse logistics by increasing the utilization of resources, the reuse and recycling of the product etc. Transportation is likely the most critical step throughout the food chain from farm-to-fork, because of the potential stresses affecting the products during the shipments and storage activities. These decisions and issues affect not only costs and logistic efficiency, but also the level of quality of products and processes, the level of sustainability and safety of the supply system with direct and indirect impacts on consumers' safety, health and well-being. In logistic networks, managers can adopt different supporting decision methods and mathematical models to come over strategic issues (such as the proper site of the manufacturing facilities or the distribution centers), tactical issues (e.g. the determination of the materials flows moved within the system and fulfilment decisions) and operational issues (e.g. vehicle routing and delivery scheduling, as well as material handling and inventory), (Li et al., 2014).

Another critical issue in logistics is the design, management and control of warehousing systems. Green warehousing is one of the main SSCM drivers (Dubey et al., 2017) and the importance of a proper warehouse management system for sustainability performance is immense. The use of green energy sources and strategies as well as the adoption of energy-efficient handling technologies are important topics for the future sustainability research. The storage decisions are significantly related with the inventory management and fulfilment problems for perishable and not perishable products (Li et al., 2014). As referred in the research of Dubey et al. (2017) warehouses generate much of the packaging waste in the supply chain. Storage costs in a food SC are another important indicator of chain members' sustainability performance. The use of standard re-usable containers is a solution for this to reduce cost and eliminate waste. Maximizing storage area utilization, minimizing storage cost, and minimizing energy usage are important objectives that are to be taken care of at the warehouses.

### 3.5. Life cycle assessment (LCA), Life cycle inventory (LCI) and investment recovery

An additional significant practice that is used in SSCM is Life Cycle Assessment (LCA). LCA is an inter-organizational effort used to measure the environmental impact of production and is often applied in the food industry (Beske et al., 2014). In particular, life cycle assessment assesses products and processes along the whole life cycle from a “cradle to grave” perspective and is based on the analysis of materials and energy flows at each phase of the life cycle, from the extraction of raw materials to manufacturing, distribution, and finishing with end-of-life processes and activities. (Li et al., 2014).

A typical case study of a corporate implementation and application of a “sustainable business cycle” is represented in the figure below (Figure 5).

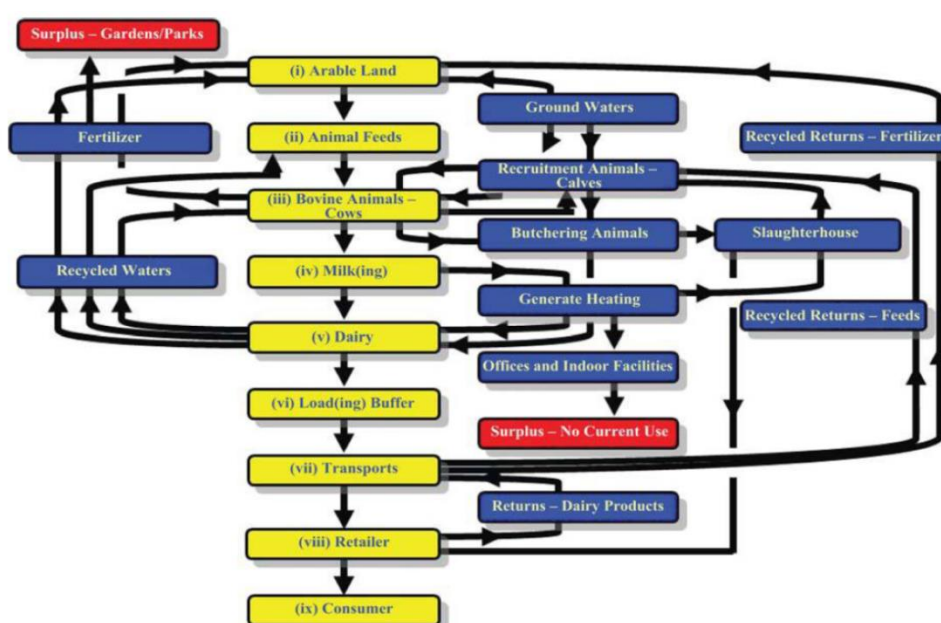


Figure 5. A sustainable business cycle – the case of Wapno (Svensso and Wagner, 2012)



Life cycle inventory (LCI) is the straight-forward accounting of everything involved in the “system” of interest. The life cycle inventory analysis consists of itemizing all inputs (materials and energy resources) and outputs (emissions and wastes to the environment) to and from the product system or process undergoing study. Input and output data are collected and documented for each process contained in the system boundary, including flows of raw materials, energy, products, co-products, wastes, and emissions to air, soil, and water. Data collection may be particularly time-intensive and resource-intensive because it must include all upstream processes (resources extraction, production, and transport) as well as downstream processes (product use and disposal). However, some process data may be available in public or commercial databases, such as Ecoinvent, the Greenhouse Gases Regulated Emissions and Energy Use in Transportation (GREET) model and US LCI. Once the data are compiled, aggregate resource use and pollutant emissions can be calculated to determine environmental loads and material/energy flows per functional unit (Zaimes and Khanna, 2015).

Finally, investment recovery refers to the process of recovering the value of unused or end of life assets through effective reuse or surplus sales. More specifically, it requires the sale of excess inventories, scraps and used materials and excess equipment (Esfahbodi et al., 2017).

### *3.6. Sustainable packaging*

Sustainable packaging is associated with the development and use of packaging which results in improved sustainability and involves an increased use life cycle assessment and life cycle inventory. Packaging, it is often considered only as a burden for the environment and as annoying waste, which fills our dust bins and landfills. Nevertheless, the task of the package is to protect the product, enabling it to reach the consumer in good condition, and thus prevent food losses at distribution, retail and household levels. Hence, sustainable packaging can be defined (Zailani et al., 2012) as *the packaging that adds real value to society by effectively containing and protecting products during movement across the supply chain*. Also, the Sustainable Packaging Alliance (SPA) defines that sustainable packaging should meet the following four principles: packaging should be effective (both cost-effective and functional for all the users in the value chain), efficient (using material resources and energy as efficiently as possible), cyclic (enabling recovery through industrial or natural systems) and safe (as non-polluting and non-toxic and therefore not posing any risk to humans and ecosystems). The main challenge is to find a good balance between the product and the packaging. Some tools that are based at least partly on life cycle assessment (LCA) are also in use, e.g. the PIQET Tool<sup>15</sup> and the Pack-In Tool by Envirowise (Grönman et al., 2013).

According to the literature review the packaging designer should determine the key goals of packaging. First, the package itself has to be safe to the user and to the environment and the package has to fulfil the main requirements set by legislation. Secondly, the package must prevent product losses throughout the supply chain from manufacturing to the grave. The second task can be divided into three main areas (Grönman et al., 2013):

1. The package preserves the product and prevents it from spoiling or breaking.
2. The package enables the use of the whole product (especially with food items).
3. The package sells the product to the right consumer.

In the figure below (**Figure 6**) the main challenges through the product value chain are quoted.

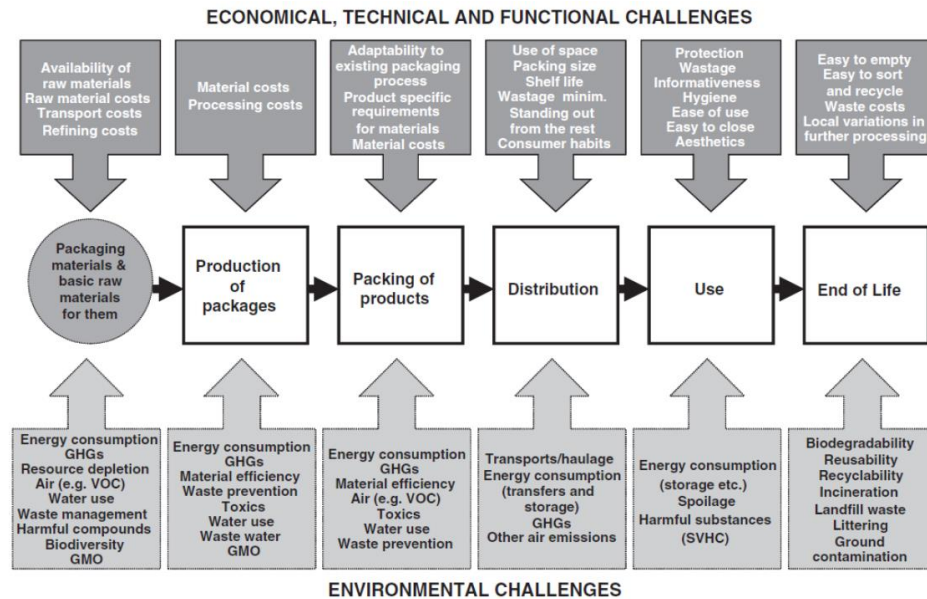


Figure 6. Challenges of packaging along the product value chain (Grönman et al., 2013)

### 3.7.Traceability

Nowadays, food traceability has drawn huge attention. In the context of sustainability, traceability is a tool that assures and verifies sustainability claims associated with products, ensuring that respect for people and the environment all the way along the supply chain exists. Traceability is defined by the European Union Commission as *the ability to trace and follow a food, feed, food-producing animal or substance intended to be, or expected to be incorporated into a food or feed, through all stages of production, processing and distribution* (Li et al., 2014). Traceability is considered as a sustainable factor because it aims in the protection of human health by maximizing the safety of food products, producing food products which are more environmentally friendly and cost less (Ansari, Z. N., & Kant, R. (2017). Traceability should be also a collaborative effort between companies and stakeholders. The most successful traceability schemes are multi-stakeholder, involving business, government, other stakeholders and organizations. According to supported functions, traceability schemes can be distinguished in two types: logistics traceability which follows only the physical movement of the product and qualitative traceability that associates additional information relating to product quality and consumers safety, such as pre-harvest and post-harvest techniques, storage and distribution conditions, etc. (Folinas et al., 2006). The means and technique for identifying the uniqueness of product may differ in each stage of the supply chain (bar-code, papers, RFID tag, computer produced labels, etc. Regarding RFID, the infrastructure behind these systems can help traceability applications for food

supply chain such as tracking short shelf-life products (Ageron et al., 2012). Other applications, as Time Temperature Indicator (TTI) provide a promising opportunity that could lead to effective quality control of the temperature through food chain, optimized stock rotation and reduction of waste, and give some meaningful information on the remaining shelf life of the food product. (Li et al., 2014).

### 3.8. Sustainable diets

Although the concept of a sustainable diet is not a new one, it is a complex issue with many gaps in our understanding of what such a diet might comprise. The term sustainable diet was first introduced in 1986 by Gussow and Clancy in which they argued that promoting food sustainability and ecologic harmony were essential to promoting a healthy diet for the individual (Johnston et al., 2014). According to FAO, 2010 “*sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable, nutritionally adequate, safe and healthy*”. Some potential positive impacts of sustainable diets are described in the table below (**Table 2**).

Table 2. Positive impacts of sustainable diets (Johnston et al., 2014)

Social impacts	Public health (reduced diet-related chronic disease, nutrient deficiencies), psychologic and physical well-being
Environmental impacts	Mitigation of climate change and natural resource depletion
Economic impacts	Employment, trade opportunities, incomes

Some non-governmental organizations such as WWF are promoting practices based on sustainable diets. To ensure that healthy eating equates to sustainable eating, they work with a variety of stakeholders who can help ensure that people everywhere understand the principles of a healthy, balanced, diverse and sustainable diet, and have the relevant information and awareness for sustainable development and lifestyles in harmony with nature ([https://wwf.panda.org/our\\_work/food/sustainable\\_diets/](https://wwf.panda.org/our_work/food/sustainable_diets/)). Concluding, sustainable diets are an emerging area of research and market activity. The challenge for the food industry is to produce healthy foods with low environmental impact that fit into sustainable diets, while remaining affordable and acceptable or even preferred by consumers (<https://fstjournal.org/features/29-1/sustainable-diets>).

## 4. Sustainable performance

Many researchers have investigated the relationship between the adoption of SSCM practices and performance outcomes, including environmental, social and economic

performance (Esfahbodi et al., 2017). It is evident that, efforts to measure sustainability very often fail to integrate environmental, economic and social aspects, resulting in a very narrow focus on the subject (Zhu and Sarkis, 2006). The definitions of the outcomes are the following (Zailani et al., 2012; Santiteerakul et al., 2011):

- Environmental outcomes: defined as positive consequences of green supply chain initiatives on the natural environment inside and outside the firm
- Economic outcomes: defined as financial returns that can actually result from the adoption of sustainable supply chain initiatives
- Social outcomes: defined as a corporate social performance (a set of descriptive categorizations of business activity, focusing on the impacts and outcomes for society, stakeholders and the firm)

Particularly, regarding food systems which wish to be sustainable, the development needs to generate positive value along three dimensions economic, social and environmental with specific targets (**Figure 7**).

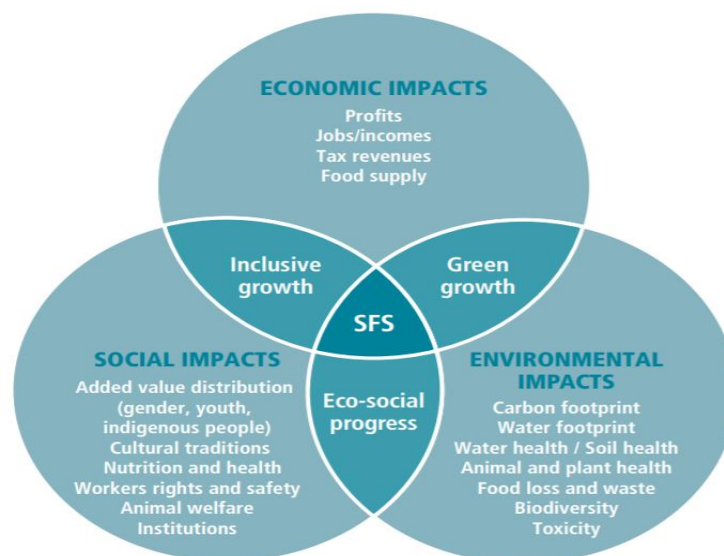


Figure 7. A sustainable food system ( <http://www.fao.org> )

However, it is evident that, due to different business nature, sustainable practices and supply chains, the indicators that are used to measure the sustainable performance have to be evaluated for SC actors to gauge their sustainability contribution and identify where improvement is needed.

Some of the main environmental performance indicators which have been used (Esfahbodi et al., 2017, Zailani et al., 2012) are the reduction of air emission, waste emission, the decrease of frequency of environmental accidents, improvement in compliance to environmental standards, reduction in energy consumption etc. Regarding economic performance indicators like decrease of cost for purchased materials, decrease of energy consumption, reduction of fees and fines, improvement of sales and market share have been selected.

Concerning social indicators, the assessment of social impacts and the calculation of suitable indicators are less well developed compared with environmental indicators (Husgafvel et al., 2011). There is no consensus on the design and use of social sustainable development indicators, which means that their effectiveness in advancing sustainability should be examined critically. Indicators like improvement in firm's image in the eyes of its customers, improvement in relation with stakeholders have used (Zailani, 2012). In the research of Husgafvel et al., 2011 a set of social indicators with their sub-indicators are represented (**Table 3**).

*Table 3. Social sustainability indicators (Santiteerakul et al., 2011)*

<b>Effects on People and Organization</b>	Rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities by region
	Employee job satisfaction (level of satisfaction)
	Employee training satisfaction (level of satisfaction)
	Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with laws and regulations.
<b>Effects on Social Systems and Institutions</b>	Result of life cycle assessment in which health and safety impacts of products and services
	Total number of compliance related with product safety, information transparency, child labor, human rights which caused by supplier's operation
	Supplier satisfaction
	% of suppliers meeting labor and human rights screening criteria
	Results of surveys measuring customer satisfaction
	Total number of compliances related with safety recalls, false advertising

Generally, some of the potential advantages resulting from the implementation of sustainable practices (Zailani et al., 2012) are:

- Cost savings due to reduced packaging waste
- Ability to design for reuse and disassembly
- Reduced health and safety costs, lower recruitment and labor turnover costs resulting from safer warehousing, transportation and better working conditions
- Lower labor costs: better working conditions can increase motivation and productivity of supply chain personnel
- Proactively shaping future regulation: companies that proactively address environmental and social concerns can influence government regulation when this regulation is modeled after a company's existing production and supply chain processes, leading to a difficult-to-replicate competitive advantage for companies and their suppliers
- Reduced costs, shorter lead times, and better product quality associated with the implementation of ISO 14000 standards, which provide a framework for environmental management systems
- Enhanced reputation: engaging in sustainable behavior can make an organization more attractive to suppliers, customers, potential employees and shareholders

Thereafter, it has been carrying out a comprehensive reference to a series of surveys related to the positive or negative correlation between sustainability performance and sustainable supply chain practices implementation.

A systematic research in the UK firms (Esfahbodi et al., 2017) showed that SSCM practices positively affect the environmental performance, resulting in environmental improvements. However, the evidence stated that the adoption of sustainable practices across the supply chain does not necessarily lead to improved economic performance, as only sustainable procurement positively affects economic performance. Although, the impact of the implementation of SSCM practices on economic performance could be further explained through the linkage among environmental and economic performance. In this point of view, the sustainable distribution, sustainable design, and investment recovery constructs that do not directly and positively impact economic performance, indirectly impact economic performance through environmental performance.

In the study of Zailani et al., 2012 it is stated that relying on cost measures alone it would not be provided a truthful picture of supply chain performance. The results of this study showed that environmental purchasing does not have a positive effect on environmental outcome. One of the possible reasons for these results could be that, the responding firms believe that the benefits of these initiatives may reflect on external parties rather than on the firm itself. However, environmental purchasing showed a positive effect on economic, social and operational outcomes. Regarding to the economic outcome, environmental purchasing had a positive effect on a firm's performance in relation to net income and cost of goods sold. On social outcome, the finding indicated that a company adopting social and/or environmental standards can lead to transformation of those standards to suppliers. Finally, the sustainable packaging as it ensures the reduced environmental impact of product spoilage and waste supports promote positive relationship regarding environmental, economic and social outcomes.

Regarding suppliers, the key benefits are numerous including customer satisfaction, quality, innovation, trust, managing supply risk, fill rate, optimal inventory, flexibility, lead time and cost control. For these benefits, practices like ISO 14001, greening logistics, greening production, recycling, remanufacturing, design for sustainable products and processes, reducing carbon footprints, life cycle assessment and costing deserve a generic investment (Ageron et al., 2012).

As is mentioned in the research of Ansari and Kant, 2017 the implementation of SSCM practices increases material, energy efficiency and innovation, enhance organizations' economic performance and creates a brand corporate reputation in the market. It is also referred that a significant cost reduction of up to 17% can be achieved using renewable energy resources in comparison to that of electricity used from the grid and/or natural gas, except from the positive ecological impact. In logistics it is proposed that the use of high productivity freight vehicle (HPFV) during transport can reduce the cost of transportation by 33.5%.

In another study (Ameer and Othman, 2012) it is stated that there are no universally accepted sustainability standards, or methodologies for measuring, assessing and/or monitoring a company's progress towards sustainability. Indeed, various methods, such as

external audit, third party awards/ accreditation processes, standards/codes benchmarking of sustainability can be procured. Overall their statistical results confirm that companies, which place emphasis on sustainability practices, have higher financial performance measured by return on assets, profit before taxation and cash flow from operations compared to those without such commitments in some activity sectors.

In the study of Wang and Sarkis, 2013 the authors conclude that only when carrying out both social and environmental practices, sustainable supply chain management is positively associated with corporate financial performance.

Finally, in the research of Bourlakis et al., 2014 the major results indicate that large dairy manufactures are the sustainability performance champions with the outlook that they should have a central role and responsibility in the implementation of sustainable issues with many performance gaps noticed between the supply chain members.

At the same time, apart from the practices mentioned (see section 3), it was found that the implementation of the quality management practices influences the sustainable performance (Nguyen et al., 2018). More specifically, it was found that quality management practices have significant impacts on dimensions of sustainability performance mainly on economic performance and social performance, followed by environmental performance. According to the research, four quality management practices were identified with an overall contribution to three dimensions of sustainability performance: Top management support for quality management, product/service design, quality data and reporting, and continuous improvement.

**In summary**, the overall findings indicate that sustainable supply chain management practices represent an interesting area of research which obviously requires further research especially in the social performance where the literature is limited.

## **5. Sustainability Issues in Greece**

The global economic crisis has cut down the hard-won development profits of the past several decades. Sustainable development is under threat with fewer resources available to deal with both potential threats and challenges (<https://www.unescap.org>). The financial crisis has prompted companies to move away from the socially responsible behavior as it costs a lot to satisfy a stakeholder's expectations (Giannarakis and Theotokas, 2011). Already during the first wave of global crisis (2008–2010), which has required huge incentives from government, banks and various businesses around the world in order to prevent the breakdown, there was, more or less, orientation that anti-crisis financial packages should be focused more to measures leading to sustainability (Đukić, P. ,2012). Especially in Greece, which has experienced a profound economic crisis, the need to study sustainable performance becomes indispensable.

In Greece, in the middle of 2009, after repeated revisions of the country's deficit and debt figures, an unprecedented national crisis launched, leading the government to ask financial support from the European institutions and the International Monetary Fund. In this difficult situation, the absence of institutional effectiveness proven by all relevant indicators (Global



competitive index, Corruption perception index etc.) made it difficult for a firm to follow a socially responsible strategy (Skouloudis et al., 2014). Furthermore, the recent economic downturn revealed the inefficiency and weaknesses of the business system to maintain steady state growth path. The Greek economy in general and Greek firms in particular are lacking in three major components: trustworthiness, competence and extroversion. The firms have to follow a value creating agenda regarding sustainability (comprising of the economic, legal and ethical expectations), considering that socially responsible firms can emerge from such downturns and are less affected than non-CSR-oriented firms (Skouloudis et al., 2014). Thus, the current crisis gives companies the opportunity to redirect sustainable management issues from a threat to an opportunity.

After a systematic research through literature review which revealed the main pressures such as the obstacles that occur at the implementation of SSCM practices, the practices that are implemented in general and finally the way these practices affect a firm's sustainable performance, it becomes interesting to investigate these factors through an exploratory empirical research.

A single case was selected in order to investigate the main topics that have been discussed about sustainable supply chain management. It was selected since it is considered the most appropriate method for processing a complex issue as sustainable supply chain management, in which a number of partners are involved. In this research, a systematic effort was made in order to analyze this topic from the company's point of view. Thus, the selection of a single case study as a research method was the most suitable way to deeply understand the phenomenon.

The research questions are formulated as follows:

- Q1: Why does a company have to apply SSCM practices?
- Q2: How does SSCM practices implementation influence the environmental, social and economic performance of an organization?
- Q3: How does a company overcome the issues that may occur?

## **6. Research methods**

This research uses a single case to investigate the main topics that have been collected through the literature review about the sustainable supply chain management. A single case is used to enable the in-depth understanding of a complex phenomenon through direct observation without experimental control or manipulation considering both temporal and contextual dimensions (Meredith, 1998). A single case (taking into consideration the debates regarding their reliability), may be a powerful example that can be expanded to more firms through illustrating its conceptual background (Gianni and Goetzman, 2014). Case study method enables a researcher to closely examine the data within a specific context. In most cases, a case study method selects a small geographical area or a very limited number of individuals as the subjects of study (Zainal, 2007). Yin (1984) defines the case study research method "as an empirical inquiry that investigates a contemporary phenomenon within its



real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used.” Also, the detailed qualitative accounts often produced in case studies not only help to explore or describe the data in real-life environment, but they also help to explain the complexities of real-life situations which may not be captured through experimental or survey research (Zailani, 2007). For the reasons referred above, a single case study was selected as the most appropriate research method for this study.

The research construct validity is assured via data triangulation and the establishment of a clear chain of evidence (Yin, 2003). Data was drawn from multiple resources, i.e. interviews, the sustainability report of Coca-Cola 3E, company’s website information, archives and records. These different data sources concluded to the convergence of information. Regarding external validity, a single case enables the analytic, not the statistical “generalization” of its findings (Yin, 2003), since it involves theoretical propositions to be further tested (Jupp, 2006). The internal validity of the case is assured by making inferences and comparing the empirically observed patterns to the ones identified in prior research (Eisenhardt and Graebner, 2007; Yin, 2003).

### *6.1. Sample*

Coca-Cola 3E was selected as the single case for this research. This firm was selected as it is one of the leaders, in the Greek food industry, member of Coca-Cola Hellenic, which is located in 28 countries, constituting the second Coca-Cola bottler worldwide. The company produces 15 brands and all together more than 200 different products and packages, through the largest sales network in the country, having a strong commitment to sustainability.

Coca-Cola 3E is a company with a presence of 50 years in Greece, which managed to overcome a series of difficulties, with the Greek national crisis being one of the main ones. The firm plays a crucial role in the Greek industry, society and economy in general, making it one of the largest capitalization companies in the Greek stock market.

### *6.2. Interview protocol/Data collection/Data analysis*

Eisenhardt (1989) suggests that prior to collecting and analyzing data, a researcher should have a developed protocol. Theory-building researchers typically combine multiple data collection methods such as interviews, observations, and archival sources. In this qualitative research, the data collection technique was a structured interview protocol with a predetermined number of questions (**Appendix 1**) which was designed in line with the previous literature views so as to integrate all the topics concerning sustainable supply chain management, from pressures and barriers to the organization’s performance outcomes of sustainable practices implementation.

Data collection was conducted in the form of two telephone interviews with the Quality, Safety and Environment manager of Coca-Cola 3E of Greece and Cyprus. Field notes were typed up during each interview. Coding was initiated only after data collection was completed. Repeated contacts by phone or e-mail were needed to confirm the chain of

evidence. The coding process followed multiple steps, as recommended by Miles and Huberman (1994), for capturing and interpreting the taken notes and qualitative interview data (Waring and Wainwright, 2008).

## 7. Results

The results are presented on the way the discussion proceeded with the manager based on the interview protocol (**Appendix 1**). Initially, a brief reference is made in the issue of sustainability in general, followed by the SSCM practices applied by the company. Afterwards the pressures and barriers Coca-Cola 3E faced on the implementation of these practices are studied and then the ways these practices affected company's sustainable performance. As it was referred and in the previous section, except for the interviews which were carried out, the analysis of the sustainability report of Coca-Cola 3E in combination with the website information and other news were important secondary sources so as to validate and converge at these findings.

### 7.1. Sustainability in general

*“Certainly, the term of sustainability has a further reading, but there are three main key points”,* the manager mentioned: quality, safety and the environment. As he informed us, sustainability is based on three dominant axioms: A) The assurance that future generations will have the ability to live equally or better than today. *“We cannot waste planet resources at future generations' cost”,* the manager said. B) Company's development and society should co-exist. Notably, he explained it by mentioning that a company can't make profits when society faces serious problems as consumers will not be able to buy the products. C) Big companies, such as Coca-Cola 3E, should have an opinion regarding critical issues and take immediate, targeted actions. He referred issues such as high-fat soft drinks and marine litter which directly concern the company. Finally, he ended up saying that an organization which wishes to be called 'sustainable' is a socially responsible organization. *“The motto is: you cannot produce as there is no tomorrow, you produce because you want tomorrow to exist”.*

### 7.2. Sustainable supply chain management practices

#### A. Practices regarding suppliers

The discussion about SSCM practices started with the process of selecting suppliers. Before starting a collaboration with a raw materials supplier or any other supplier, it is essential for them to sign the guiding principles of the company. These guiding principles, as the manager clarified, are prerequisites for the 100% of suppliers and include a wide range of requirements e.g. confirmation that children are not working at the supplier's company etc. For instance,

Coca-Cola 3E cannot buy sugar from a low-priced supplier who employs children for work. The guiding principles are described analytically on the company's website (<https://coca-colahellenic.com/en/about-us/policies/supplier-guiding-principles/>). He continued claiming that, except for the guiding principles, inspections are also carried out maintaining the right to terminate an active partnership.

#### B. Environmental practices

Concerning the environmental policies, the manager emphasized the significance of water management. In fact, water constitutes the most basic component for the company as a range of products containing water are produced, but also it is a product for sale itself. For this reason, as he added, it is important to use water in the most sustainable way, mentioning that not only the quality of water should be appropriate without being deprived by nature, but also the water process must be done in a sustainable way. Analyzing the practices regarding water management, the manager reported that, with global commitment, in Coca-Cola 3E, the biological treatment water supports aquatic development. Thus, shortly before the water runs out of the rivers, there are fishponds, which is a proof of its purity beyond regular measurements. He also noted that, within plants, water-saving plans with gradual water reduction are implemented as well. The yield is measured in l water / l of product and this ratio is decreasing. Regarding water management programs in general, he referred that for the last 11 years, there is a program 'Mission Water' for many dry islands with projects that increase and improve the quality of water as network improvement, dirty water accumulation, pumping station etc. When he was asked about packaging materials management, he told us that all packages are 100% recyclable with a commitment of 35% of PET to come from recycled PET after proper processing. This target and the sustainable development commitments in total for 2025 are described systematically in a series of external sources (see <https://www.capital.gr/market-news/3318554/coca-cola-hbc-oi-nees-desmeuseis-biosimis-anaptuxis-gia-to-2025>). Regarding energy consumption, which is related to the carbon footprint of the company, he said that energy saving practices are implemented, such as electrical power production from 100% renewable energy sources and provision of high-energy cooling equipment. He ended up informing us that, the company runs an environmental management system 14001 and the European Water Stewardship program.

#### C. Practices regarding distribution and warehousing

Coca-Cola 3E as the largest in transport volume in Greece, signs contracts with transport companies with the stringent environmental and security standards. As he explained, there is a framework of conditions which the transport companies are obligated to follow, such as statutory requirements (good state of the vehicles, manufacturer-based pollutant emissions, wheel change, lubricant storage, etc.). As storage is regarded, he told us that there are two

storage systems: warehouses on the premises and limited external warehouses. Regarding energy consumption of warehouses and storages, he mentioned that there is a series of actions targeting in reducing energy, waste and water. Specific practices such as changing the lighting of warehouses and changing lifting gears using lithium battery lifters, which is a holy contemporary solution, are applied.

#### D. Practices regarding company's employees

According to the manager and concerning the employees, the primary contract they have to sign in is the legislative requirements conformance regarding work (working conditions, etc.). Employee hygiene and safety is some of the main targets for Coca-Cola 3E along with practices such as OHSAS 18001 and the establishment of health and safety committees, which are also referred in the sustainability report of Coca Cola 3E (<https://gr.coca-colahellenic.com/gr/etairiki-ipefthinotita/εκθεση-βιώσιμης-ανάπτυξης-2017/>). Furthermore, the manager told us that, the company takes care for the well-being of employees with a series of practices, informing employees about future activities and targets, educating and evolving them.

#### E. Practices regarding society

- Practices regarding support in young people

*“As this is a part of sustainability, Coca-Cola 3E wants to be in touch with students, university community and young people”.* The manager analyzed some of the programs in this direction. One of these, ‘Youth empowered’, is a project which supports young people with projects, presentations, interviews aiming at their preparation for the competitive labor market. Another practice identical to Youth empowered is ‘Rise’. Rise is a selection process for people who wish to make a career in the company. Finally, a program with a great response concerning students and society broadly is about the renovation of schools (partial or complete) after relevant competitions. All these programs are described systematically in the sustainable report of Coca-Cola 3E (<https://gr.coca-colahellenic.com/gr/etairiki-ipefthinotita/εκθεση-βιώσιμης-ανάπτυξης-2017/>).

- Practices regarding local communities

*“Coca- Cola 3E wishes to create a long-term value for the society and residents by developing the local economy at all”*, he claimed. The manager analyzed volunteering as a practice in this area. For Coca-Cola 3E volunteering exists in two main contexts: a) In time of crisis (earthquakes, fires, etc.), b) Volunteering in social needs, environmental needs, in nursing homes, children's institutions, actions with immigrants.

## F. Practices regarding quality and human nutrition

Concerning the correlation of quality and sustainability, the manager reported that, by providing a quality product, a company ensures sustainability in general. In this way, the company provides products of high-quality standards and security, implementing recognized management systems as ISO 22000, FSSC 22000 and HACCP system (food safety systems) and ISO 9001 (quality management system), systems which are also mentioned in the sustainability report of Coca-Cola 3E (<https://gr.coca-colahellenic.com/gr/etairiki-ipeftthinotita/εκθεση-βιώσιμης-ανάπτυξης-2017/>). Regarding human nutrition the manager said that, the company provides a series of new products emphasizing in the offer of healthier choices mainly in products with reduced sugar content.

### 7.3. *Pressures of implementation*

According to the manager, the main pressure which led Coca-Cola 3E in the implementation of sustainable management practices, is the top management commitment for the company's existence in the future. Legislation requirements very often also force companies to 'transform' by applying sustainable practices e.g. water saving. He continued saying that, the trends of stakeholders undoubtedly constitute an important pressure as they can also change company's strategy. For example, when there was an intensive debate about obesity, the company realized that it could not ignore it and decided to develop new products for consumers who do not want to get extra calories. In this way, the consumer had the choice of choosing the suitable product regarding his/her wishes.

### 7.4. *Barriers of implementation*

*“All these practices referred above are not applicable directly. You are committed in doing it in the future by setting specific goals”.* The manager referred to the practice of recycled PET, to explain this statement. Recycled PET materials are not yet available and need enormous effort and design. As PET is a food-contact packaging, you must make a series of measurements while at the same time persuading consumers increase the recycling rate via a various of actions (e.g. training) to recycle more. Finally, the cost for applying the practices, which in some cases may be significant, should not be neglected. Continuing with suppliers, the problems that exist in everyday life are various. However, as it was mentioned, by working with the sense of the partnership (which is a rather important element of the company) and through long-term cooperation and contact, you build relationships of trust and confidence with suppliers. In this way the company achieves its goals while at the same time “pushes” its suppliers to develop and improve as individuals. The same logic is being followed for customers (supermarkets, wholesalers, etc.). Through partnership and customer centricity, you try to build a win-win situation.

Table 4. SSCM practices and performance

SUSTAINABLE SUPPLY CHAIN MANAGEMENT PRACTICES	ECONOMIC PERFORMANCE	SOCIAL PERFORMANCE	ENVIRONMENTAL PERFORMANCE
Water management practices	<p>+</p> <p>“Water saving plans have a financial footprint but not a significant one. The profit is small because water is not very expensive as its value is relatively low in Greece”</p>	<p>+</p> <p>“The program ‘Mission Water’ has an important social impact”</p>	<p>+</p> <p>“The most important one. For example, in 2017, less than 77,700 m<sup>3</sup> of water were consumed, while the water consumption ratio (in production units) decreased from 1,84 to 1,72”</p>
Recycling of Packaging Materials	<p>+</p> <p>“Large footprint as cost reduction is important”</p>	<p>+</p> <p>“Large footprint; society sees the business positively when doing such actions”</p>	<p>+</p> <p>“The most important one. In 2017 there was a reduction in plastics in some products, saving about 60 tons per year. Also, through the ‘Light weigh project’ practice, 330 tones saved per year, equivalent to 740 tons of CO<sub>2</sub>”</p>
Supporting practices for young people and local communities	<p>-</p> <p>(There is no further comment from the manager)</p>	<p>+</p> <p>“The total value (in Euros) of both actions aimed at supporting the local community and charity events is increasing”</p>	<p>+</p> <p>“Positive footprint in case some environmental practice is applied”</p>
Food quality management systems (e.g. ISO 22000)	<p>-</p> <p>(There is no further comment from the manager)</p>	<p>+</p> <p>“Providing safe and quality products to consumers”</p>	<p>-</p> <p>(There is no further comment from the manager)</p>
Environmental management systems (e.g. 14001)	<p>-</p> <p>(There is no further comment from the manager)</p>	<p>+</p> <p>(There is no further comment from the manager)</p>	<p>+</p> <p>(There is no further comment from the manager)</p>
Practices regarding suppliers’ and external partners’ selection	<p>-</p> <p>“Sometimes you pay more to have the best suppliers”</p>	<p>+</p> <p>“Added value for costumers. Furthermore, the company is driving the potential partners to adopt practices (employee protection, security human rights etc.) aiming to the sustainable supply chain development”</p>	<p>+</p> <p>“The most important one”</p>

SUSTAINABLE SUPPLY CHAIN MANAGEMENT PRACTICES	ECONOMIC PERFORMORMANCE	SOCIAL PERFORMANCE	ENVIRONMENTAL PERFORMANCE
Practices for reducing pollutants and saving energy	+ “It has an important financial footprint as energy has a huge cost”	- (There is no further comment from the manager)	+ “Significant environmental footprint. Energy consumption and energy footprints have declined in production units. In 2017, the carbon footprint improved by 48.7% compared to 2016”
Employee welfare	- (There is no further comment from the manager)	+ “Excellent working environment that is fair, safe and enjoyable with prospects for development (e.g. in 2017 104 employees took on new roles)”	- (There is no further comment from the manager)
Human Rights practices	- (There is no further comment from the manager)	+ (There is no further comment from the manager)	- (There is no further comment from the manager)
Products with reduced calories	- (There is no further comment from the manager)	+ “Providing consumers, a wide range of products to choose from. The average calorific value of the product is 218 units / 1 of product”	- (There is no further comment from the manager)

### 7.5. Sustainability and performance

“A company's profits in general can be characterized as immediate, short-term and long-term and sustainability focus in all of them”, he noted. For this reason, big companies as Coca-Cola 3E move in this direction by applying a set of practices, some of these analyzed before. In the table above ( **Table 4**), which consists a convergence of information that emerged after interviews with the manager and the sustainability report of Coca-Cola 3E, positive or negative correlation (+/-) between SSCM practices and performance is presented, indicating in several cases the way these practices impact sustainability.

Furthermore, except for the economic footprint (positive or negative) which is created for Coca- Cola 3E due to the SSCM practices implementation (**Table 4**) the manager mentioned that thanks to the company’s activity, a positive financial contribution is generated for all the

supply chain members and the economy of Greece in general. As it is also described in the sustainability report (<https://gr.coca-colahellenic.com/gr/etairiki-ipefthinotita/εκθεση-βιώσιμης-ανάπτυξης-2017/>), through Coca-Cola 3E we have job creation, tax contributions, profits that are reinvested in the economy and new investments. Thus, company contributes directly to the country's economy growth. At the same time, through suppliers, service providers, distributors (Greek suppliers and partners are selected in general) and customers, jobs and incomes are created helping indirectly to the country's economic development.

#### 7.6. Sustainability Issues

When the manager was asked about the means the company has followed to overcome sustainability issues ever occurred, he referred on the way the company has managed to overcome the economic issues emerged at the company after 2010 (sales volume reduction 30-40%) due to Greek financial crisis. According to the manager, this was due to the following reasons:

A) *“Companies with deep structures make it easier to cope with and survive in difficult situations”*. Proper organization, experience and commitment of the top management were the key features, the manager told us.

B) According to the manager, great value has been given to the cost. In fact, production costs have been reduced to offer more competitive products on the market.

C) The company has expanded to other sectors. Thus, newer and more innovative products were launched. For example, the company came into the category of coffee and spirits in order to survive and expand.

D) The company invested in the employees through the evaluation, the formation of a culture, the selection of qualified persons and others. *“The more you are tied as a family, the more easily you overcome the difficulties and the crises. Employees are the ones who make the difference in a company”*.

E) *“The company is a member of a multinational group through which it is supported”*. He explained it by saying that, when the company is pressured in one country, the group can help to achieve the balance. In this way, Coca-Cola 3E was not unprotected as many other purely Greek businesses.

### 8. Discussion and conclusions

The case study findings are discussed in this section with the aim of ending up in a series of useful conclusions regarding SSCM.

Coca-Cola 3E through signing guiding principles for all suppliers, achieves their compliance with the preconditions which have been set. Through this process, the company manages to control all suppliers, even the smallest one, which is particularly important for a



large company such as Coca-Cola 3E with a wide range of suppliers. This is in line with the article of Agero et al., 2012 where it is stated that suppliers should be carefully evaluated and selected. Especially, supplier selection process concerning the environmental part is in the same direction with environmental purchasing for suppliers' compliance (Zailani et al., 2012). Therefore, we conclude that the appropriate choice of suppliers consists a dominant part of a company as the supplier is one of the basics participants in a supply chain. Apart from the initial supplier selection, which, as it was mentioned above, is a really important and crucial process, a company should not rest assured and follow other practices as well. According to the results which are in line with Grimm et al., 2016 a company has to conduct visits and look for ongoing cooperation and communication with suppliers in the sense of partnership, aiming at a continuously improving of supplier compliance with company's sustainability standards.

On the environmental side, it is worth emphasizing at the practices of sustainable packaging and sustainable design so as a company to improve its environmental footprint. The practice of using recycled PET as a packaging material which is already processed by Coca-Cola is in this logic. Through the example of recycled PET, we reach one more important conclusion. As it was referred in the article of Zhu and Sarkis, 2006 it is clear that the successful implementation of SSCM practices presupposes both the internal cooperation between the whole company and the external one with other partners throughout the supply chain. To explain this, let us consider the importance (for the achievement of the practice of recycled PET) of the increasing of the packaging recycling rate from customers' side, who are one of the dominant members of a supply chain.

Through this empirical study, we also understand the significance (for a company and the supply chain at all) of the proper management of critical issues such as transportation and storage. As transport is probably one of the most critical steps across the food chain from farm to fork (Li et al., 2014), Coca-Cola 3E cooperates with transport companies by setting strict conditions to the partners. Regarding storage, as warehouses generate much of the packaging waste in the supply chain (Dubey et al., 2017) and large amounts of energy are consumed, Coca-Cola 3E, has adopted energy-efficient handling technologies while, at the same time, it is trying to reduce waste in a minimum possible level.

In the field of social practices, the company seems to have deeply understood the importance of implementing them in order to achieve sustainable growth. Applying practices for employees and partners (denying compliance with global initiatives and other indices mentioned in the literature review), Coca-Cola 3E aims to rise in value through actions which are beneficial for the society, customers and all stakeholders in general.

Regarding pressures, the sustainability manager of Coca-Cola 3E reported as main ones the top management commitment for the company's existence in the future, the trends of stakeholders and the legislation requirements. All these types of pressures were reported in the literature review by Govindan, 2018, Zhu et al., 2008, Esfahbodi et al., 2017, respectively. Thus, we conclude that top management commitment is a decisive factor in a company's sustainability initiatives, while customer and state requirements make it difficult for you to 'stay back'. Furthermore, it is obvious that in companies with Coca-Cola's size and turnover it is not only given the opportunity to follow consumer trends and legislative requirements,

but also to go one step ahead by taking actions that lead to the development, by mobilizing people and authorities to improve.

Analyzing the barriers, the cost, the complexity of implementing practices and the daily problems that may arise are the main issues for Coca-Cola 3E. Regarding the cost of the practices which is reported in the literature as a major barrier, (Seuring and Müller, 2008; Ageron et al., 2012) a big company such as Coca-Cola 3E is not affected at the same extent as a middle-class business. Complexity in the implementation of practices can also be great for a company but through the proper organization, preparation and strategy based on measurable goals, a company manages to implement its plans. Day-to-day problems, such as those that occur in cooperation with the various suppliers and consumers, can be solved through the partnership, targeting in the double-sided growth and satisfaction. The lack of this culture, as mentioned in the article of Grimm et al., 2016, is a major barrier in the implementation of SSCM practices.

Regarding the impact of sustainability practices, the results showed several similarities and contradictions comparing to those studied in literature:

- Concerning the suppliers' selection practices, it is noted that their application has a positive sign in the environmental and social footprint of the company but a negative economic one. These findings contradict with these of Esfahbodi et al., 2017 and Zailani et al., 2012 where it was found that both sustainable procurement and environmental purchasing are positively related to the economic performance. The negative correlation with the economic stamp can be attributed to the fact that a company sometimes wastes more money to have the optimal suppliers. In terms of environmental performance, the results are in line with these of Esfahbodi et al., 2017 where a positive regression is observed. However, the results differ with these of Zailani et al., 2012 where environmental purchasing appeared to have a negative effect on the company's environmental performance with a possible cause that the benefits of these initiatives may reflect on external parties rather than on firm itself.
- In addition, the results showed that the implementation of practices such as energy saving and recycling appeared to be positively correlated with both the environmental footprint and the economic one. This positive economic performance is in line with the findings of Wang and Sarkis, 2013 and Ansari and Kant, 2017.
- Furthermore, it was found that the application of quality systems seems to have a positive effect on the social part as the company ensures the availability of safe and quality products to the consumer, findings that are in the same line with Nguyen et al., 2018.
- Finally, practices in relation to society (especially young people), employees of the company and nutrition present a particularly positive sign in the company's social performance as one of the dominant purposes of a company is the application of practices that are in the context of value creation.

One conclusion that comes out from the above and from **Table 4** is that by looking at the impact of sustainable supply chain management practices to the economic performance of

the company on its own, Coca-Cola 3E benefits in fact. Thus, by reducing energy and saving water, company saves in costs. However, taking into consideration the overall results, most of the practices applied have a positive correlation with social and environmental performance and a negative one with the economic performance. Big companies are not interested only in reducing costs, but also in value creation at each stage of value chain from the supplier of raw materials to the consumer. Coca-Cola's goal is to achieve a positive impact on society and planet while maximizing the creation of shared value for the owners of the business, its employees, shareholders and stakeholders, expecting that the long-term economic pay back will be remarkable.

Furthermore, from the results it is clear that through the company's existence and activity a positive economic footprint is created for all the supply chain members and the economy of Greece in general, contributing in a sustainable supply chain development.

Finally, through the ways Coca-Cola 3E managed to overcome the sustainability issues occurred, we can come to the following general conclusions:

- Big companies (such as Coca-Cola 3E which is a member of Coca-Cola HBC Group) have the capability to face any difficult financial problems that may occur comparing with companies of a smaller turnover and size. Thus, big companies have much more flexibility in both applying more SSCM practices, becoming the pioneers and also resolving more easily any issues often arise.
- Beyond the company's size and turnover, the culture and commitment of senior management consist main keys in resolving various sustainability issues, contributing to the continuous company's progress. At Coca Cola 3E, the proper management of human resources via various of practices (selection, evaluation etc.) and the sound decisions of senior management in general, consisted determinant keys for the company in order to reverse (in the last 3-4 years) the negative trend in sales due to Greek financial crisis.

This research has made a first attempt to include all different variables regarding sustainable supply chain management from pressures to performance with the aim of giving a more complete view. Coca-Cola 3E constitutes a colossus in the Greek food industry where a great number of innovative and remarkable practices concerning sustainable development are implemented, with the goal of contributing to a better tomorrow. We believe that this case provides a systematic view of current research on sustainability issues in the food sector for readers and a useful reference one new academic studies. Furthermore, the information picked up from this case can be used to other business settings and companies through benchmarking.

However, as with any research, this study has some limitations that provide opportunities for further research. The observations and findings are limited to one food supply chain, with the information collected specifically only from one partner's side (Coca-Cola 3E). Field studies may take place within different industries and include companies with other characteristics in terms of sizes and resource levels, beyond the food sector in order to validate and generalize the present research findings.

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## **10. Appendix 1**

### **Interview protocol**

- What does sustainability, sustainable development means for you?
- Have you introduced the "philosophy" of sustainability at your organization as at your supply chain members? If so, how?
- Is there a team in your company dealing with sustainability issues?
- What factors-pressures have driven your company at the implementation of supply chain sustainability practices?
- What practices of sustainability do you apply?
- What are the main obstacles your organization has encountered applying sustainable supply chain practices?
- How did you overcome these obstacles?
- How has the implementation of sustainable supply chain practices affected the environmental, social and economic performance of your organization?