

Sustainable consumption and production in the food supply chain: A conceptual framework



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ABSTRACT

Increased globalization and a growing world population have a great impact on the sustainability of supply chains, especially within the food industry. The way food is produced, processed, transported, and consumed has a great impact on whether sustainability is achieved throughout the whole food supply chain. Due to the complexity that persists in coordinating the members of food supply chain, food wastage has increased over the past few years. To achieve sustainable consumption and production (SCP), food industry stakeholders need to be coordinated and to have their views reflected in an optimized manner. However, not much research has been done concerning the influence of stakeholders and supply chain members' coordination in the food industry's SCP context. To facilitate the theory development for SCP, in this work, a short literature review on sustainable supply chain management and sustainable supply chains in the food industry is provided to give the reader current knowledge on how the past and current research are introduced in this work. Following that, different theories that drive sustainable consumption and production have been identified and focused. As a result, theories like the institutional theory, dynamic capability theory, and stakeholder theory are presented. Additionally, a conceptual framework has been developed by identifying the indicators, drivers, and barriers based on the stakeholder theory to achieve the SCP in food supply chain. Finally, limitations and future scope are discussed.

1. Introduction

In the past 50 years the demand for food has tripled and we have come up to a point where human consumption is 30% higher than nature's capacity to regenerate (Staniškis, 2012). One reason for this increase is the growth in the world's population. The world's population has changed from 2.53 billion in 1950 to an approximate amount of 7.32 billion in 2015 (Statista, 2015).

The dramatic increase in the world's population aligns with the problem that all people need to be nourished. Hence, the food supply chains of yesterday can no longer effectively handle demand, so they need to be restructured. Folkerts and Koehorst (1998) define a food supply chain as "a set of interdependent companies that work closely together to manage the flow of goods and services along the value-added chain of agricultural and food products, in order to realize superior customer value at the lowest possible costs." Due to globalization, food supply chains are growing and cross-border linkages become necessary (Folkerts and Koehorst, 1998), but larger quantities of food production are required to feed the population. This mass production has the consequence of damaging the environment more and more (Nellemann

et al., 2009).

Attention brought to the environment in relation to supply chain management is called sustainable supply chain management (SSCM). The main challenge lies in integrating the two concepts of sustainability and supply chain management (Touboulic and Walker, 2015). SSCM has, for example, been defined by Seuring and Müller (2008) as "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." This definition succinctly features three primary aspects: cooperation between members of the supply chain, the Triple Bottom Line (TBL) approach,¹ and attention to the supply chain stakeholders. In order to achieve SSCM under the challenging circumstances of the food supply chain's changing needs, the topic of sustainable consumption and production (SCP) has to be considered. Food and agricultural systems have particularly changed in the past decades and have affected both consumption and production patterns (Haen and Réquillart, 2014). SCP is one goal of the sustainable development; specifically, its goal is having more efficient and profitable production while

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¹ The Triple Bottom Line approach by Elkington (1994) aligns economic, environmental, and social aspects.

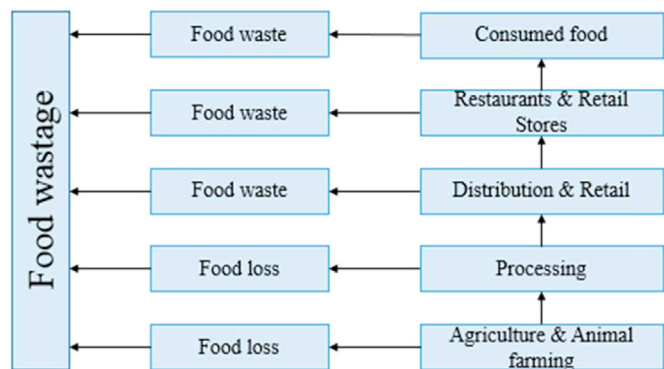


Fig. 1. Stages of food waste; own work.

using fewer raw materials as well as adding value to a product while creating less pollution and waste in the process. Moreover, more consumer needs shall be fulfilled with less energy, water, or waste (Department for Environment, Food and Rural Affairs, 2003). Hence, SCP was defined by the UK Department for Environment, Food and Rural Affairs as “a continuous economic and social progress that respects the limits of the earth’s ecosystems and meets the needs and aspirations of everyone for a better quality of life, now and for future generations to come.” In the past, the topic of SCP has received a good deal of attention. At the Rio Earth Summit in 1992, world leaders pointed out that the unsustainable pattern of consumption and production is a major cause of the deterioration of the global environment (UN, 1992). At the conference Rio+20 in 2012, world leaders adopted a 10-Year framework of programs to improve the international cooperation and to support the initiatives towards SCP in developed as well as in developing countries. In this framework it was stated that in order to achieve sustainable development, SCP has to have a high priority (Akenji and Bengtsson, 2014).

According to the United Nations Environment Programme (UNEP), one of the most striking examples of dysfunction with regard to consumption and production is the issue of food loss and waste. Approximately one third of all food produced worldwide, worth around US \$1 trillion, is lost or wasted in producing or consuming food (UNEP, 2015a). Hereby, a division is made into food loss and food waste. Food loss mainly occurs in the production stage, in harvesting or processing. But significant amounts of food waste occur at distribution, retailer, and consumer segments (Kummu et al., 2012). Almost half of the total food wasted, around 300 million tonnes annually, is due to the fact that

producers, retailers, and consumers abandon food that is still fit for consumption (UNEP, 2015a). As a result, food wastage happens on all stages in the supply chain, as shown in Fig. 1.

One of the focus areas in the SSCM definition cited above is cooperation between supply chain members, and it is also a major challenge to achieving SCP. In order to make food supply chains sustainable and, in particular, the consumption and production areas, the interests of the different supply chain parties have to be coordinated. This paper shall outline the challenges and potential solutions for aligning different supply chain members to achieve SCP with a focus on the drivers and barriers of sustainable consumption and production in the food industry. Using the Stakeholder theory, the main stakeholders will be outlined and analyzed. In addition, potential solutions shall be discussed that could affect the drivers and barriers. Moreover, the study will address whether food wastage can be prevented if the supply chain parties cooperate in a better way. In addition, the indicators for SCP shall be presented. Since indicators provide one of the most effective forms of evaluating success of an SCP programme, they offer a good way to evaluate progress or lack thereof (Veleva et al., 2001). Since this work contributes to the importance of this research field, the discussion in Section 5 will reflect on future research that may be pursued in this field. The question shall be answered what a change to more SCP can achieve and how that goal can be reached. Hence to address the objective of achieving SCP in the food industry, the following research questions have been framed and addressed in this work.

RQ1: What are the theories that can help to achieve SCP?

RQ2: What kind of framework can be suggested that includes drivers, barriers and indicators to achieve SCP?

The rest of the paper is organised as follows. Section 2 concentrates on a literature review which presents an extract on the published literature on SSCM as well as in sustainable supply chain in the food industry. The review section is followed by the theoretical development that presents sustainable development as the overarching goal of SCP and the connection of SCP to the food industry in Section 3. Section 4 provides the theories driving SCP that lay the groundwork for the application of research on the drivers and barriers of the food industry’s SCP as well as the indicators for SCP. The paper ends with the discussion and a conclusion which will also give an introduction to possible future research in Section 5 and Section 6 respectively.

2. Literature review

The following section presents a literature review on the topics of

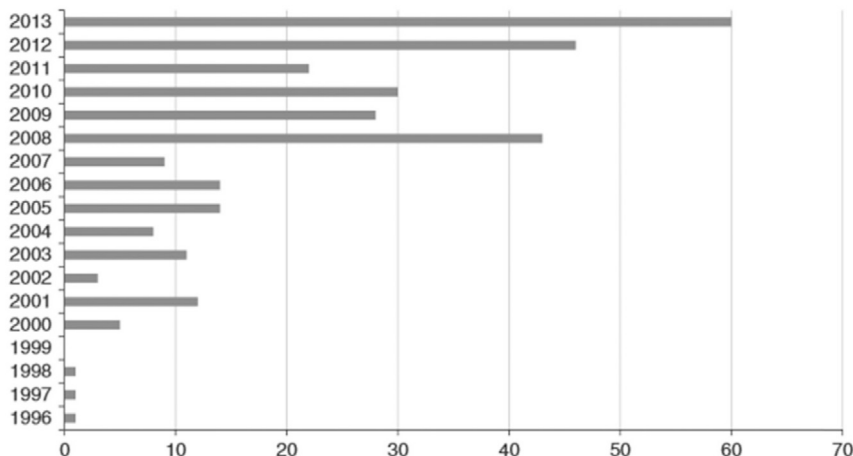


Fig. 2. Number of articles on SSCM by year, based on Touboulic and Walker (2015).

sustainable supply chain management and sustainable supply chains in the food industry. The aim of the literature review is to facilitate theory development and to uncover areas where more research is needed (Webster and Watson, 2002). It will contribute to the proposition that attention for the topic of sustainable supply chain management has increased in the past years and will also contribute to the assertion that it is a main topic in the food industry. The literature review will lay the groundwork for the following theory implications in order to state the challenges and barriers for sustainable consumption and production. Moreover, this topic has gained more attention from recent researchers because of the ever-growing population. The objective of this paper is to identify the current research which considers sustainable supply chain management and sustainable supply chains in the food industry for the SCP. With help from the literature review, the current research within sustainable supply chain management and sustainable supply chains in the food industry will be investigated.

2.1. Sustainable supply chain management

There has been a shift towards sustainability in literature and it empowers companies to integrate more environmental and social issues into their corporate strategies, as argued by Srivastava (2007). Elliott (2012) describes sustainability as the bridge between development and environment. In their work, Touboulic and Walker (2015) conduct a structured literature review on the topic of sustainable supply chain management (SSCM). Their aim is to investigate theoretical perspectives in SSCM and to map the use of theories in the field. They present a line-up of the published literature between 1996 and 2013. This schedule is shown in Fig. 2 and it depicts that there has been a notable emergence of literature studies on SSCM since 2000, with a striking increase in 2008 (Touboulic and Walker, 2015).

Carter and Rogers (2008) performed a large-scale literature review and introduced the concept of sustainability to the field of supply chain management. They demonstrated the relationship between environmental, economic, and social performance within a supply chain. Their work defined SSCM as a strategic collaboration and achievement of a company's environmental, economic, and social goals in the coordination of business processes in order to improve the long-term performance not only of the individual company but also of the entire supply chain (Carter and Rogers, 2008). They also pointed out that the literature on SSCM is dominated by, and mostly restricted to, environmental issues such as green product development, logistics, and waste treatment (Carter and Rogers, 2008). In addition, this fact has been underscored by the work of Seuring and Müller (2008), who observe that SSCM literature is still dominated by green environmental issues, whereas social issues and sustainability as the integration of all three aspects are topics that still seldom addressed. Further, they assert that the integration of all three aspects of sustainability has emerged since 2002 (Seuring and Müller, 2008). A broad review of SSCM studies has been done by several authors (see Gupta and Palsule-Desai, 2011; Seuring et al., 2008; Ahi and Searcy, 2013).

According to Brandenburg et al. (2014) SSCM includes in particular the storage and movement of raw materials and green products throughout the entire supply chain, from the point of origin to a point of sustainable consumption. Their work presents a content analysis of carefully identified papers on quantitative models that address sustainability aspects (Govindan et al., 2014). Furthermore, supply chain managers regard the integration of environmental, economic, and social issues into their daily tasks in order to achieve sustainable performance (Tseng et al., 2015). Nevertheless, according to Seuring and Müller (2008), there exists a need for increased cooperation along the entire supply chain if companies want to reach their sustainability goals. SSCM can lead to a reduction of resources, materials, and waste if a better resource utilization is established (Tseng et al., 2015). Additional advantages of SSCM have been presented by various authors (see Hock and Erasmus, 1999; Carter and Easton, 2011; Liang and Chang, 2008).

Therefore, SSCM contributes to the goals of sustainable development. The topic of sustainable development, as well as sustainable consumption and production in relation to the food supply chains, will be reflected in Section 3.

With a focus on dynamic capabilities Beske et al. (2014) explain how SSCM practices allow companies to maintain control over their supply chain as well as how to achieve a competitive advantage. They categorize SSCM practices with regard to enhanced relationships between supply chain partners and the flow of goods and information. Five different categories have been presented. First, the strategic orientation outlines the company's strategic values (Beske et al., 2014), which, in the case of SSCM, are mostly driven by the Triple Bottom Line approach (Dyllick and Hockerts, 2002). Second, continuity is concerned with the structure of the supply network and the way the supply chain members interact (Beske et al., 2014). This includes the building of long-term relationships and the development of supply chain partners (Pagell and Wu, 2009). Third, collaboration deals with the link of structural aspects to business processes and how partners are technically and logistically integrated (Beske et al., 2014). Fourth, risk management deals with the adoption of various risk management strategies in order to mitigate certain risks in partnership with different supply chain members (Beske et al., 2014). Finally, the pro-activity for sustainability deals with the engagement of various stakeholders (Beske et al., 2014). By engaging stakeholders (for example, customers), organizations get the chance to retaliate pressure and gain more benefits from stakeholder knowledge (Pagell and Wu, 2009). All of the five practices named are applied in the paper and contribute to finding the answer to the research questions mentioned in the introduction.

2.2. Sustainable supply chains in the food industry

The following literature review is limited to findings from three databases, namely, the Web of Science, Scopus, and EBSCOhost. The keywords used as search terms are as follows: sustainable, sustainability, sustainable development, food, supply chain. The results have been limited to only English language sources, and conference papers were excluded. Apart from that, all journal articles were included. The results were reviewed and the appropriate articles were selected to represent the current literature on the topic of sustainable supply chain management in the food industry.

A general review has been presented by Li et al. (2014), who studied recent developments of sustainable food supply chain management in order to examine research issues concerned with this topic. They focused on reviewing key issues and research challenges in this field. Furthermore, Murphy and Adair (2013) also focused their work on the sustainable supply chain management in the food sector. They pointed out that the food sector is under increasing pressure to embrace more sustainable programs and receives greater attention from consumers and media. In addition, they focused on industry initiatives and approaches that have become common in the food industry (Murphy and Adair, 2013). To address the topic of sustainable development, Cojocariu (2012) presented work that focused on the sustainable food supply chain with regard to green logistics. Modern food production and advanced logistics increase the threats on food safety, so this study addresses the topic by presenting patterns of green logistics in food supply chains. Changes in production, logistics, as well as the agricultural and food products industry are topics Jedvall (1999) pursues, with a particular focus on reaching eco-efficiency targets in the food supply chain. Due to the fact that restructuring the food supply chains is challenging, Smith (2008) presented a paper on the topic of developing sustainable food supply chains. The paper was also a contribution to the opportunities to engage consumers and to highlight the importance of cooperation among food manufacturers, retailers, NGOs, and governmental and farmers' organizations (Smith, 2008).

Garnett (2013) explores further problems, challenges, and solutions in connection with the food supply chain. The problem of the

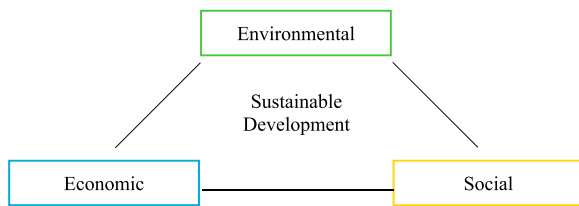


Fig. 3. Dimensions of sustainable development; from previous work with SCP.

environmental impact of the food supply chain is addressed and it is divided into three main categories: production, consumption, and socio-economic challenges. Controlling as well as making the food supply chain more transparent has also been reflected on by several researchers (Hamprecht et al., 2005; Wognum et al., 2011). Hamprecht et al. (2005) pointed out that little is known about how companies can efficiently control their existing supply chain with regard to economic, social, and environmental performance. Further, Wognum et al. (2011) underlined the importance of transparency in food supply chains in order to regain and retain consumer trust, since they wish to be informed. Their work was supported by exploring the current status of information systems to support sustainability in food supply chains. The question of how to achieve a sustainable supply chain has also been answered by various authors (Fabrizzi et al., 2014; Pagan and Lake, 1999; Kaipia et al., 2013). The article written by Pagan and Lake (1999) presents some of the ways the food supply chain – and hence consumption and production – can be made more sustainable through the application of technology, greater resource efficiency, better understanding of consumer demand, and consumer education. They also considered how the food industry is responding to these challenges. Kaipia et al. (2013) focused their work on material and information flows with the application of a case study in the fresh food supply chain, concerning milk, fish, and poultry. Fabrizio et al. (2014) highlighted the effects of short food supply chains and how they can contribute to gaining benefits for the producer, the consumer, and the community.

Research has also been done on different theories that have been used in the sustainable food supply chains. Grimm et al. (2014) focused on the critical factors for sub-supplier management in a sustainable food supply chain perspective. Thus their study explored and increased the understanding of critical factors that help to overcome complexities and challenges of sub-supplier management in relation to the food industry. The topic of corporate social responsibility in food supply chains has been presented by Chkanikova and Mont (2015) who also reflected on the challenges and barriers for food retailers to implement corporate supply chain responsibility. As mentioned in Section 2.1, Beske et al. (2014) concentrated their work on describing how SSCM practices allow companies to maintain control over their food supply chain and to achieve a competitive advantage by implementing dynamic capabilities.

Research on sustainability in food supply chains has been carried out with many different approaches. For example, Iakovou et al. (2014) presented a paper to introduce a methodological framework for the design of green supply chains for the agrifood sector. The framework optimizes the agrifood supply chain design as well as the planning and operations through the implementation of appropriate green supply chain management and logistics principles. A sustainable food supply chain distribution system has been presented by Valdi et al. (2014). They focused on the downstream distribution from producers to customers, a process that plays a significant role in the environmental performance of production supply chains (Valdi et al., 2014). Concerning the redesign of food supply chains in order to become more sustainable, Van der Vorst et al. (2009) developed a simulation model towards logistics, sustainability, and food quality analysis.

Moreover, research on sustainable food supply chains has been performed in different fields of the food industry. Ting et al. (2014) focused their work on quality in a sustainable food supply chain on the wine

industry. Del Borghi et al. (2014) did a work on the evaluation of environmental sustainability in the food industry through a Life Cycle Assessment with a focus on tomato products in the supply chain. Furthermore, Manzini et al. (2014) wrote about transportation issues in the sustainable food supply chain and focused on the shipment of edible oils. Finally, research on food supply chains has been categorized into different countries, including both China and Finland (Kao et al., 2012; Paloviita, 2010).

Food supply chains are a priority area of interest, especially concerning their sustainability. The topic has been examined by many researchers, but there has been little significant research on the ways in which SCP in the food industry might be achieved and what the drivers, barriers, and indicators are. This work will contribute to further research.

3. Theoretical development

In the following section the theoretical development will be presented. This includes an in-depth presentation of sustainable development and sustainable consumption and production in connection with the food supply chain. To present the connection of SCP and food supply chains, the following section will reflect on the topic of sustainable development as the overarching reason for sustainable consumption and production. The presentation will function as a groundwork for the following application of different theories that drive sustainable consumption and production. In particular, the institutional theory, the dynamic capabilities, and the stakeholder theory will be reflected on and applied to research on the drivers and barriers to achieve sustainable consumption and production in the food supply chain.

3.1. Sustainable development and sustainable consumption and production

The main question of sustainable development is “how do we meet the needs of today without diminishing the capacity of future generations to meet theirs?” (OECD, 2001). At a certain level, sustainable development is the approach for moving towards a more sustainable future (Maxwell and Sheate, 2006). It has first been introduced and defined by the World Commission on Environment and Development (WCED, 1987) in 1987 as “Development which meets the needs of the present without compromising the ability of future generations to meet their own needs.” Many governments have committed themselves to meet sustainable development through aligning economic welfare, environmental quality, and social coherence (Böhringer and Jochem, 2007). As shown in Fig. 3 the concept of sustainable development is concerned with the quality of economic growth, human well-being, and the environment. Hence, it connects environmental, economic, and social issues as reflected in the TBL approach (OECD, 2001).

In order to achieve sustainable development when the world has limited resources, establishing sustainable patterns in consumption and production is a necessary requirement. This was recognized by the World Summit on Sustainable Development, Rio+20, and the High Level Panel (HLP)² (UNEP, 2015a). The main goal of SCP is not just an environmental issue; it is also about maintaining natural capital,³ respecting the productivity and capacity of our planet. This awareness will contribute to meet human needs and sustain economic activities (UNEP, 2015a). The importance of SCP and the acknowledgement that an unsustainable pattern of SCP is causing the deterioration of the global environment was

² The World Summit of Sustainable Development (WSSD) was held in Johannesburg, South Africa, in 2002 (World Health Organization, 2015). Rio+20 was the United Nations Conference on Sustainable Development that took place in Rio de Janeiro, Brazil in 2012 (UN, 2015a). In July 2012, Secretary-General Ban Ki-moon announced that the 27 members of a High Level Panel would share advice on the Global Development Framework beyond 2015 (UN, 2015b).

³ Natural capital refers to the combination of finite non-renewable and renewable natural resources that underpins human welfare and development, by using ecological services and systems to absorb pollution (UNEP, 2015a).

declared at the Rio Earth Summit in 1992. Later, in 2002, SCP was declared as a central role of sustainable development aligned with environmental protection and poverty reduction (Akenji and Bengtsson, 2014). In order to support SCP patterns, a 10-Year Framework of Programs (10YFP) was developed at the Rio+20 conference. The framework was supposed to support regional and national initiatives towards SCP in developed as well as in developing countries and to enhance international cooperation (Akenji and Bengtsson, 2014). The formulation of the 10YFP also included the creation of sustainable development goals. Moreover, the formulated goals made clear that achieving SCP should be placed as a high priority; in fact, the HLP declared it to be the core of sustainable development (UNEP, 2015a). The interrelated objectives of SCP are therefore to achieve well-being for people and to keep negative environmental impacts of economic activities within carrying capacity (Akenji and Bengtsson, 2014). In particular, SCP determines the degree of sustainability for the following areas: energy production, agricultural practices, food security, industrial pollution, water quality, biodiversity, marine issues, wood production, and gender equality (Akenji and Bengtsson, 2014).

The UNEP pointed out that a change towards clean and efficient production is necessary and that it is substantial to sustainable development (UNEP, 2015a). They declared three objects to be of major importance by the supply side. First is the sustained provision of natural resources essential to human survival, like water, food, energy, and land. Second, they cite sustained provision of production factors for economic development, including the managing of significant renewable and non-renewable resources like timber, fibre, metals, and minerals. The last but not least important consideration is the reduction of pollution associated with human and economic activity, like greenhouse gas emissions, toxic chemicals, and nutrient release (UNEP, 2015a). A key aspect to achieving SCP is the attention devoted to resource efficiency given by government policies, technology choices, and investments. But as pointed out by Stevens (2010), progress towards sustainability is slow. This is due to difficulties in encouraging corporate responsibility and industrial production that fulfils the basic requirements to be environmentally and socially sustainable (Stevens, 2010). Some latest crises in economic and financial sectors can be traced back to a lack of corporate governance; consequently, a period has been entered in which governmental incentives and regulations address economic, food, and climate crises (Stevens, 2010). The goal should be to deliver more output per unit of input, and to complete the task with less environmental damage (UNEP, 2015a). Furthermore, the achievement of sustainable production can make a contribution towards green, inclusive, and decent employment standards. This is because sustainable agricultural systems are more labor intensive, since they avoid toxic or polluting chemicals (UNEP, 2015a).

Because the world's population continues to grow, consumption has consequently increased. The average consumption per person has tripled in the past 50 years, largely because consumption became equivalent to quality of life (Staniškis, 2012). Achieving sustainable consumption does not have to be about consuming less; instead, it should address consuming better (UNEP, 2015a). If consumption happens more efficiently, it can contribute to being less risky to human health and the environment. The current consumption pattern is a driver for unsustainable production and resource degradation. The first question that should be asked to achieve sustainable consumption is how well consumers are actually informed about the environmental implications of their consumption. If they recognize the power they have over production decisions, it's likely they will make wiser consumption choices (Staniškis, 2012). Sustainable consumption does not only include purchasing behaviours, but also all types of interactions between individuals and infrastructure, like mobility and housing; the concept links livelihood and lifestyle together (UNEP, 2015a). It can therefore contribute to economic benefits, social well-being, and social inclusion in addition to reducing environmental risks. Although sustainable consumption can be

encouraged by policy economic and voluntary instruments, it is a more technically and politically robust system than changing to sustainable production (UNEP, 2015a). Moreover, it raises issues such as human values and lifestyle choices; consequently, sustainable consumption has not seen as many policy initiatives as sustainable production (UNEP, 2015a).

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 taken into account in order to achieve sustainable development (FAO, 2015). According to the Food and Agricultural Organization of the United Nations, "sustainable consumption and production in food and agriculture is a consumer-driven, holistic concept that refers to the integrated implementation of sustainable patterns of food consumption and production, respecting the carrying capacities of natural ecosystems. It requires considerations of all aspects and phases in the life of a product, from production to consumption, and includes such issues as sustainable lifestyles, sustainable diets, food losses and food waste management and recycling ..." (FAO, 2015). Since the food industry is a dynamic industry with continuous changes in customer demand, consumers have a strong influence over the manner they buy, transport, conserve, cook, and consume their food (Van der Vorst and Beulens, 2002). Furthermore, food consumption is affected by food availability, food accessibility and food choice, which can, in reverse, be influenced by demography, geography, income, globalization, or urbanization (FAO, 2015). In 2011, the FAO and UNEP established the Sustainable Food Systems Programme (SFSP), whose main goal was to build capacity for the commitment of more SCP patterns across the food industry and to develop new multi stakeholder engagement to build cooperation towards common goals (FAO, 2015).

Stakeholders play an important role and shall be explored in the next sections with the aim of building a stakeholder framework for the drivers and barriers for the food industry's SCP.

3.2. Theories driving sustainable consumption and production

In the following section, selected theories that drive SCP will be presented in relation to how they contribute to the importance of SCP, why companies have to consider it, and why the topic is especially crucial in the current food industry. These theories are, respectively, the institutional theory, dynamic capabilities theory, and the stakeholder theory. They will also lay the groundwork for the research on the drivers and barriers of SCP and the multiple stakeholders that are affected. The three presented theories are part of the organizational theory. According to Ketchen and Hult (2007), the term organizational theory refers to theorizing about organizations and the organizational theory is in its early stages into supply chain management literature. This work shall provide an insight into how these three selected theories can be applied to the food industry's SCP. Further theories that could be fruitfully pursued in future studies will be considered later in the discussion (Section 5).

3.2.1. Institutional theory

Institutional theory emphasizes the role of environmental pressures and how this pressure influences a company to adopt an organizational practice (Ketchen and Hult, 2007; Sarkis et al., 2011). The institutional theory further provides a tool through which researchers can examine influences that endorse legitimacy of an organizational practice. This includes factors like culture, social environment, regulations, legal environment, tradition and history, and economic incentives, but also an importance of resources (Glover et al., 2014). The main concern of the theory is to acknowledge how organizations secure their positions and legitimacy by following the rules and norms of the institutional environment. These rules are, for example, regulatory structures, governmental agencies, laws, or societal and cultural pressures (Scott, 2007). In

particular the institutional theory points out that external pressure from social, economic, and political aspects influences a company's strategy and has an effect on the decision-making process. This observation is of importance since organizations seek to adopt legitimate practices and to legitimize their practices (Jennings and Zandbergen, 1995). In this case, organizations follow new environmental management rules given by the government, including those that consider key aspects of SSCM. Hence, the institutional theory explains how changes affect decisions regarding green and sustainable activities. These changes can, for example, be changes in social values, technological progressions, and regulations (Ball and Craig, 2010).

One essential element of the institutional theory is that the organization becomes homogeneous as a function of isomorphism over time (Ketchen and Hult, 2007). Within the theory there are three forms of isomorphic drivers; they consequently create isomorphism in organizational strategies, structures, and processes (Sarkis et al., 2011; Glover et al., 2014). These drivers are namely coercive, normative, and mimetic (DiMaggio and Powell, 1983). The first driver, coercive, is performed by those in powerful positions. An example of such a powerful institution would be government agencies. They can influence an organization's actions through, for example, fines and trade barriers (Rivera, 2004). In addition, coercive isomorphic drivers are critical to mandate environmental management and sustainability (Ketchen and Hult, 2007). In recent studies it was shown that coercive pressures by the government promoted voluntary environmental management practices and that organizations were driven towards adopting voluntary green initiatives (Sarkis et al., 2011).

The second driver, normative, drives organizations to adapt in order to be perceived as having legitimate organizational activities (Sarkis et al., 2011). The core normative pressure for organizations results from socially related requirements. These are the customers and the market and their increasing environmental expectations. For example, in the U.S. 80% of the consumers were willing to pay more money for their products if they were produced more environmentally friendly (Carter et al., 2000). This level of acceptance supports the argument of Haen and Réquillart (2014), who state that consumers play an important role in determining the type of production. Because of their consumption behavior and their market demand for food that fulfils sustainability criteria, they can contribute to enhancing SCP. Consumers may pay special attention and prefer products that have been produced with low levels of harmful emissions, such as low inputs of land, water, and energy, as well as respect for animal welfare, low transportation distances, and low carbon footprints (Hean and Réquillart, 2014). Recent studies have presented that consumers, especially in developing countries, show increased environmental awareness (Harris, 2006). In addition, exports and sales to foreign customers are two more drivers that claim manufacturers to adopt sustainable practices (Sarkis et al., 2011).

The third driver, mimetic, exists when organizations imitate actions of successful competitors in order to replicate the path of their success (Aerts et al., 2006). One example presented by Glover et al. (2014) is the dedicated sustainable milk supply for supermarkets. The imitation of successful organizations in particular affects enterprises in countries like Canada, France, and Germany and drives them to implement sustainable production practices (Sarkis et al., 2011). 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 (Christmann and Taylor, 2001).

Therefore, it is shown that external drivers promote SCP, particularly the role of the government and legislation. This has an impact on how organizations make decisions and it provides an insight into the role of different actors in the development of SCP practices and their role in achieving sustainable development goals. Thus, different stakeholders are affected and the institutional perspective focuses on the role of regulatory, conformity, and social pressures that drive organizational actions (Glover et al., 2014).

3.2.2. Dynamic capabilities

The theory of dynamic capabilities was introduced by Teece et al. (1997) in order to explain the competitive advantage and performance on high velocity and dynamically changing markets. They referred to it as "the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments." It was further described as the capacity of an organization to create, extend, or modify its resource base with the result of reaching higher economic value than their competitors (Beske et al., 2014). The theory of dynamic capabilities results from the resource-based view (RBV) of the firm. In the RBV, all successful organizations display certain resources; if some of those resources are rare, valuable, and/or hard to imitate, that organization can achieve a competitive advantage (Beske, 2012). If the markets are dynamic, the environment is not stable; hence, the advantage of a resource that exists today might become less important or even dissolve tomorrow. Consequently, an organization can build a competitive advantage through applying its valuable resources creatively (Castiaux, 2012). Since dynamic capabilities are comprised of a firm's organizational and strategic routines, they can be understood as a bundle of capabilities instead of being single processes (Beske et al., 2014). They are firm-specific and were developed by the organization through experiences and learning. Hence, they can be recognized as competencies and routines that the organization has built up over time. The goal is that those capabilities can help a company establish a long-term competitive advantage through the better deployment of resources (Castiaux, 2012). The importance of dynamic capabilities increases in turbulent contexts, where the usual routines and competencies fail to be adapted or may be challenged. This observation is particularly relevant for the changing environment (Castiaux, 2012). Concerning SCP, organizations have to integrate sustainable development considerations into their strategy; the food industry, especially, is a dynamically changing industry (Beske et al., 2014). Organizations are influenced by the evolution of markets and technologies as well as the increasing ecological and social requirements. Consequently, the success of the dynamic capabilities theory depends on its utilization, since the sooner an organization is able to adopt the theory and to realize their own marketplace strengths, the greater the chance that they will become more effective than their competition and realize competitive advantages (Beske, 2012).

Three classes of dynamic capabilities have been identified by Teece (2007): sensing, seizing, and transforming capabilities. In order to develop sustainable innovations, organizations need sensing capabilities at the technological level, at the market level, and at the environmental level. These innovations require the integration of internal and external stakeholders, such as green energy solutions that depend on governments or technological firms who rely on energy providers and distributors (Castiaux, 2012). In the case of SCP, organizations must be aware of the emergence of environmental rules and practices – including sustainable practices – and look at new technologies in order to produce sustainably; these strategies will contribute to SCP and help the firm to keep or achieve a leading marketplace position (Castiaux, 2012). Seizing capabilities include the innovation process that can be implemented after opportunities that meet environmental objectives are identified (Teece, 2007). Transforming capabilities refer to the transformation that occurs within an organization after it chooses a solution and acknowledges the change it implies. This transformation guarantees the connection of its strategy and the new assets (Castiaux, 2012). According to Castiaux (2012), dynamic capabilities refer to all levels of the organization, since each has to integrate sustainable thinking in their practices and proposals to contribute to SCP. Dynamic capabilities reach over the frontiers of the organization and influence cooperation choices, inter-organizational learning, and networking.

The food industry comprises an excellent example for a dynamic industry with its constant changes, particularly with regard to customer demands and government regulations concerning SCP. Organizations must quickly adapt to strategies and reconfigure resources, thereby following the concept of dynamic capabilities (Teece et al., 1997).

Because food is relevant to all people, this industry is one that is significantly driven by dynamic capabilities (Beske et al., 2014).

3.2.3. Stakeholder theory

According to Freeman and McVea (2001) a stakeholder is “any group or individual who can affect or is affected by the achievement of an organization’s objectives.” An important concept in the stakeholder theory is the idea that organizations produce “externalities” (Sarkis et al., 2011). Externalities are described by “situations when the effect of production and consumption of goods and services imposes costs or benefits on others which are not reflected in the prices charged for the goods and services being provided” (OECD, 2003). These externalities have an effect on a firm’s internal and external stakeholders, and the OECD gives examples for negative and positive externalities with regard to SCP. A negative externality, for example, is pollution, since chemicals that are dumped into lakes by an industrial plant may kill fish and have an effect on the livelihood of fishermen and farmers. A positive externality may arise from the construction of a road, which opens new areas for commercial development, housing, and tourism (OECD, 2003). The effect of the externalities often causes stakeholders to increase pressure on companies to reduce the negative impacts and to increase the positive ones (Sarkis et al., 2011). Stakeholders have been grouped into various categories by different authors (see Delmas, 2001; Delmas and Toffel, 2004; Freeman and McVea, 2001). They can be internal, such as stockholders and employees, including management. But they can also be external such as customers, banks, suppliers, environmentalists, governments, and so forth. Stakeholders can further be divided into direct or indirect, primary or secondary, or based on multiple dimensions of legitimacy, power, and urgency (Mitchell et al., 1997; Delmas, 2001). Primary stakeholders have a more direct influence or are influenced more by the company than secondary ones (Mitchell et al., 1997). Basically, the main idea of stakeholder theory is that internal and external groups will influence organizational practices. This may concern environmental externalities, as mentioned for the SCP, internalized through stakeholder pressures within and between supply chain members (Sarkis et al., 2011). Furthermore, the organization’s essential obligation becomes to ensure its survival and success by balancing the needs of multiple stakeholders, instead of just purely maximizing its financial success (Kaku, 2003).

In the past, several authors have used the stakeholder theory to address environmental issues, like environmental management, environmental regulations, and protection of the natural environment (Céspedes-Lorente et al., 2003). Their work addresses different types of research within stakeholder theory that is concerned with the natural environment. The role of external stakeholders in assessing environmental performance and corporate environmental risks, the importance of pressure on environmental reporting practices and communication, the influence of stakeholders on the environmental strategy of the organization, and the development of environmental cooperation between the organization and the stakeholders are some of the prominent focus areas (Céspedes-Lorente et al., 2003). In relation to SCP, stakeholder theory can contribute to sustainability by encompassing different stakeholders and by addressing the environmental, economic, and social dimensions. Furthermore, the theory can provide leaders of the organization with a more general perspective on how to understand relations of the organization with other parts of environmental and social systems. Since stakeholders are usually closely aligned with social institutions, there is a connection to the institutional theory (Sarkis et al., 2011).

Supply chains, especially food supply chains, have a variety of stakeholders and are more than individual enterprises. The range of stakeholders is particularly valid when environmental issues are introduced (Sarkis et al., 2011). In order to achieve SCP in the food industry, many stakeholders put pressure on the supply chain; not all practices that lead to SCP are conducive for generating a competitive advantage for the organization. Akenji and Bengtsson’s work (2010) introduced a framework for identifying the influence of different stakeholders in the supply

chain. Their work was based on the packaging industry but, after careful revision, the framework can also be applied to the case of stakeholder influence in achieving SCP. Three drivers have been identified that are associated with stakeholder influence (Akenji and Bengtsson, 2010). The first influence is from the various stakeholders who portray their own interests. Here, the key actors must be identified and their needs and expectations determined. The second influence refers to the role of each stakeholder, its influence on others, and its importance in the supply chain. Here, the most important stakeholders are identified, especially those that can drive change within the entire supply chain. The third driver identifies the instruments or techniques that each stakeholder uses in order to influence others (for example, government policies, procurement guidelines, or something else).

Using the three illustrated theories, the indicators for SCP and the drivers and barriers, under consideration of the multiple stakeholders, will be presented.

4. Indicators and drivers and barriers for SCP

If all descriptions above focus on how sustainable development can improve the quality of life for humanity, now and for future generations, then the question becomes, according to White (2001) “how can this be delivered by all those actors in society”? From the introduced theories that drive SCP, the following chapter will give an overview of different indicators for SCP, since they give deeper knowledge within the triple bottom line, namely, economic, environmental, and social structures. Furthermore, the driver, barriers, and practices of SCP will be investigated to answer the RQ proposed in the work. Overall this case study will investigate the current situation of SCP, focusing on the food industry, and on which practices could be implemented to make the change towards SCP.

4.1. Indicators for sustainable consumption and production

A great challenge faced by today’s companies and consumers is how to integrate the paths of environmental sustainability and economic growth (Pajunen and Heiskanen, 2012). Social, economic, and ecological thinking can be an opportunity for all actors. “Making environmental friendly decisions, such as saving raw materials, using by-products and reducing waste, might be the win-win situation for companies, shareholders, consumers, communities and the environment” (Pajunen and Heiskanen, 2012). In recent years, environmental problems have resurfaced in the media as a popular topic for green marketing research (Chekima et al., 2016). An increasing number of consumers are becoming selective in patronizing products with green certification (Govindan et al., 2015). Governments and organizations use indicators to obtain an overview of key information about economic, social, or environmental structures. They are typically numerical measures that go beyond simple data to show trends or cause and effect relationships (Veleva et al., 2001). The need for change has led to new thinking and approaches in terms of transitions; these approaches include how best to conceptualize and understand the way different systems undertake change and the role different factors (such as innovations or policy) play in these processes (Blok et al., 2015). The movement to achieve SCP is probably one of the most important yet little known social movements of the new century (Barber, 2007). Further, the use of indicators has shown to be an important method that has increased in the last years, and are used for the purpose of measuring progress towards sustainable development. According to Veleva et al. (2001) there are three main reasons why indicators are an important tool: firstly, to raise awareness and understanding; secondly, to inform decision-making; and thirdly, to measure progress towards established goals. The reason why indicators are established within consumption and production is to present the change to every stakeholder with the purpose of introducing current and potentially future trends. According to the OECD (1999) this covers the volume and amount of resources used as well as gaining more knowledge

needed to assess current strategies and to develop future strategies. To have trustworthy indicators, accurate information is needed to guarantee that the development and implementation of sound environmental policies takes place. Furthermore, [OECD \(1999\)](#) elaborates on three important indicators for SC that have the purpose of highlighting the interface between consumption patterns and environmental issues and are, therefore, used to help better understand how different policy instruments and driving forces affect the environmental sustainability of consumption. Moreover, indicators contribute to a broader collection of sustainability concerns in the decision-making process and they give a basis for monitoring policies. According to the [OECD \(1999\)](#) indicators are not only designed to provide an overview of the relationship between consumption, production patterns, and sustainability issues, but also to help reveal trends and draw attention to phenomena that require further analysis.

Currently, not much research has been done on the indicators of SCP or on how to best measure the effectiveness when sustainable practices are implemented. Works on SCP indicators, targets, and future sustainable development goals have been presented by the UNEP in two papers. They pointed out that SCP connects environmental and social concerns with economic processes. This happens both on the supply side, concerning production, and on the demand side, concerning consumption. It implies changing the consumption patterns of governments and households, done through changes in lifestyle and individual consumer choices and behavior, and to changes in the procurement strategies in the public sector ([UNEP, 2015b](#)). SCP was mentioned as one of the sustainable development targets. Eight targets have been presented in the UNEP (2015) and all of them have different indicators to make sure that the targets will be implemented and measured. The complete list of the targets to ensure SCP can be found in the [UNEP \(2015b\)](#). Nevertheless, the first five targets and indicators shall be presented here. The first target is the implementation of the 10-Year Framework of Programs on SCP, in which all countries shall take action, with developed countries taking the lead under consideration of the development and capabilities of developing countries. The suggested indicators for this target are the number of countries with SCP National Action Plans: national policies, poverty reduction strategies, sustainable development strategies and plans, and the number of countries actively engaged in regional cooperation supporting SCP. The second target implies that by 2030 sustainable management and efficient use of natural resources should be achieved. The related indicators are the Domestic Material Consumption, Material Footprint, and the Domestic Material Input. The third target demands that by 2030 per capita global food waste at retail and consumer levels should be halved. Food losses, along the production and supply chains including post-harvest losses, must be curtailed. The indicator to ensure this target is the per capita food and waste amounts, as measured using the Food Loss and Waste Protocol ([UNEP, 2015b](#)). Especially this third target deals with the problem mentioned in the introduction of this paper. Food wastage is a big problem that shall be addressed by SCP patterns and which can be controlled and reduced if indicators are used. The fourth target dictates that by 2020 environmentally sound management of chemicals and the life cycle of waste will stand in accordance with internationally established frameworks. This action will result in a significant reduction in air, water, and soil pollution and will minimize adverse impacts on human health and the environment. The indicator to reach this target includes that the parties to international multilateral environmental agreements on hazardous chemicals and waste will meet their obligations to transmit information as required by each relevant agreement. Secondly, the contaminants in air, water, and soil from industrial sources, agriculture, transport and wastewater and waste treatment plants are appropriately recognized. Finally, the fifth target requires that by 2030 substantially reduced waste generation through prevention, reduction, recycling, and reuse is established. This can be measured by the national waste generation, the national recycling rate, the rate for specific materials and sectors, and the size of the re-used goods on the markets. In order to achieve the above

targets [Akenji and Bengtsson \(2014\)](#) elaborates on an effective framing of SCP, with related indicators and implementation arrangements; their frame requires three aspects. Firstly, a comprehensive understanding of the drivers of consumption and production is needed. Then, gaining an understanding of the patterns of consumption and production in society is required, and how these patterns respond to the first aspect. Thirdly, using a life-cycle perspective, areas where production and consumption have the highest impact on society and the environment are prioritized (transport and mobility, food and agriculture, housing and construction) ([Akenji and Bengtsson, 2014](#)). Hence, all parts of the supply chain are responsible and affected. The drivers for production and consumption, as mentioned in the first requirement, as well as the barriers for SCP will be presented in the next section.

4.2. Drivers and barriers for sustainable consumption and production

Up to now, not a lot of research on the topic of drivers and barriers of SCP has been done. Some research on the drivers and barriers for sustainable consumption was completed by the [UNEP \(2015d\)](#). This research concentrates on the general influence that customers have on the sustainability of the products they buy. Six driving forces that influence consumption were identified. The first force has an economic influence and is connected to economic growth, disposable income, and prices. The second force is concerned with demographics and deals with the facts of single-person households and longer lifetimes. The third force deals with lifestyle and cultural tastes for diversity, as well as with individualism and the working and leisure hours of customers. The fourth force concerns the media, education, and information that has an influence on the customer's environmental awareness. The fifth force describes the existing technology and infrastructure that makes the products and services available to the customers. The last force is the policy framework that deals with the economic instruments, regulation and social tools ([UNEP, 2015d](#)).

In contrast, some barriers that influence consumption have been identified. These barriers mostly go along with the increase in the world population, as described in the introduction of this paper. Due to more and more people on this planet, consumption patterns have changed and will continue to do so in the future. The first barrier is the limited access to green products and services. One reason for this problem is, for example, mass production, which is necessary to feed all people on earth. This has an impact on the food industry, since ways must be found that provide enough food for the people but that are also structured to be sustainable and to have as little impact as possible on the environment and humans. In addition, the food supply chain is affected and the structure of how food is produced and transported has to be reconsidered. The second barrier is the lack of transparency and credibility, which is not likely to improve if food supply chains increase in number and complexity. The third barrier describes the limited degree of consumer awareness on low impact product use. With an increase in population, information sharing and greater awareness have to be considered. The fourth and fifth barriers are the lack of appropriate waste infrastructure and the few take-back mechanisms, both of which are especially concerned with parts of the world that have a high number of citizens per area and where a lot of waste is produced ([UNEP, 2015d](#)).

The effect on the supply chain is concerned with finding ways how to reduce waste and to reconsider the taking back of products. One approach to reduce the waste is reverse logistics. By returning used products to the supply chain, valuable parts of the products can be reused and waste can either be recycled or properly disposed. The last barrier underlies this fact and is concerned with the lack of after-sales support. These barriers have been particularly acknowledged in Asia, because experts presume this continent will have the largest population in the future with the most people and the biggest increase in the population ([UNEP, 2015d](#)).

In order to address the stakeholder theory, each stakeholder who has an influence on the success of SCP shall be acknowledged, along with the

Stakeholders	Government	Business	Consumers	NGOs	Development cooperation agencies	Media	Research centers
Drivers	<ul style="list-style-type: none"> - Provide long-term vision - Policy frameworks - Provide education and info-programs 	<ul style="list-style-type: none"> - Produce sustainable products - Cleaner Production - Legal compliance 	<ul style="list-style-type: none"> - Make commitment to greener lifestyle - Show responsibility 	<ul style="list-style-type: none"> - Support information sharing - Help in achieving best practice 	<ul style="list-style-type: none"> - Integrate SCP patterns into sector projects 	<ul style="list-style-type: none"> - Influence on consumer preference - Spread message on sustainable lifestyle 	<ul style="list-style-type: none"> - Contribution to SCP innovation
Barriers	<ul style="list-style-type: none"> - Missing guidelines how to follow legislation rules 	<ul style="list-style-type: none"> - Long supply chains due to globalization - Missing waste infrastructure 	<ul style="list-style-type: none"> - Low awareness of contribution towards SCP 	<ul style="list-style-type: none"> - Social and environmental aspects are not yet included 	<ul style="list-style-type: none"> - Not familiar with the concept of SCP yet and how to integrate patterns 	<ul style="list-style-type: none"> - Cooperation and communication towards consumer awareness missing 	<ul style="list-style-type: none"> - Not enough research in SCP patterns and how to achieve the targets yet
Targets	<ul style="list-style-type: none"> - Encourage dialogues - Provide guidelines 	<ul style="list-style-type: none"> - Greening the entire supply chain 	<ul style="list-style-type: none"> - Make a contribution towards change and be aware of contribution 	<ul style="list-style-type: none"> - Increase awareness of environmental and social aspects 	<ul style="list-style-type: none"> - Develop projects within SCP 	<ul style="list-style-type: none"> - Support awareness of consumers and increase attention 	<ul style="list-style-type: none"> - Contribute with more research e.g. take-back policy / waste management

Fig. 4. Stakeholders and their connection with SCP; own work.

role that each stakeholder plays. As presented at the Planet Under Pressure conference in March 2012, the following stakeholders have an influence on the success of SCP: government, business, consumers, non-governmental organizations (NGOs), development cooperation agencies, media and research centres (Planetunderpressure, 2012a). This major international conference was the largest gathering of global change scientists focusing on solutions to global sustainability challenges, and it helped inspire the United Nations conference on sustainable development (Rio+20) (Planetunderpressure, 2012b). The question that needs to be answered is how each stakeholder can contribute to SCP patterns (Haen and Réquillart, 2014). The government’s role is to provide a long-term vision and a consistent policy framework. By this action, they can offer incentives that guide other participants such as economic instruments and education campaigns. Furthermore, their target should include encouraging dialogue to support community initiatives in order to challenge the sustainability of current consumption patterns (UNEP, 2015c). By providing education and information programs, governments can reinforce value and monitor the success of their act. The business of a stakeholder is to produce sustainable products and to place them available on the marketplace. They can contribute by having legal compliance, cleaner production, and resource efficiency. By operating sustainable procurement and re-thinking of certain business areas, they can contribute to greening the supply chain (Planetunderpressure, 2012a). If the role of the consumer changes, groups of consumers can contribute by making a greater commitment to a more sustainable lifestyle (Haen and Réquillart, 2014). The government can use information campaigns to draw attention to the fact that if consumers are purchasing products, they are socially, morally, and politically responsible and are influencing SCP patterns. Support in information sharing can come from NGOs and can create awareness and involvement to help achieve best practices. The development cooperation agencies have to integrate SCP patterns into their sector projects (UNEP, 2015e). Moreover, the media has an influence on consumer preferences and can spread messages on sustainable lifestyles. Finally, research centres provide an evidence base for SCP and innovation (Planetunderpressure, 2012a). In general, one barrier for SCP results from the lack of cooperation and coordination among the stakeholders and their goals (Haen and Réquillart, 2014). In order to achieve better SCP patterns, stakeholders have to align their targets. A summary of the mentioned stakeholders and their connection with SCP – meaning their drivers, barriers, and targets – is presented in Fig. 4.

The constantly changing environment puts pressure on the stakeholders and their cooperation, which consequently puts pressure on the organizations. They have to focus on their stakeholders while contributing to SCP patterns and act according to the legislation. The importance of dynamic capabilities increases in this context and it gets more and more important to be able to restructure the organization’s strategy according to upcoming challenges.

As they are currently presented, strategies focus mainly on the production side and on finding sustainable ways to satisfy consumer needs. A framework that successfully aligns sustainable consumption and

production patterns could serve to measure both and their related outcomes. Future research that may be done on this topic will be reflected on in the next section.

5. Discussion on possible future research

The findings of this paper provided useful information about the drivers, barriers, and practices with the increasing importance and popularity of SCP. Furthermore, from the deeper investigation into the food sector, it can be seen that this direction of study has not yet been fully explored. As investigated with the textile industry there are many research fields that can be supported in the future and some ideas that are important according to the author’s opinion will be presented in this discussion.

The United Nations have made a start in developing plans for the future, including the indicators that help to measure SCP and to provide guidelines for governments and organizations to implement SCP patterns. In cooperation with the European Commission the authors point out that the present indicators focus on societies as a whole and they are not specifically linked to SCP or they focus only on minimal standards.

A step towards SCP would require selecting and evaluating more appropriate indicators to measure resource use and its environmental and economic impacts. This would ensure the monitoring of progress in relation to defined targets (Lutter et al., 2009). In order to select the appropriate indicators, more information is required, which suggests a future research field. Indicators are the primary way to evaluate if the implementation of SCP patterns is successful. Research has to be performed to determine the main drivers for resource consumption, the contribution of different types of product consumption to environmental pressure, and the quantification of potential increases in eco-efficiency and involved costs. In addition, research could contribute to solve the problem of existing trade barriers and barriers in rural infrastructures (UN, 2015a).

Another field of research that has not been reflected on in many studies is concerned with food miles as a sustainability indicator for SCP. Food miles presently have a long distance and require a high level of transportation logistics. Due to the globalization the transport of food has a high impact on the environment and the overall impacts of food transports are complex (Grant et al., 2013). Several authors have pointed out that although the measurement of logistics and supply chain performances is a well-established area in the literature, the focus on environmental logistics and the measurement of supply chain performances are still under-researched (Grant et al., 2013; Shaw et al., 2010). Sustainable food supply chain research on the problem of increasing transportation and transporting food around the world is critically needed. This challenge goes along with the problem of food wastage. In the literature review no paper was found on the subject. Better cooperation of supply chain members could assist in preventing food loss and food waste. Therefore, an interesting field of research would include an investigation of how well the different participants in the food supply chain cooperate, with a special look at transportation logistics. If there

was sufficient research on the supply and purchase availability of raw materials, the beginning of the supply chain could make a contribution to SCP patterns. Further research on food miles as a sustainability indicator could have a share in the decision making, because consumers choose between buying seasonal food from all over the world (which involves high pollution due to transport mechanisms), or buying food that has been in storage for a couple of months (which involves high storage costs). Consequently, research could be presented on the economic and environmental impacts of choosing between seasonal or storage food. Research might also consider if more developed ways of transporting – like upgrading the transport infrastructure – could decrease environmental impacts. Better packaging, usage of better trucks, and enhancing the reliability of power supplies (like controlled temperature and propelling of vehicles) could be steps towards SCP patterns (Cojocariu, 2012).

According to Haen and Réquillart (2014) future research on SCP will have to incorporate the interactions between consumption and production more explicitly. It is required that models account for the heterogeneity of production systems and of consumers' consumption behavior and the nutrition status within countries. Research cannot deal with the fact if people are consuming more sustainable food if not accessible to all people. In their work they pointed out four issues that have to be addressed in the future. There are inequalities in access to food and consumption behavior within populations. There are externalities resulting from production, processing, and marketing along the entire product chain. This includes how consumers can influence the processes through their purchasing behavior. Addressing the food wastage, future research has to be done on mechanisms of competition for agricultural and non-agricultural uses of land that goes in line with the competition for scarce resources. Furthermore, it should be presented how biofuel production, different types of food production, post-harvest losses and waste compete for scarce land, which will affect competition and access to food for all people. All in all, future research could make a contribution by drawing attention to needed and undesirable developments and by confirming the need for timely action (Haen and Réquillart, 2014). Hereby a focus lies on the increasing world population that needs to be met by productive growth.

This paper presents only three theories (institutional theory, dynamic capabilities theory, and stakeholder theory) that drive SCP patterns. Further theories can be adapted to examine why a contribution to SCP is of importance and how it can benefit the organization. For example, the resource dependence theory (RDT) deals with the fact that in supply chains, participants should be dependent and collaborate in order to seek higher performance gains in the long-run, not just to purchase short-term benefits at the expenses of others (Sarkis et al., 2011). This addresses the problem of coordination in the supply chain in order to align the different targets and achieve sustainable development goals and SCP. In order to reach sustainable development, organizations need to depend on resources from outside parties to compete and to carefully manage this dependency with other organizations. With regard to reach overall sustainable consumption and production goals, organizations have to recognize that they are part of one big supply chain and realize the influence they have on the consumption and production patterns. Organizations cannot be fully self-sufficient with regard to strategically critical resources that lead to their survival. This is supported by the complexity theory, which says that as complexity increases in order to reach sustainability, organizations find it more difficult to forecast their organizational actions (Sarkis et al., 2011). Likewise, the coordination and cooperation of supply chain parties play an important role and should serve as a target of future research.

A further research field with strong future potential addresses the integration of sustainability assessments in the sustainable production decision making process. Zhang and Haapala (2012) presented a multi-criteria decision making (MCDM) model to explore different preferences of various stakeholders to devise indicators' weightings and to compare alternatives. They further mentioned various studies where the

MCDM approach has been used. For example, Pohekar and Ramachandran (2004) reviewed different MCDM methods for energy planning and addressed their effectiveness when it is applied to sustainable decision making. Furthermore, Mendoza and Prabhu (2000) applied a MCDM technique, including ranking, rating, and pair-wise comparisons, as a decision tool for accessing the criteria and indicators designed to evaluate sustainable forest management. The outcome of this study showed that the MCDM technique is effective for selecting sets of criteria and indicators and, ultimately, for prioritizing them. In connection to electricity production Streimikiene et al. (2012) developed a multi-criteria decision framework for choosing the most sustainable electricity production technology. Their work looked at the economic, technological, social, and political developments that stress the need for shifts in sustainable production. As pointed out, the mentioned papers deal with decision-making in order to achieve sustainable production. To additionally address decision-making in sustainable consumption, researchers developed a tool to help policymakers access and use data regarding the environmental impacts of consumption as well as production. By using the tool (EUREAPA tool), decision makers can analyse data from different kinds of perspectives and create scenarios to understand the implications of changes in consumption and production (European Commission, 2014).

In order to address the sustainability of food supply chains, a project in the Netherlands used a MCDM approach. They pointed out that MCDM models will be able to evaluate alternative processing methods for entire chains with respect to food quality, company profit, and sustainability. A "TI Food and Nutrition" project was established with the aim to supply key actors in the food chain with an approach to quantify the sustainability of their current and future processes in the food chain. In 2013, the MCDM tool was developed and applied to the supply chain of bread. Using the model it was possible to evaluate and compare the production processes for fresh, par baked, and bread produced from fermented old bread. Hence, possibilities for improvements in the production process were shown. An interesting result showed that the reuse of waste in the bread industry cannot only improve the sustainability of the process, but also improve the quality of the bread and make a contribution to producing less waste (TI Food and Nutrition, 2014). This example shows the potential of using decision-making tools in order to achieve SCP in food supply chains. Further research can contribute to evaluate different processing methods and to optimize the entire chain with respect to food quality, sustainability, and company profit.

Another research field that has already been mentioned in the drivers and barriers for SCP, and that is connected to the above mentioned example of the bread industry, is reverse logistics. In the literature it is clear that the taking back of valuable parts can result in an advantage for the company and their production processes. As shown in the bread example, bread that was not used can be taken back to the company in order to produce fresh bread. This result leads to better recycling of products, in this case even with food, and to a reduction in food wastage.

While this research approach knows the topic of SCP is important and that its importance will increase further in the future, further knowledge is necessary to understand what is affecting the implementation of SCP and how it is affecting profits, the planet, and people.

6. Conclusion

This paper presented the change and the increase in the importance of sustainable consumption and production with a focus on the food industry. The food industry, especially, is one where the systems are undergoing major changes that are likely to become more pronounced in the future. The main reason for the change in the consumption and production was cited earlier, the dramatic increase in the world's population. The reality of population increase is a fact that cannot be changed and cannot be stopped. Due to this inevitable change, it is of great importance that food supply chains have to be reconsidered with the aim to achieve and contribute to SCP patterns. The sustainable

Table A1
SCP indicators for the future SDGs.

Targets	Suggested indicators
1. Implement the 10-Year Framework of Programs on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.	Number of countries with SCP National Action Plans or SCP mainstreamed as a priority or target into national policies, poverty reduction strategies, development and/or sustainable development strategies and plans. Number of countries/organizations actively engaged in regional cooperation supporting the implementation of SCP activities at the regional, sub-regional and national levels.
2. By 2030 achieve sustainable management and efficient use of natural resources.	Domestic Material Consumption, disaggregated by material category. Material Footprint, disaggregated by material, final demand and expenditure category. Domestic Material Input, disaggregated by material category.
3. By 2030 per capita global food waste should be halved at the retail and consumer level, and reduce food losses along production and supply chains including post-harvest losses.	Per capita food losses and waste as measured using the Food Loss and Waste Protocol.
4. By 2020 achieve environmentally sound management of chemicals and all wastes throughout their life cycle in accordance with agreed international frameworks and significantly reduce their release to air, water and soil to minimize their adverse impacts on human health, environment.	Parties to international multilateral environmental agreements on hazardous chemicals and waste that meet their obligations in transmitting information as required by each relevant agreement. Contaminants in air, water and soil from industrial sources, agriculture, transport and wastewater and waste treatment plants. Sound chemicals management corporate policies and practices throughout the value chain.
5. By 2030, substantially reduce waste generation through prevention, reduction, recycling, and reuse.	National waste generation. National recycling rate and recycling rate for specific materials and sectors. Size of the re-used goods on the market.
6. Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.	Number of companies publishing sustainability reporting. Market share of goods and services certified by independently verified sustainability labelling schemes.
7. Promote public procurement practices that are sustainable in accordance with national policies and priorities.	Number of national governments implementing SPP policies and/or national SPP action plans. % of Sustainable Public Procurement in total public procurement for a set of prioritized product groups. Impact of Sustainable Public Procurement on CO ₂ emissions. SCP mainstreamed into formal education.
8. By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.	Number of countries implementing the UN Guidelines for Consumer Protection. Market share of goods and services certified by independently verified sustainability labelling schemes. Frequency of researches online for key words with direct links with sustainable development and lifestyles.

development goals are one of the first steps to achieve more sustainability; SCP patterns can make a contribution to these goals if they are implemented. As described in the introduction one important part of achieving SCP is to decrease the food wastage. Not much research has been done on this topic, but it was pointed out that there are certain indicators for SCP that deal with food loss and food waste and that try to contribute towards less waste in production and consumption. It could not be determined if cooperation of the supply chain members is a crucial factor for achieving this goal. No research has been done on cooperation between supply chain partners and their effect on SCP in the food supply

chains. Nevertheless, it was pointed out that each member of the supply chain and, hence, each stakeholder affects the supply chain and contributes to SCP patterns. Especially in the food industry, stakeholders can contribute to influence customers and organizations to be more sustainable with regard to their food consumption and production. In order to present reasons why it is of importance that the supply chains have to be restructured with regard to SCP patterns, the theories that drive SCP have been presented. They have a great impact on the organization in connection with the changing environment and legislation. The theories laid the groundwork to point out different stakeholders and their drivers and barriers for SCP.

This work is a contribution to the research on SCP and one of its aims was to provide ideas for future research. These ideas for further research will help to achieve sustainability and SCP patterns in the food industry. Because research on the topic is currently scarce, it would be desirable if scholarly attention on this topic increases and produces more information to organizations and consumers on how to achieve SCP patterns. MCDM methods could, according to the author's opinion, contribute and support the organizations in their decision-making about more sustainable production.

In June 2015, the G7⁴ met in Germany to discuss future strategies on environmental management, and, among others, one goal that emerged is to work for an end of extreme poverty and hunger and to reduce the number of people living in hunger by 500 million within the next 15 years (Welthungerhilfe, 2015). Now the future will show if sufficient action has been taken with regard to helping undernourished people but still promoting the ideas of sustainable consumption and production behavior. Climate change and the world's population increase will be two major problems and challenges for manufacturing organizations in the future. Each member of the supply chain will have to contribute, because there is no sustainable consumption without sustainable production and vice versa. These two facts go along and together they contribute to sustainable development goals.

Appendix A

See Appendix Table A1.

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⁴ The G7 include the following countries: Japan, Germany, France, Great Britain, Italy, USA and Canada (Die Bundesregierung, 2015).

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