Achieving sustainability at multi-industry businesses through supply chain performance measurements

A proposal for IKEA´s new tool for sustainable performance measurements and development.

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Abstract

Research connected to sustainability have increased tremendously during the last decades, partially due to the increased attention of businesses practices in sustainability. A field that has gathered traction with many practitioners is sustainable supply chain management (SSCM) and especially performance measurements. This thesis focuses on this field through a literature review of 56 academic articles as well as five interviews with practitioners. This combination provides a deeper understanding of the challenges and possibilities of performance measurements in SSCM. It uses this knowledge on a case study of IKEA and their tool for sustainability performance measurements and development in their supply chain. The findings are then employed to propose a performance measurement framework for IKEA´s revised sustainability tool. Significant parts of the proposal are extending the scope of the tool, integrating the three sustainability dimensions, and adding features to increase suppliers' motivation to use the tool. By doing so, the thesis provides a balanced view of the field and contributes to its development.

Keywords

Triple bottom line, TBL, sustainable supply chain management, SSCM, performance measurements, supply chain, supply chain management, SCM, sustainability.

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Preface

This thesis was written during the spring and summer of 2021 as the final part of the Environmental Engineering program with a focus on Environmental systems. I would like to thank IKEA and Dominika Kačaba for giving me the opportunity to write this thesis with them. Further, I would like to thank my supervisors Per Svenningson and André Månberger at Environmental and Energy System Studies who has supported and guided me through the process. Lastly, I want to thank my dear friend Nyasha Stenman for her diligent proofreading of this thesis.

Contents

Acronyms and Abbreviations

AHP	Analytic Hierarchy Process
APL	Action Plan
BD	Business Developer
BSC	Business Scorecard
CA	Category Area
CDP	Carbon Disclosure Project
EPE	Environmental Performance Evaluation
GHG	Greenhouse gases
GSCM	Green Supply Chain Management
HBF	Home Furniture Business
KPI	Key Performance Indicator
MCDM	Multiple-Criteria Decision-Making
MPFG	Metal, Plastics & Float Glass
NGO	Non-Governmental Organization
PPP	People & Planet Positive
RQ	Research Question
SCM	Supply Chain Management
SD	Sustainability Developer
SDG	Sustainable Development Goal
SSCM	Sustainable Supply Chain Management
SSI	Supplier Sustainability Index
TBL	Triple Bottom Line
UN	United Nations

1.0 Introduction

1.1 Sustainable businesses

Sustainability practices have transformed from a necessary good into a competitive advantage for businesses around the world during the last decades. An increased awareness of issues connected to climate change and sustainability within the public has led to an increased demand for responsibly made products. An increasing part of businesses' success has become dependent on their sustainability as a result; this has made the consequences of corporate greenwashing extremely serious. Just a few years ago businesses' sustainability efforts received little attention, but that is in the past. This has been shown by instances in which investigations have revealed scandals such as the RanaPlaza incident in Bangladesh and Diselgate that have jeopardized the future for several multinational corporations (Andersen and Skjoett-Larsen, 2009). A discussion on how to define a business as "Sustainable" has followed. There are currently numerous different sustainability definitions that businesses, organizations, and non-governmental organizations (NGOs) use. However, most definitions are based on the definition of sustainable development that was provided by the Brundtland Commission in 1987:

"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (UNESCO, 2021) (Brundtland, 1987)

This lack of a definition has redirected the focus to more quantitative methods of measuring the difference in impact between products and businesses (Ahi, 2015a; Ahi, 2015b). This has made it obvious that it is not enough for businesses to merely measure their own sustainability, but their entire supply chain. The environmental impact of a business supply chain is on average 11.4 times as high as their footprint (CDC, 2021). Sustainability issues thus need to be measured in the entire supply chain. This is the goal of the relatively new concept of sustainable supply chain management (SSCM), a field that has grown rapidly during the last decade (Ashby et al, 2012). Its objective is to reach certain sustainability goals within organizations through cooperation among all supply chain participants (Ahi, 2015a).

One challenge many businesses face with SSCM is to understand its sustainability practices. It can be explained by the interdisciplinarity of the field and the many practices that are included in its broad scope (Pimenta and Ball, 2015). This report focuses on one of these practices, performance measurements. A lot of the information and reports available on performance measurements within supply chains has been published during the last couple of decades (Sheperd & Gunther, 2005). However, when it comes to performance measurements in SSCM, the sources are a lot scarcer (Taticchi et al, 2013). Especially reports that measure all three pillars of sustainability, the Triple Bottom Line (TBL), which includes environmental, social, and economic sustainability.

1.2 TBL performance measurement frameworks

There are various opinions between the researchers in the field of SSCM regarding which and the number of dimensions to be used. However, the common theme is the use of the TBL (Sánchez-Flores, 2020). TBL performance measurements can be considered an important tool in understanding what, where and how things occur in sustainable supply chains. It provides businesses with information that they can use to determine the effectiveness of their SSCM strategy (Schaltegger & Burrit, 2014). However, there are few established theories, models, and frameworks that can be used to further assess sustainable supply chain performance (Ahi et al., 2015a).

There are plenty of different performance measurement approaches. What most of these have in common is that they have been developed to evaluate the performance within industries and not across. This has resulted in that many authors have declared frameworks that can integrate and measure the sustainability performance of supply chains in a multi-industrial context as an important starting point for future research (Bai and Sarkis, 2016; Morali and Searcy, 2012; Reefke and Sundaram, 2017; Taticchi et al., 2015; Varsei et al., 2014). This thesis aims to do that. SSCM is particularly challenging for multi-industry businesses since most performance measurement methodologies focus on one specific industry (Taticchi et al, 2015).

There are currently few publications on the topic of TBL performance measurements in the SSCM within large multi-industrial businesses. There are also few reports that research the best practices of sustainability performance measurements within businesses. This thesis aims to combine the two. The author of this rapport believes that this connection between the industry and science is crucial for further knowledge development within the field. It also increases the probability of the framework being relevant to modern businesses and integrated into their SSCM. Additionally, the body of knowledge within supplier sustainability performance measurements is yet immature and this thesis provides a practical summary of the current knowledge of five large businesses as well as within academia. It uses the gathered knowledge by using IKEA as a case study and proposes a framework for new tool for sustainable performance measurements within their supply chain.

1.3 Aim and research questions (RQs)

This rapport aims to formulate a general performance measurement framework that multi-industrial businesses can use in their SSCM as well as reviewing IKEAs current tool for sustainable performance measurements and suggesting improvements for their new tool. RQ 1-3 are focused on gathering the relevant information on SSCM performance measurement frameworks within the chosen field. RQ 4-6 is focused on gathering information on IKEAs current performance measurement tool as well as the requirements for their new tool. The RQs of this thesis are:

RQ 1: What are the key characteristics of performance measures within SSCM and how can they be utilized to describe the supply chain sustainability at large multi-industry businesses?

RQ 2: How can a TBL performance measurement framework be designed for large multi-industry businesses?

RQ 3: What are the characteristics of “sustainable production”?

RQ 4: What are the core challenges for the current performance measurement tool at IKEA?

RQ 5: What are the most essential wishes for IKEA´s new tool for measuring the sustainability performance and the sustainable development of their suppliers?

RQ 6: How can the framework for IKEA´s current performance measurement tool be improved to better suit the goals of their sustainability agenda?

1.4 Thesis outline

This thesis begins by giving a through introduction to the field of SSCM performance measurements as well as its aim and research questions. It then continues by explaining the methodology that the author has used to gather its three main information sources, a literature review and two separate interview studies. Thereafter does it present the findings of these information sources. Chapter 3.0 contains the results of the literature study and focuses on reports that together present an overview of the latest developments and challenges within performance measurements in SSCM. Chapter 4.0 presents the results of an interview study with IKEA employees and their suppliers that work with their current tool for sustainability performance measurements. Chapter 5.0 contains the results of an interview study with sustainability experts at large multi-industrial companies that gathers their expertise and practical experiences. The following chapter, chapter 6.0, includes a description of IKEA, their sustainability strategies, and their current sustainability systems. In chapter 7.0 and 8.0 are the information gathered in the earlier chapters used to develop a proposal for the framework to IKEA´s new SSCM performance measurement tool. Finally, in chapter 9.0, the RQs are answered, conclusions are drawn based on the findings and suggestions for future research are made.

1.5 Delimitations

The chosen literature is focused on TBL SSCM. Reports that only addressed environmental or economical sustainability were removed; reports that only addressed social sustainability were included due to the lower availability of reports in this field. Reports that primarily focused on one specific industry were not included since the goal was to create a general framework. Reports that did not mention neither SSCM, green supply chain management (GSCM), or SCM were removed since this thesis focused on SSCM. The interviews with the users of IKEA´s current tool were not conducted with all employees at IKEA that worked with their current tool but with selected individuals that showed interest in participating. The participants in these interviews were part of one of the three groups sustainability developers (SDs), business developers (BDs), and suppliers. The other groups at IKEA that occasionally work with the tool were excluded. The five participating sustainable developers were not interviewed individually but in a group as a brainstorm session since they had limited time. The external interviews were limited to five businesses.

2.0 Methodology

This chapter consists of a detailed description of the research methodology used to gather the information presented in chapters 3.0, 4.0, and 5.0. In general, there are two overarching research methodologies, quantitative and qualitative research. Quantitative research focuses on information that can be converted into numbers and then is interpreted through statistics. Therefore, it is crucial to have a deeper knowledge of the data to apply the right conversion and chose the correct statistical test (Sheard, 2018). Qualitative research focuses on information that it can use to explore and understand the chosen field better (Berk, 2015). Selecting which research methodology to use in a report depends on the nature of the report. This thesis has three qualitative research sources where it collects information that is used to answer the RQs presented in chapter 1.0.

2.1 Literature review

The first source of this thesis is a literature review with two objectives. The first objective is to provide a sound theoretical background of sustainability, SSCM, and performance measurements. The second objective is to provide the necessary information to answer the relevant RQ´s. The review was conducted through five phases according to Tranfeld et al (2003): Identification of research, Selection of studies, Study quality assessment, Data extraction, and monitoring process, and Data synthesis.

The first phase was initiated by starting with a wide search on “Sustainable production” and “Sustainable Supply Chain Management” in LUBsearch, Lund University’s library search engine. Reviewing the title, abstract, and content of different reports as well as popular “Subjects” resulted in the formation of the following string that produced a total of 562 results:

("sustainable supply chain management" OR "green supply chain management" OR "sustainable supply chain" OR SSCM OR "green supply chain*") AND ("performance measurement*" OR "performance evaluation*" OR “performance assessment*”) AND ("framework" OR "model" OR "tool" OR "review*").*

During the second phase of the review, relevant papers was selected through a multi-step process where inclusion criteria were added (see 1). First, papers published before 2015 were excluded which resulted in 376 search results. Second, all papers that had not been peer-reviewed were excluded, decreasing the search results down to 305. Third, results that had not been published in academic journals, such as magazines, conference materials, and reviews, were excluded and narrowed the search to 300 results. The final step excluded results written in other languages than English, resulting in 293 search results.

The third phase, quality assessment, consisted of a thorough selection of reports based on a chosen set of inclusion and exclusion criteria. The titles and abstracts of all search results were read and the ones that matched the criteria, presented in table 1 and 2, were excluded or included accordingly. That narrowed down the search to 45 papers. By checking the reference list in these reports, 11 additional reports were found, and the total number of chosen reports was increased to 56. It is important to note that these reports were chosen without regard to the criteria in table 1 and 2. The basic information from these papers was gathered to form a database which later was used to illustrate differences and similarities between the final reports.

Table 1 – The inclusion criteria and the causes for inclusion

Inclusion criteria	**Reason for inclusion**
Peer reviewed academic journals	A way of ensuring a higher level of quality in the chosen literature in comparison to books, seminars, and other sources.
Papers written in English	This thesis is written in English, and this was a way of avoiding potential misunderstandings with translations.
Published between 2015-2021	The most recent published reports were deemed to be most relevant to the topic of this thesis and literature reviews within the search was believed to include the most crucial information published before 2015. Any additional sources found in the chosen literature were not limited to this criterion.

Table 2 - The exclusion criteria and the causes for exclusion

Exclusion criteria	**Reason for exclusion**
Articles primarily based on explaining or developing mathematical methods/tools.	Reports heavily based in mathematics did not contribute to the aim of this thesis, to create a theoretical framework.
Articles that do not mention the TBL.	The aim of this thesis was to create a general TBL framework for performance measurements in SSCM.
Articles focused primarily on one specific industry.	The aim of this thesis was to create a general TBL framework for performance measurements in SSCM.

In the fourth phase, the data extraction and monitoring process were conducted by using a data-extraction form that collected relevant data from the chosen literature such as bibliometric data, key results and used SSCM definitions. The last and fifth phase synthesized the collective data from the reports and is presented it in chapter 3.0.

2.2 Interview studies

Interviews are a great opportunity to get access to primary data, something that is crucial for studies within large fields such as performance measurements in SSCM. This data has a large probability of producing a relatively deep understanding of the processes and challenges

within the field. This thesis includes are two interview studies that focus on different target groups, both were performed according to the following structure. They were initiated by defining their aim, then the target group was defined, then the interview questions was formulated, after that the interviews were conducted and lastly the responses were summarized and analyzed (see chapter 4.0 and 5.0).

2.2.1 Interview study with the users of IKEA´s current tool

This qualitative interview study aims to gather valuable knowledge, experiences, and thoughts from the users of IKEAs current sustainability tool, the supplier sustainability index (SSI) tool. This data will then be used to answer the RQs of this thesis. The target groups of this study are three groups that use the current tool in their daily work, the SDs and the BDs that are employees at IKEA as well as IKEA´s suppliers which are external businesses. All three groups provide different perspectives on the tool and their responses will be presented per group. A description of these different roles will be presented in chapter 4.0. It is relevant to note that IKEA is divided into seven different category areas (CAs) for their different products: “Food”, “Comfort & textiles”, “Electronics”, “Indirect procurement” (cleaning, office supplies, etc.), “Metal, plastics & float glass” (MPFG), “Specific HFB” (Home Furniture Business) and “Wood”.

Six SDs were interviewed together instead of separately as the other participants; these worked in the areas “Wood”, “Textile furnishing”, “IKEA Components” & “MPFG”. The 13 BDs that participated in this interview worked in different areas; 5 in “MPFG”, 3 in “Textile furnishing”, 1 in “Mattresses”, 2 in “Wood”, and one sustainability compliance auditor. A total of 34 interviews were conducted, 16 were performed by the author of this thesis and the remaining were conducted by other members of a team at IKEA responsible for developing their new supply chain sustainability performance measurement tool (see chapter 2.3).

To address RQ 4-6 in this thesis, the questions of this interview study will be focused on the participant's thoughts of IKEAs current sustainable supplier index (SSI) tool as well as their expectations on the new tool. The interview questionnaire consisted of nine questions (see appendix 2.0) that were developed with the team at IKEA mentioned above (more in detail in chapter 2.3). The interviews were approximately 30-40 minutes long and were conducted online through an online meeting platform of the participant's choice using the structured questionnaire as a base. The questions were sent to the interviewees before the interviews to give them time to formulate their answers. Notes were taken by the interviewer during the interviews. The notes were looked through after the interviews and required editorial changes were made. Lastly, all questions were sent to the participants to make sure that the written answers correlated with their thoughts.

The interviews were summarized by first dividing the interviews into three different groups: sustainable developers, BDs, and suppliers. The content of the different answers to each of the interview questions was divided into various categories. Thereafter, all categories were looked through and mergers of similar categories were made. During the following step, a frequency analysis was performed on the collective answers of each respective group to each question. The first three questions were grouped since they referred to defining sustainable production and positive feedback on the tool, the responses for these questions are presented plainly through figures showing the frequency analysis of the most common answers. The remaining six questions were grouped since they all referred to feedback and wishes for the new tool, the responses to these questions were presented through both frequency analysis and tables. These summaries can be found in chapter 4 of this thesis. The result from this study is then used to

formulate a general framework for performance measurements in SSCM as well as to propose the structure for IKEAs new supply chain sustainability performance measurement and development tool (see chapter 7.0 and 8.0).

2.2.2 Interview study at large multi-industrial businesses

This qualitative interview study aims to gather a deeper understanding of the current practices in SSCM performance measurements at large businesses as well as valuable lessons and experiences in the field. Therefore, data were collected from individuals with valuable knowledge and experiences from working with performance measurements at large multi-industrial businesses. The businesses were selected by going through international charts that list the companies that are at the forefront of sustainability since they were thought to be at the forefront of sustainability performance measurements in SSCM. The ones used were Carbon Disclosure Project´s (CDPs) A list, top 100 sustainable companies by the Corporate Knights (CDP, 2020; Corporate knights, 2020; Corporate knights, 2021). As well as the businesses part of Dow Jones Sustainability Index, the DJSI World as of the 23rd November of 2020 (S&P Dow Jones Indices, 2020).

There were 5 interviews conducted with sustainability experts at different large corporations. In connection with the aim of these interviews, the participant's responses were anonymous. This was believed to allow them to talk more freely of their current practices, experiences, and lessons. The participants and their businesses will therefore be referred to by numbers from 1-5. Following the goal of this thesis (see chapter 1.3) participants were working at businesses in different industries: the fashion industry, the electrical industry, the food industry, and the logistics industry. The six questions for the external interviews were formed together with the author´s supervisor at IKEA, Dominika (see chapter 2.3). They were designed to answer RQ 1-3 of this thesis (see appendix 1.0). The questions were focused on the different companies' views on SSCM as well as their tools, methods, and monitoring systems for measuring the sustainability performance of their suppliers. The summarized responses from this study can be found in chapter 5.0 of this thesis.

2.3 Collaboration with IKEA

This thesis was conducted at IKEA and tasked with analyzing their current tool for sustainable performance measurements and data collection from suppliers as well as gathering data on the latest trends in sustainable performance measurements. The results of this thesis will be used as an inspiration to redesign IKEAs supplier sustainability performance measurements tool. The author was also part of an internal team at IKEA that was tasked with developing their new tool. This enabled direct communication regarding specifications on the tool, required information, and assistance in performing interviews at the business (see chapter 2.2.1). The team consisted of six team members, the writer of this thesis, and five employees at IKEA with different backgrounds and several years of experience in the field. The team had an average of two online meetings every month, starting at the end of January 2021. The supervisor and primary contact at IKEA were Dominika Kačaba. The writer and Dominika discussed the progress of this thesis on a weekly basis between February and September 2021.

3.0 Theory: Literature review

This chapter presents the results of the literature study.

3.1 The three sustainability dimensions

The TBL concept is used by many scientists within the SSCM field. It operationalizes sustainability by breaking it down into three dimensions: Social, environmental, and economic sustainability (Ahi & Searcy, 2015b). It is an important starting point for businesses to understand what, where and how they can apply SSCM practices (Schaltegger & Burrit, 2014). This approach has been shown to have a positive impact on businesses' corporate and sustainability performance. Businesses need to balance the dimensions in TBL as a part of the many sustainability legislations, standards, and frameworks that recently have been introduced, such as waste management legislations, ISO`s environmental management standard (ISO 14000), and the global reporting initiative (GRI) (Zhu and Sarkis, 2004; Matos and Hall, 2007; Ashby et al., 2012). Researches make it clear that all three dimensions should be in focus, but so far have social sustainability has not gained as much attention as environmental and economic sustainability (Brandenburg et al., 2014; Moxham and Kauppi, 2014). This thesis aims at correcting this imbalance.

The TBL includes three sustainability dimensions (Bradenburg et al, 2015) (Carter & Washispack, 2018) (Cazeri et al, 2017). First, social sustainability focuses on challenges in work conditions, human rights, social commitment, customer issues, and business practices (Cazeri et al, 2017). Second, environmental sustainability focuses on environmental management, use of resources, pollution, natural environment (Cazeri et al, 2017). It also promotes technical entrepreneurship to solve these issues. Third, economic sustainability focuses on reliability, responsiveness, flexibility, financial performance, and quality (Cazeri et al, 2017). It drives businesses to improve their financials (Bhanot et al, 2019). Each dimension is an important driver for the other two TBL dimensions (Bhanot et al, 2019). The TBL approach has prevailed during the last decade (Levering and Vos 2018; Martins and Pato 2019; Ahi & Searcy, 2013).

3.2 The academic view on a sustainable production

This chapter will provide an overview of the concept of sustainable production. It is important to note, that sustainable manufacturing will be thought of as a synonym to sustainable production in this thesis. Sustainability in businesses production/manufacturing has become a higher priority with the increase of sustainable supply chain practices. Production is especially important since its processes can have a large impact on the finished product, e.g., the quality, the percentage of rejects and the environmental performance (Boukherroub et al, 2015). The United Nations (UN) believed that sustainable production is a central part of sustainable development which explains why the concept emerged in 1992, shortly after the Brundtland definition of sustainable development (Krajnc and Glavič, 2003). At the time, the supply chain concept was merely in its wake and businesses focused on their direct sustainability impacts. This caused the sustainable production concept to be a major part of the sustainability movement.

It continues to be highly relevant in the context of sustainability and several authors see sustainable production as a key part of the future in SSCM research (Matthews et al, 2016). In addition, many models that deal with manufacturing have indicated a quest for sustainable production (Bradenburg et al, 2015). Krajnc and Glavič (2003) mention several characteristics in the environmental dimension that they believe ensure sustainable production within the

limits of the planet. The business needs to minimize all types of wastes, natural resources, materials, and energy. The products should be designed, produced, distributed, and recycled so that their associated impacts are within the earth's capacity. This means that all stages in a product's life cycle need to be addressed and that there will be a shift toward clean technologies (Krajnc and Glavič, 2003).

Wästkämper et al (2000) defined Sustainable manufacturing as creating manufactured products that cater to all dimensions of sustainability. Definitions of sustainable production found through the literature review:

1. *"Creating goods by using processes and systems that are non-polluting, that conserve energy and natural resources in economically viable, safe and healthy ways for employees, communities, and consumers and which are socially and creatively rewarding for all stakeholders for the short- and long-term future."* (Glavie and Lukman, 2007)
2. *"…the creation of goods and services using processes and systems that are non-polluting; conserving of energy and natural resources; economically viable; safe and healthful for employees, communities, and consumers; and socially and creatively rewarding for all working people*." (Veleva and Ellenbecker, 2001). The Lowell Center for Sustainable Production (LCSP)
3. *"… the continuous application of an integrated preventive environmental strategy to processes, products, and services to increase overall efficiency, and reduce risks to humans and the environment."* (UN, 2006).

It is worth noting that these definitions were created and published almost two decades ago and there seem to be few recent scientific reports that use the term sustainable production. The author of this thesis believes that the shift towards supply chains during the last decades has directed the focus to more holistic sustainability concepts such as supply chain management (SCM) and SSCM.

3.3 SSCM theory

An increasing number of businesses are considering sustainability practices when it comes to their short- and long-term decisions. These practices are commonly based on the Brundtland definition of sustainable development (see chapter 1.1). However, the vagueness of this definition has led to complications when applying its principles in practice. This challenge is expressed through the liberal usage of the term "sustainable" and "green" that can be seen in the many products and services that businesses around the world provide to their customers (Ahi & Searcy, 2013). No matter which term that businesses use, sustainability has reached a higher place on the agenda. Changes in customer demands, trends, and growing competition are some of the many reasons that have driven this process (Sánchez-Flores, 2020). Another significant driver is sustainability scandals/issues/instances in business supply chains that have been brought to light. One example is the Rana Plaza incident in 2013 in which bad working conditions lead to the deaths of over 1100 people and criticism towards many businesses in the fashion industry (Ehrgott et al, 2011). Other examples are the Nike sweatshop allegations (Nielsen, 2013), the Toshiba accounting scandal (Fukase, 2015), and the Volkswagen emission scandal ("Dieselgate") (EPA, 2016).

Scandals like these have jeopardized the reputation of several large corporations and have increased mistrust toward the industry (Fukase, 2015). The effect has been increased pressures from various stakeholders on the transparency of businesses' sustainability

practices. It has efficiently shown businesses around that they need to become better at ensuring sustainability in their supply chains and that they cannot ignore their suppliers' practices (Daub 2007; Hubbard 2009; Tate et al. 2010; Varsei et al, 2014; Handfield et al, 2005; Sharfman et al, 2009; Bansal, 2005). Businesses need to integrate their entire supply chains in their sustainability work, which means more complex operations and an increased number of stakeholders. This is a big structural change for many businesses since they must widen their sustainability perspective from mainly internal to an approach that extends well beyond the limits of their business (Ahi & Searcy, 2015a; Seuring and Gold, 2013). It has fundamentally changed the way businesses compete against each other. Now it is not simply individual organizations competing against each other but rather entire supply chains (Anati and Olson, 2013).

SCM is a new concept that utilizes sustainability practices in entire supply chains. The SSCM field has grown alongside businesses sustainability interests (Ashby et al., 2012; Ardakani and Soltanmohammadi, 2019; Ahi & Searcy, 2013). It is the strategic integration and coordination of an organization's business processes to improve the long-term sustainability performance of the business itself and its supply chains (Rogers and Carter, 2008). In practice, it is often used as a management system that collects and analyses information in a way that supports the decision-making process at businesses (Neely et al, 2002).

Different measurement tools, indicators, and performance metrics are an essential part of this system since they enable sustainability to be quantified and calculated along the supply chain (Schaltegger and Burritt, 2014; Wood, 2010). These calculations are based on a wide variety of different SSCM approaches and the ones that businesses choose have a large impact on the content and quality of their disclosure. It has also been shown to reduce the gap between their disclosure and practice (Mura et al, 2018). The growth of SSCM has tremendous potential since research has shown that a business supply chain can be responsible for more than 80 percent of businesses sustainability issues (McKinsley, 2016; Dubey, 2015; Tidy et al, 2016). Despite the large potential of the field, the literature is still fragmented, and a lot of research needs to be conducted (Morali & Searcy, 2012). Recent reports have pointed out gaps in the field as well as research opportunities:

- That the theoretical background of SSCM needs to be expanded (Svensson 2007; Carter and Rogers 2008; Seuring and Muller 2008; Kuhnen & Hanh, 2018; Carter & Washispack, 2018; Ansari & Kant, 2017).
- Research on the issues regarding SSCM implementation (Taticchi et al, 2015).
- The impacts of SSCM on society (Reefke & Sundaram, 2017).
- Lack of models with a TBL approach (Boukherroub et al, 2015; Ansari & Kant, 2017; Ahi & Searcy, 2013)
- In many models, Supply chain performance is "economic-driven" (Boukherroub et al, 2015).
- Applicability as a holistic approach (Ansari & Kant, 2017; Ashby et al, 2012).

Businesses still faces huge challenges even if these gaps are filled: The large investments that SSCM requires, the lack of green resources (e.g., the availability of renewable energy) and the complexity of a holistic supply chain approach (Ageron et al, 2012). Implementing SSCM practices will require a lot of effort, so it is not the easiest choice for businesses in the short run, but it is the only choice in the long run. SSCM is an important new tool that businesses can use to simultaneously enhance their profits and increase their sustainability (Hussein et al, 2016).

3.4 Defining SSCM

The multidisciplinary nature of SSCM has resulted in numerous definitions and many discussions (Ahi & Searcy, 2013). It has become a catchword that has been used in various contexts and started a debate on what it means in practice. This could explain why relatively few reports state which SSCM definition they use (see table 3). It is important to note that this thesis agrees with Ahi and Searcy´s view of SSCM as an extension to SCM (Ahi and Searcy, 2013), it goes even further and views GSCM as an extension of SSCM. This thesis focuses on SSCM and will therefore not define neither SCM nor GSCM since these would be similar. Currently, there is no universal definition of SSCM but numerous different ones (Ahi and Searcy, 2013; Morali and Searcy, 2012). The most cited definition in the chosen literature is presented in table 3. There are three main definitions that are cited in the selected papers of the literature study in this thesis, however, a majority of the selected papers does not define SSCM.

Table 3 – The three most frequent SSCM definitions that are used in the selected reports and the number of reports they are present in.

SSCM definition	Number of occurrences	Sources
Seuring & Müller, 2008	6	(Carter & Washispack, 2018; Dubey et al, 2015; Ginnakis, 2020; Saeed & Kersten, 2020a; Saeed & Kersten, 2020b; Taticchi et al, 2013)
Carter and Rogers, 2008	6	(Ashby et al, 2012; Beske-Janssen et al, 2015; Carter & Washispack, 2018; Rajeev et al, 2017; Saeed & Kersten, 2020b; Varsei et al, 2014)
Ahi & Searcy, 2013	3	(Ahi & Searcy, 2013; Ahi & Searcy, 2015b; Ahi et al, 2016)
Hassini, Surti, and Searcy, 2012	2	(Seuring & Müller, 2008; Taticchi et al, 2015)

All four of these definitions include the three sustainability dimensions, the TBL, an approach that has prevailed during the last decade (Levering and Vos 2018; Martins and Pato 2019; Ahi & Searcy, 2013). The definition by Carter and Rogers (2008) and Seuring and Müller (2008) are both occurring in six reports. The author chose to use the definition by Seuring & Müller in 2008. It is best described as a combination of the others, it is more detailed than the one proposed by Carter and Rogers but less detailed than the one by Ahi and Searcy. It is this definition that will be used in this thesis, it states that SSCM is:

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

3.5 SSCM frameworks & performance measurements

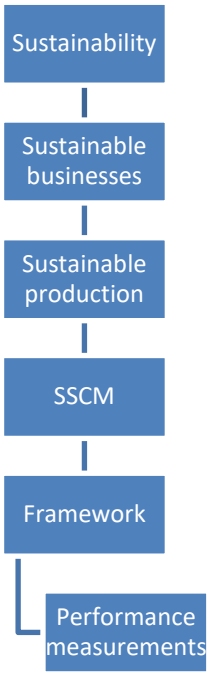

Figure 1 – Illustration of how performance measurements originate in the sustainability conecpt.

The embrace of sustainability and supply chain mindset in academia and practice has resulted in a more SSCM approaches (see figure 1) and researchers have called for more studies on frameworks and measurements in SSCM (Taticchi et al, 2013). Businesses have realized that these frameworks and performance measurements are crucial elements for them to compete/succeed in sustainability (Sharma et al., 2005; Balfaqih et al, 2016; Chiarini, 2017; Bai et al., 2012; Taticchi et al., 2012).

SSCM consists of a framework that defines the management principles to be used in all processes included in SSCM such as the performance measurements. It consists of all interactions and actions related to the performance measurements such as motivation, data collection, and reporting. A framework is defined as a system of rules, ideas, or beliefs that are used to plan or decide something (Cambridge Dictionary, 2021). Some authors have proposed that frameworks should integrate upstream supply chains, internal operations, and the downstream customers (Olugu et al. (2010). Multiple frameworks have been proposed during the last decade, but the ones used by practitioners are mainly created by the business community. This indicates that academia needs to become better at producing frameworks that are relevant for businesses. Normally, frameworks have a few central characteristics (Ansari & Kant, 2017):

1. They suggest that the elements are studied as well as the structural relationships among them.
2. They describe the required sequence of activities required to achieve the objectives.
3. They describe the activities that connect the various framework elements.
4. They describe how the framework can be applied in practice.

Performance measurements is an important part of businesses frameworks. Researchers have found that they enable businesses to improve their practices, long-term performance, transparency, communications and reduce costs faster than their competitors. In fact, the difference in annual revenue can be as large as 5-6% (Panchal and Jain, 2011; Panicker and

Sridharan, 2011; Rao and Holt, 2005; Taticchi et al, 2015). Many researchers have found that performance measurements have an important role in the progress of SSCM (Ahi & Searcy, 2015a; Beske-Janssen et al, 2015; Santos et al, 2020). It is seen as a significant part of SSCM since its implementation enables key SSCM elements such as transparency, supplier evaluation, and collaboration (Beske-Janssen et al, 2015).

Performance measurements are the process used by businesses to measures the efficiency and effectiveness of their actions (Neely, 1999; Sheperd & Gunther, 2005; Neely et al., 1995). The efficiency focuses on how well businesses resources are being used in a TBL perspective (Chardine-Baumann and Botta-Genoulaz, 2014). The effectivity focuses on the degree that the objectives are being met (Taylor, 2004). The appropriate objectives and efficiency are necessary to choose actions that extend sustainability principles across the supply chain (Gimenez and Tachizawa, 2012).

The measurements are usually conducted through the following processes: selection and development of measures, data collection and manipulation, information management, performance assessment, and review of the system. These processes enable the system's main functions: measuring performance, managing strategy, exercising communication, influencing behavior, and providing learning and improvement (Bourne et al, 2003). An important aspect of performance measurements are their scope since it decides the number of stakeholders that are included. Many authors suggest a holistic approach in which performance measurements should be conducted throughout the entire supply chain (Schöggl et al., 2016; Taticchi et al, 2013) & (Ahi & Searcy, 2015c; Taticchi et al, 2015; Karthik et al, 2015). The scope can be expanded both upwards and downward in a business supply chain but businesses' low liability for their customer's actions have resulted in that they are usually overlooked in relation to upstream stakeholders (Kovács, 2008). This thesis and the proposed framework (see chapter 8.0) focuses on upstream stakeholders in supply chains.

3.6 SSCM motivations, drivers and barriers

SSCM provides a wide range of benefits for businesses (Kazancoglu et al, 2018) but there are various factors that affect the progress of sustainability, such as supplier motivations and supply chain drivers and barriers (Ahi & Searcy, 2015a). However, there exists a lot of confusion and inconsistencies when it comes to these factors (Pagell and Shevchenko, 2014). That is why researchers have called for studies that focus on identifying motivations, drivers, and barriers in TBL SSCM frameworks (Taticchi et al, 2015).

When it comes to businesses' fundamental views of SSCM there are three different types of motivations for businesses that pursue sustainability. First, businesses with legitimization motivation focus on reacting to external demands rather than proactive efforts, they want to meet conditions rather than exceed them. Their main concern is what could occur if they would not meet certain requirements, e.g. bad publicity or sanctions. Second, businesses with competitiveness as motivation see SSCM both as a requirement and as an opportunity (Bansal and Roth, 2000; Lindenberg and Steg, 2007). Third, businesses that are motivated through ecological responsibility pursue SSCM due to a sense of obligation or responsibility (Vanpoucke et al, 2016).

On top of these fundamental motivations for SSCM are there also others that focus on the motivations of individuals, the psychological point of view usually defines this as intrinsic motivation (Gottschalg and Zollo, 2006). There are three types of intrinsic motivation:

Hedonic, gain, and normative motivation (Lindenberg, 2001; Lindenberg and Steg, 2007). Hedonic motivation is connected to the improvement of certain feelings and therefore involves actions such as pleasure-seeking and happiness. It includes a scale that grades feelings from bad to good and the goal is to achieve a feeling as close to "good" as possible. Gain motivation relates to resources and the goal is to reach optimal resource efficiency. Normative motivation rather focuses on "doing the right thing" based on the individual's moral framework and the main goal is to live according to this framework (Lindenberg and Steg, 2007).

Many of the chosen reports view drivers from either an internal or an external perspective. The internal perspective focuses on internal stakeholders, actions, and processes while the external perspective focuses on pressures from external stakeholders such as governments, customers, and politicians (Zimon et al, 2019). Several authors argue that external pressures are the main driver for sustainability (Zimon et al, 2019; Santos et al, 2020; Jain and Sharma, 2014). It is important to identify the drivers of SSCM to speed up businesses' transition towards sustainability as well as to develop the field (Ahi & Searcy, 2015a). According to the findings of Morali & Searcy (2012), the need to respond to internal and external pressures from stakeholders is one of the greatest driving forces for businesses to adopt SSCM. The most frequent drivers found during the literature study are shown in table 4.

Table 4 – The most frequent drivers found in the literature review, divided between internal and external drivers..

Internal drivers	**Sources**
Competitive advantage	(Morali & Searcy, 2012; Seuring & Müller, 2008; Zimon et al, 2019)
Management commitment	(Zimon et al, 2019) (Gonzalez-Benito and Gonzalez-Benito, 2006; Hoejmose et al., 2012).
Organizational involvement	(Zimon et al, 2019; Gonzalez-Benito and Gonzalez-Benito, 2006; Hoejmose et al., 2012; Carter and Dresner, 2001; Hanna et al, 2000).
Economic stability and profitability	(Dubey et al, 2015; Fawcett et al., 2008; Srivastava and Srivastava, 2006; Srivastava, 2007; Darnall et al., 2008; Fortes, 2009; Carter and Dresner, 2001; Walker et al., 2008)
External drivers	**Sources**
Governmental regulatory pressure	(Zimon et al, 2019; Seuring & Müller, 2008; Santos et al, 2020; Jain and Sharma, 2014; Green et al, 1996; Walker et al, 2008).
Pressures from customers	(Morali & Searcy, 2012; Seuring & Müller, 2008; Santos et al, 2020; Jain and Sharma, 2014; Carter and Dresner, 2001).
Responding to stakeholder pressures	(Morali and Searcy, 2012; Green et al, 1996).
Improve stakeholder relations	(Morali and Searcy, 2012; Klassen and Vachon, 2003).

Monitoring performance	(Walker et al, 2008; Gonzalez-Benito and Gonzalez-Benito, 2005; Rao and Holt, 2005).

The barriers or challenges of SSCM are also important to identify to enable individual businesses and entire industries to develop efficient countermeasures. The barriers for SSCM that were found in the review could be divided into three key areas:

1. The required resources: technical problems (Singh et al, 2016), higher costs (Morali & Searcy, 2012; Seuring & Müller, 2008; Wycherley,1999), lack of employee involvement (Morali & Searcy, 2012); (Singh et al, 2016)), lack of leadership (Morali and Searcy, 2012) and lack of government policies (Singh et al, 2016; Bradenburg et al, 2015).
2. The lack of understanding for the sustainability concept: environmental degradation (Singh et al, 2016), coordination effort (Seuring & Müller, 2008), and alignment of goals with SSCM objectives (Morali & Searcy, 2012).
3. Risk management and monitoring: Management problems (Singh et al, 2016), lack of trust (Schöggl et al, 2016) & Wycherley,1999), insufficient communication in the supply chain (Seuring & Müller, 2008), transparency of information and knowledge (Morali & Searcy, 2012; Schöggl et al, 2016) and reach sub-suppliers located upstream (Vanpoucke et al, 2016).

The identified business factors can serve as a valuable input when businesses create new SSCM or update existing ones. This is important for all businesses since it is becoming a fundamental requirement to measure sustainability in supply chains and to monitor their performance over time (Ahi & Searcy, 2015a).

3.7 Common performance measurement approaches

There is a great variation in how different businesses and frameworks approach performance measurements (Bhanot et al, 2019). Different business types, industries, and environments explain this variety (Schaltegger et al, 2014). Their different approaches can be divided into three general types of performance measurement approaches, similar to the three fundamental business motivations mentioned in the previous chapter. Reactive approaches that focus on end-of-pipe solutions, proactive approaches in which businesses recycle and reuse resources within their supply chains, and value-seeking approaches in which sustainability is integrated into strategies and where the sustainability responsibility covers the entire supply chain (van Hoek, 1999). End-of-pipe approaches were initially popular since the processes and products could remain the same, but there has been a shift toward the two remaining approaches during the last decades(Ashby et al, 2012; Dubey et al, 2015). The limited number of TBL stochastic methods have indicated that simpler models are preferred to assess supply chains (Bradenburg et al, 2015); this has resulted in supply chains that generally focus either on efficiency, consistency, or sufficiency improvements (Schaltegger & Burrit, 2014). Efficiency has received a considerably larger amount of attention in both practice and academia (Sahamie et al., 2013).

A conclusion drawn by (Boukherroub et al, 2015) is that many of the proposed performance measurement approaches are based on three concepts: their objectives are focused on performance criteria, their variables are a combination of factors that impacts the

performance, and their measures are the indicators that indicate the achievement level of each criterion (Boukherroub et al, 2015).

In summary, there is widespread recognition of the importance of adopting a systemic and balanced approach towards designing performance measurement systems for supply chains (Sheperd & Gunther, 2005). A large amount of performance measurement approaches in academia makes it unsuitable to include a detailed description of each one in this thesis. Instead, a general overlook will be provided by presenting a description of the most common approaches. The review found that the following three performance measurement approaches were among the most popular ones:

First, the Business scorecard (BSC) approach, it was originally designed for the financial sector since it measures organizational performance from financial, customer, internal process, and learning perspectives. It has later been modified to include the three sustainability dimensions and therefore becoming applicable for supply chain evaluations (Bhanot et al, 2019). A BSC uses two central principles. First, it gives its users information on different dimensions through several different metrics. Second, it limits the number of measures as a way of prioritizing the measurements and focusing on the most important indicators. It thereby provides a multi-dimensional overview of businesses and eliminates unnecessary data collection (Kaplan and Norton, 1992). BSC does not contain a mathematical model or weighting which explains why it often is incorporated with other methods, e.g. the fuzzy balanced ANP scorecard (Beamon, 1999).

Second, Analytic Hierarchy Process (AHP) is the second most used approach in SSCM performance measurements. It is an easy and flexible multiple-criteria decision-making (MCDM) approach that organizes and analyzes multi-variable decisions (Kumar and Garg, 2017). The technique is used by managers to understand the tradeoff between the three sustainability dimensions and simplifying complex decisions (Schaltegger and Burritt, 2014). It also allows the participation of several stakeholders in making decisions and agreements (Schaltegger and Burritt, 2014). Research has shown that the AHP approach provides several benefits when it comes to analyzing complex decisions in sustainable supply chains (Kumar and Garg, 2017).

Third, Composite Metrics is another approach that can be applied to performance measurements in SSCM (Brandenburg et al, 2014; Hassini et al, 2012). It is a practical method that enables businesses to focus through its ability to gather and summarize complex challenges into one indicator (Singh et al, 2012). Composite metrics have gained merit as a tool for sustainability implementation, however, some authors claim that the metrics tend to become too subjective due to that they are dependent on the selected weighting system (Bohringer and Jochem, 2007).

On top of the most popular performance measurement approaches mentioned above, various indicators and frameworks have been proposed by SSCM practitioners. Below are the five most popular ones described (see appendix for the complete list).

- The Global Reporting Initiative (GRI) is a non-profit organization that offers various reporting guidelines for businesses and tried to develop a more standardized way of reporting (Kuhnen & Hanh, 2017). GRI promote sustainability reporting through their sustainability reporting guidelines (PérezLópez et al., 2013; Alonso-Almeida et al., 2014). These guidelines are

voluntary and have been developed by thousands of practitioners and researchers (Legendre and Coderre, 2013).

- The Supply Chain Operations Reference (SCOR) framework is not designed for performance measurements but is one of the most popular systems in multiple industries (Huan et al., 2004; Taticchi et al., 2013; Qorri, 2018). It is developed by the Supply Chain Council (SCC) to describe all processes in supply chains across all stakeholders, both upstream and downstream (Gunasekaran and Kobu 2007). The more than 250 metrics that are part of the framework are categorized against five performance attributes: reliability, responsiveness, agility, costs, and asset management efficiency. In spite of the framework's popularity among practitioners, have it received little attention in the academic world (Taticchi, Tonelli, and Pasqualino 2013).
- The UNs Sustainable Development Goals (SDGs) represent global targets that act as a reference point to capture positive contributions in sustainable development. There are 17 different goals and number 12 “Responsible consumption and production” is especially relevant since it is aligned with the idea of SSCM (Zimon et al, 2019).
- The ISO 14000 family is part of ISOs environmental standards and provides requirements and guidance for environmental systems, we will focus on ISO 14001 and 14031. ISO 14001 is their standard for environmental management systems, it has more than 300 000 certificates globally. It is a way for businesses to meet and go beyond their legal requirements as well as taking measures that satisfies internal and external pressures (ISO, 2021a). ISO 14031 is the guideline for businesses' environmental performance evaluation (EPE). It is a generic standard that businesses can use to support their own performance measurements (ISO, 2021b). It incorporates a wide array of measures such as fugitive non-point air emissions and spill and leak prevention (Tajbakhsh & Hassini, 2015).

There are plenty of businesses that successfully have implemented specific performance measurement approaches for SSCM. One of them is Hyundai motors, which demanded all of their prioritized suppliers to implement ISO 14001 in 2003. In addition, the business supported its suppliers with material such as workshops. Five years later, the certified suppliers had increased tremendously from 34% to 99% (Lee and Cheong, 2011). Third-party certifications are also common, such as forest stewardship council and electronic product environmental assessment tool (EPEAT) (Morali & Searcy, 2012).

There is a lot that can be learned from different performance measurement approaches and practitioner initiatives; studying them can help gain a deeper understanding of SSCM performance measurements (Beske-janssen et al, 2015). Researchers recommend that future research tries to design something similar to a TBL sustainability index (Hussein et al, 2016). No matter which approach is chosen, there is a need for systematic performance measurements that assess sustainability in businesses and their supply chains (Chen et al., 2014; Koberg and Longoni, 2019).

3.8 Designing SSCM framework & model

SSCM performance measurements frameworks and models are typically designed and optimized for a particular situation, business, or industry. Unfortunately, the significance of SSCM design and planning is often ignored by practitioners (Liu et al., 2014). This thesis will aim to aid businesses to embrace this part of SSCM.

A great starting point for designing an SSCM is defining its goal and purpose (Beske-janssen et al, 2015). Thereafter, it is important to choose the methods or tool's fundamental principle. Ahi et al (2016) and Ahi & Searcy (2015a) propose one that is frequently used in academia, where an increase in sustainability means that the capacity of the supply chain has become

higher than its barriers. If not, its sustainability will regress. After that, the findings of Schöggl et al (2016) is a good next step. They were condensed into seven key requirements for supply chain aggregation and assessment:

1. The chosen performance measurement tool should allow suppliers/businesses to provide less detailed information since some might be unable to provide certain data due to insufficient knowledge or resources.
2. Different types of data/units should be allowed in the tool since it targets a diverse range of sustainability factors.
3. The performance measurement should be conducted chain-wide with all stakeholders in the supply chain, not only the focal business and direct suppliers.
4. The used metrics should evolve over time and change alongside potential changes of relevant sustainability topics.
5. The performance measurements should be able to adapt to regional and cultural contexts.
6. Promote greater standardization to ensure comparability of results between suppliers but also year-to-year comparisons.
7. Robustness in situations where the available information is insufficient (see more in chapter 3.2).

These different steps can be considered as important building blocks when creating an SSCM but also when creating its content, such as frameworks, methods, and tools. The reports in the literature review call for future research in five areas to develop SSCM (see table 5).

Table 5 – Table showing five future research areas that researchers have suggested for future research in SSCM.

Step	**Source(s)**
Performance measurements that address the social dimension of SSCM.	(Brandenburg et al., 2014; Kuhnen & Hanh, 2017; Tajbakhsh & Hassini, 2015; Mura et al, 2018; Taticchi et al, 2013; Reefke & Sundaram, 2017; Bhanot et al, 2019; Karthik et al, 2015; Ahi & Searcy, 2014).
Holistic TBL performance measurement frameworks and models.	(Bradenburg et al, 2015; Carter & Washispack, 2018; Cazeri et al, 2017; Bhanot et al, 2019; Boukherroub et al, 2015; Rajeev et al, 2017; Santos et al, 2020; Seuring & Müller, 2008; Ahi & Searcy, 2015a; Ashby et al, 2012; Saeed & Kersten, 2020b).
Frameworks in SSCM that utilize new tools to integrate TBL	(Taticchi et al, 2015; Taticchi et al, 2013).
Avoiding mono-objective models through more independent dimensions	Boukherroub et al, 2015).
Standardized performance measurement frameworks and systems in terms of metrics, structure, etc	(Hervani et al 2005).

Performance measurements in SSCM require a performance measurement framework, and the performance method/tool. The framework enables businesses to develop their performance measurement system and to identify appropriate sustainability indicators (Mutingi et al., 2014a, 2014b). The focal business should focus on the entire supply chain, the relevant dimensions and must be careful not to overlook the need for context-based metrics (Ahi & Searcy, 2015c). Salzmann et al. (2005) and Schaltegger et al (2011) found that holistic SSCM performance measurement frameworks need to consider the TBL.

Performance measurement tools uses the principles of their frameworks to shape the necessary interactions between different stakeholders, the level of data collection, and decide on the trade-offs between the business´s different goals. According to Azzone et al (1998), there are four significant areas that are important for designing an effective performance measurement tool. 1) Its ability to account for long-term impacts. 2) Its ease of usage. 3) Its ability to account for all relevant indicators. 4) Its timeliness, the time it takes to collect and analyze the collected data (BR et al, 2016). Additionally, a scan of the literature concluded that there are three aspects that a performance measurement method should address: First, the reduction of negative sustainability impacts. Second, including the entire chain of each individual product. Third, adopting all aspects in the life cycle goals, minimum performance, trade-offs, and win-win configuration (Taticchi, Tonelli, and Pasqualino 2013).

Businesses are necessarily not forced to create a tool from scratch; normally, they use an existing tool or combines one or several performance measurement approaches to create one that they believe is more suitable to their needs (see chapter 3.7 for popular approaches). If they chose to use an existing tool, Bradenburg et al (2015) found that simpler approaches where preferred by businesses, and Qorri (2018) recommends that they should choose the tool they know the best. If a business chose to design its own tool, the literature provides some guidelines on how to do so successfully. Globerson (1985) proposed four steps to designing a tool:

1. Identify key performance areas.
2. Establish performance indicators.
3. Use benchmarking to define targets for each criterion.
4. Design a control loop to correct eventual deviations from the targets.

Another initial step is to choose the fundamental principle of the tool, many tools are based on the principle proposed by Ahi & Searcy (2015a) and Ahi et al (2016) (see chapter 3.6). These findings can hopefully help businesses to choose/create a tool and select the most relevant SSCM indicators. However, when these have been chosen is it time to decide if and how they shall be weighted in relation to each other. If weighting is chosen to be included, it is usually based on the priorities of the supply chain and its circumstances. A beneficial approach might be to analyze the impacts of different weighting approaches before making this important decision (Ahi and Searcy, 2014). These aspects are of large importance for the success of performance measurement methods, but so is also their structure. A common method hierarchy is the one used by Kazancoglu et al (2018), a three-dimensional method that includes main criteria, sub-criteria, and indicators (measures). An interesting suggestion by Xing et al (2016) is that a collaborative cloud platform is essential to SSCM since it allows the data to be exchanged among its stakeholders.

3.9 Dimensions

The dimensions of a performance measurement tool divide its indicators into different clusters and the chosen dimensions are coherent with the focuses of the framework (Ahi, 2015). Differences in goals, industries, and supply chains have resulted in a wide array of different dimension sets, so-called structural dimensions. Bradenburg et al (2015) identify eleven structural dimensions grouped into the modeling dimension, the sustainability dimension, and the sustainable supply chain dimension. As mentioned in chapter 3.1, many researchers recommend the three TBL dimensions. However, the findings of Singh et al. (2012) and Hassini et al. (2012) indicate that relatively few methods integrate all three dimensions in their SSCM, rather one or two of these. It is important that the chosen method uses a broad integrated approach to sustainability across all dimensions rather than specific and disconnected expertise in each one (Matos and Hall, 2007). An analysis of the structural dimensions chosen in the reviewed articles showed that most articles used a combination of different models (17/21) (see appendix 8.0 for details). It also showed that there is a large variation in the chosen dimensions of each article. However, it was clear that the three sustainability dimensions or the TBL were part of most structural dimensions in one way or another.

- Economic sustainability was present in 14 of 21 articles through one of the following terms: economic, economic performance, economic/financial performance, or Economic stability.
- Social sustainability was present in 15 of 21 articles through one of the following terms: social, social focus, social values & ethics, social responsibility, or Social sustainability practices benefiting society.
- Environmental sustainability was present in 14 of 21 articles through one of the following terms: environmental, environmental focus, environmental wastes, and emissions or environmental conservation.

Based on this find, all other dimensions as sub-dimensions and categorized them according to what is suggested by Santos et al (2020), with three sustainability dimensions and the transversal dimension that describes elements that connects all the TBL dimensions simultaneously (see appendix 6.0). The results from the dimension analysis show a clear coherency. The three sustainability dimensions economic, environmental, and social sustainability are deeply rooted in the SSCM field.

3.10 Metrics and key performance indicators (KPIs) in SSCM

Indicators are needed to measure different suppliers' performance (Schaltegger and Burritt, 2014). That is why the selection of these indicators is a crucial part of a performance measurement tool, they characterize the entire process (Sheperd & Gunther, 2005). There is no common definition for the term "Indicator", this thesis uses the Merriam-Webster dictionary´s definition: *an instrument that shows the existence or condition of something* (Merriam-Webster, 2016). There is a lack of standardized sets of indicators in SSCM, a claim that is supported by several researchers (see e.g., Ahi and Searcy, 2015; Tuni et al, 2018; Saeed & Kersten, 2020a; Pimenta & Ball, 2015). They have found that there is a very low repetition of indicators in SSCM; one explanation is that there are various different names for similar indicators, and some differ between being either absolute or relative (Tuni et al, 2018).

More complexity is added by the large number of stakeholders that are present in supply chains. That is one argument Matos and Hall (2007) and Hubbard (2009) use to explain why it is hard to account for every single aspect of sustainability in a performance measurement tool. The selection of indicators is therefore a time-consuming activity for many businesses. Neely

et al (1995) simplify this activity by suggesting key considerations for selecting SSCM performance indicators:

- What performance measures are used?
- What are they used for?
- How much do they cost?
- What benefit do they provide?

Unfortunately, many businesses fail in choosing the correct set of measures (Mentzer et al., 2007). A way to avoid this issue is to select indicators that focus on the most important activities to improve sustainability rather than try to cover every single one. That is partially why Hassini et al. (2012) proposed that suppliers should create their own indicators. No matter if businesses choose existing indicators or create their own, it is important to define the difference between social, economic, and environmental sustainability metrics. Cetinkaya et al. (2011) do so by dividing indicators belonging to the dimensions into three clusters. The economic dimension (quality, efficiency, and responsiveness), the environmental dimension (emissions, natural resources utilization, and waste & recycling), and the social dimension (health & safety, employees, and noise). This is in line with Jain et al (2020) who suggest that indicators within each dimension are divided into different clusters to induce more efficient handling of large numbers of criteria. Lastly, Lambert and Pohlen (2001) observed another issue with SSCM indicators, that they often do not capture the supply chain but rather focus on internal logistics performance measures.

3.11 Supplier selection & categorization

Many performance measurement tools have additional attributes to the ones mentioned earlier in this chapter. Initially, when businesses started to select suppliers based on their performance in specific areas, the economic performance was often in focus (Kar and Pani, 2014; Wilson, 1994). This changed as the awareness of climate change and environmental issues increased; that's why suppliers' environmental and social performance was added to the selection criteria (Jain et al, 2020). It is a necessity for businesses that pursue a sustainable supply chain to select suppliers that are appropriate for long-term partnerships and in achieving their organizational objectives (Varsei et al, 2014; Hsu et al, 2013; Bai and Sarkis, 2010; Rashidi and Cullinane, 2019). This search has persuaded researchers to address this challenge and propose frameworks and techniques for supplier selection (Ho et al., 2010). Often, these are primarily focused on the initial process of selecting suppliers as well as the process of categorizing them based on their performance measurements in a tool.

The supplier selection process naturally varies between businesses, but it often contains multiple criteria. This process have recently become more complex since TBL, political and other concerns have been added to more traditional factors such as price (Izadikhah et al, 2018). The ability to select sustainable suppliers from the start is a competitive advantage for a business that competes against other sustainable supply chains (Jain et al, 2020). It requires that the suppliers are evaluated based on several metrics; many businesses use these metrics in their code of conduct to simplify this process. In addition to the initial supplier selection, there are several other tools that businesses can use in order to benefit their sustainable suppliers. Performance measurement tools usually output a score for each supplier.

There are many ways of using this score, it can be used as proposed by Santos et al (2020) to categorize suppliers into five different sustainability levels that describe the requirement for each level from a three-dimensional (environmental, social, and economic) view. The levels range from businesses with the lowest sustainability to the ones with the highest. The first level is "Nonexistent" where the business does not have an SSCM performance management system, they do not act on issues that integrate the TBL and their activities are directed towards remanufacturing, analysis, and results. The next level is "Aware" where the business presents an initial knowledge of the TBL dimensions. The following level is "Intermediate", where the business starts to develop their planning and execution of TBL issues. Thereafter is the "Advanced" level where there are structural advances in terms of innovation and technology, their mission, vision, and sustainability strategies are improved and strengthened. The relationships with stakeholders are improved tremendously and their sustainability performance is close to full consolidation. The last and highest level is "Sustainable" where the business reconfigures their operations to minimize their footprint, social education programs are provided, and their different processes reach the maximum level of sustainability. All TBL dimensions are effectively integrated with the business´s strategy (Santos et al, 2020).

Jain et al (2020) suggest a similar grading system for their TBL performance indexes with five levels but these are referred to as "extremely poor", "poor", "average", "good", and "very good". But for the supplier's performance evaluation they suggest three levels "Best", "Average" and "Worst". Being selected as a partner to a large business or achieving a high enough score in a performance measurement tool can have a large impact on their business; high sustainability might lead to them being prioritized by the focal business while a low score might result in the loss of a customer. This underlying supplier selection makes performance mesurements a crucial instrument in the future of SSCM and has the potential to give sustainable businesses a competitive advantage (Taticchi et al, 2015).

3.12 Data collection

Data collection is an important aspect of performance measurements. Collecting data requires work both from the suppliers that collect the data and from the business that gathers, analyses, and uses it in their sustainability report. The two main challenges for data collection are data availability and quality (Ahi et al, 2016). Availability of data is an issue since some information from specific suppliers might not be available due to reasons such as a lack of measuring equipment, it is in the wrong units, or it is only available in a certain interval. The quality of the data often varies due to measurement inconsistencies, faulty meters, or uncertainties.

However, there are various approaches to tackling these issues. Examples of such are reporting, surveys and audits in the chosen measurement approach (Pimenta & Ball, 2015) (see chapter 3.7 for the most common ones). As mentioned earlier in this thesis there is a lack of standardization when it comes to performance measurements; the same goes for the data collection, and a lot of researchers call for research in this area (Tuni et al, 2018). One suggestion by Mura et al (2018) and Tuni et al (2018) is to create an environment where data is shared between different stakeholders and businesses. A common concept for sharing such data in benchmarking enables comparisons between businesses, industries, and even countries based on their score. In addition to benchmarking, the frequency of the measurements and data collection is of great importance. Sheperd & Gunther (2005) start a discussion on how often the frequency should be re-evaluated periodically and possibly changed.

4.0 Interviews with the users of IKEA`s current tool

The following chapter presents the answers from the interview study performed with users of IKEA`s current tool. Each CA at IKEA has its own Sustainability managers that give its sustainability inputs to action plans (APLs) and is accountable for the sustainability performance of the CA. The primary users of the tool can be divided into three different groups: SDs, BDs, and suppliers. The suppliers are eternal businesses that are not part of IKEA. The main purpose of the SDs is to lead and support the implementation of the IKEA sustainability strategy, People & Planet Positive (PPP). They achieve this primarily by supporting the business development teams to set priorities, implement tools, assess suppliers as well as meeting the sustainability goals in line with category plans. BDs are part of a business team in one of IKEAs CAs; they are the ones that are in contact with the different suppliers and aid them in developing and implementing APLs to improve their sustainability. The results for each topic are presented accordingly. It is important to note that all the SDs were interviewed together, that is why there is no frequency analysis presented for this group.

4.1 Defining a sustainable production & positive feedback.

4.1.1 Sustainable production

The first question of the interviews was "What does sustainable production mean to you?". In their definitions, the three participant groups agreed on six characteristics for sustainable production. They mentioned that they believed that it is a production:

- with high resource efficiency regarding energy, material, employees, etc.
- with good working conditions.
- that is climate neutral since it produces no additional carbon dioxide in the atmosphere.
- that is environmentally friendly.
- that produces no waste, all resources are reused or recycled in some way.
- that uses renewable energy.

(For more details, see appendix 2.0).

4.1.2 Motivation

The second question of the interviews was "What inspires, motivates and guides you to work with sustainability development?".

There were few similarities between the answers from the three different groups on this question so their answers will be summarized and presented for each group. The SDs expressed the following inspirations and motivations: It enables them to follow the progress at suppliers. It allows them to experience best practices across industries. It allows them to interact with suppliers. "It is the right thing to do". A majority of the BDs agreed on one motivator, the environment, and more specifically that it is their environmental impact that drives them the most. All additional suggestions were individual for each BD (see appendix XX). The suppliers as a group agreed on four motivators. 1) To hand over the earth in good condition to future generations. 2) To increase the energy efficiency of different processes. 3) To work toward becoming a climate-neutral business. 4) To ensure the welfare of the workers as well as the environment. All other answers were few in numbers (For more details, see appendix 2.0.)

4.1.3 Benefits with current tool

The third question of the interviews was “What values/benefits do you see when working with full SSI?”. The SDs provided no answers to this question since they ran out of time during their brainstorming session. The BDs saw three main benefits. Firsts, its usage as a development tool. Second, to use it to understand the supplier’s status. Third, that it provides uniform data yearly that is comparable. The suppliers mentioned two main benefits of the tool. Using it to track their sustainability improvements and to wonder about their sustainability.

4.2 Feedback and suggestions for future tool

In this chapter the responses to the remaining six questions (number 4-9) in the interview are presented, they are divided into three segments: “Main challenges”, “Desired measurements & reporting” and “Wishes”. See each segment for respective summary.

4.2.1 Main challenges with the current tool

The fourth question of the interviews was “What are the main challenges you have when working with full SSI. The frequency analysis of the responses to this question can be found in the appendix. The SDs main challenges with the tool were that its way of work drains energy, its structure is not always catching the reality and it is not inspirational. The BD's main challenges with the tool were that it was hard to understand and to validate the data that were sent in by the suppliers. The suppliers’ main challenges with the tool were that it was time-consuming, that the questions were unclear and that more specific data for each industry/supplier should be requested. Another challenge was that the scoring system either gave 0, 25, or 100 % in a score.

4.2.2 Desired measurements & reporting

This chapter presents the participant's answers to the fifth and sixth questions of the interview questionnaire “How would you like to measure the sustainable production performance?” and “How would you like suppliers to report/share sustainability performance development?” respectively. The SDs focused on the output data of the tool and KPI in their answers to these questions. They desired a KPI that triggers the desired behaviors at the suppliers; they also provided examples on a few climate KPIs that could be used: greenhouse gases (GHGs) and GHG emissions per IKEA share. The BDs had thoughts in several areas such as data collection, development, system, and support. A frequency analysis of their answers showed that GHG and dialogue between SDs and suppliers. All other responses varied. A frequency analysis of their answers showed that the desire for the new tool to include some sort of benchmarking was highest. Thereafter, came the desire to have meetings within categories to discuss challenges, best practices, etc. Then the desire for the new tool to be online. (For more details, see appendix 2.0).

4.2.3 Wishes for the new tool

This chapter presents the participants` answers to “What are your wishes for the new SSI?” and “What are we missing?”. The interviewee's answers to both questions were summarized together since the answers to both questions were suggestions/wishes for the new tool. A majority of the answers to the ninth question “Anything else?” was also added to this summary; the remaining were divided between the other summaries.
No frequency analysis was possible to perform on the brainstorm session with the SDs. Therefore, were all responses presumed to be unanimous. They wanted to make sure that the new tool collected relevant data, that it would be possible to enter supply chain data, that the

data would be uploaded every 3rd/4th month and that there would be one output figure that would cover it all. They also wished for more specific questions, more questions on biodiversity, more questions on chemicals, that the questions would be aligned with e.g. chemical specialists, that the new tool could consist of one general part and one category specific part, that there would be a staircase classification of suppliers and the suppliers would be able to see comments directly. They also wished for benchmarking, an online tool, and supplier ownership. Several BDs agreed on one wish for the new tool, that it would be online. The suppliers agreed on four wishes for the new tool. 1) That it would contain more detailed guidelines. 2) That it would be an online tool. 4) That the questions would be simplified. 4) That there would be an increased amount of support.

4.3 Summary & observations

Based on the collective feedback from the three groups on the present tool it was clear that they would appreciate the following characteristics in a new tool:

- An online tool.
- A less time-consuming tool.
- A tool with simplified questions that would be easier to understand.
- A tool where suppliers can be benchmarked against each other.
- A tool that collected more specific data relevant to certain industries, CAs, or suppliers. A suggestion on this topic was to divide the tool into two parts, one more generic for all suppliers and one more specific to certain suppliers.
- A tool with a staircase grading system in which suppliers must reach a certain score to achieve e.g. a “Gold rating”.
- A tool with a graphic output that effectively illustrates the supplier’s sustainability efforts.
- A tool that provided clear guidelines which explain the questions and provides suppliers with some examples on how they should be answered.

5.0 Interviews with large multi-industrial businesses/organizations

This chapter contains a summary of the five interviews that were conducted with large businesses based on their sustainability practices (see chapter 2.2.2 and table 6). The interviews consist of six questions that were designed to answer RQ 1-3 of this thesis (see chapter 2.2.2). The summarized answers are presented accordingly in the following six chapters.

Table 6 – General information of the businesses of the interviewed sustainability professionals.

Business/Participant no.	Industry	Market share (B2C)	Employees	Revenue (billion US$)
1	Clothing retail	Top five.	Over 100 000.	Over 20.
2	Electronics	Top five (smartphone market).	Over 200 000.	Over 200.
3	Consumer goods	Top three.	Over 100 000.	Over 50.
4	Logistics	Top five.	Over 300 000.	Over 60.
5	Grocery retail	Top five.	Over 100 000.	Over 90.

5.1 Sustainable production

This chapter summarizes the participants` answers to the first question, "What does sustainable production mean to you?".

Participant 1 focused on the three pillars of sustainability and their interrelations. Participant 2 focuses on social and environmental sustainability, a code of conduct that ensures a safe workplace and a production with low environmental impact as well as integrating sustainability in all stages of a product's life cycle. Participant 3 also focuses on the entire supply chain, including all aspects from sustainable raw material sourcing to encourage sustainable consumer behaviors. Another area that was mentioned was the importance of the product portfolio and that the business can swap ingredients to sustainable ones that fulfill basic human needs. Other key aspects mentioned were the treatment, training, and support of employees along the chain. Participant 4 provided no answer to this question. Participant 5´s simplified answer was that sustainability needs to be viewed in terms of metrics and progress. It depends on where the business is located, how advanced the supply chain is, and the scope of their issues. It is a production that can continue in the same way forever.

5.2 Supply chain sustainability strategy

This chapter presents the responses to "What is your business overall strategy for ensuring sustainability along your supply chain?".

Participant 1's answer consisted of three main points:
First, they focus on codes, policies, and goals as tools. They then follow up the collected data through audits, they are conducting their audits but are transitioning to performing audits together as an industry (with several other businesses). Second, they also focus on increasing supplier ownership where their suppliers are viewed more as partners. Third, they also try to

affect laws and rules for the better through policy development. Participant 2 empathizes the importance of the code of conduct as well as other policies; their labor, and human rights policies are based on global policies such as UN guiding principles on Business and Human Rights and the International Labor Organizations Core Conventions. They also follow several management systems such as the Responsible Business Alliance. The core goals are to decrease their environmental emissions and ensure safe workplaces along their supply chains. They both conduct their audits and uses third-party audits.

Participant 3 mentioned that they focus on big global commitments such as halving their emissions by 2030. Their Nordic departments have made great progress in this area. Another point is that they have implemented all the UN sustainable goals into their business strategy. On top of this audits are performed continuously, not only on their direct suppliers but also on sub-suppliers, to make sure that their supply chain follows their principles. Participant 4 mentioned that their main strategies are based on different certificates such as the ISO 14000. Participant 5 explained that their strategy focuses on measuring risks and then using them to define what is sustainable. They either focus on mitigating the risk they find through risk assessments or turning them into positives.

5.3 Data collection and measurement

The following are the participant's answers to "What sustainability data do you collect from your suppliers and how do you use it to improve their sustainability performance? What KPIs do you use?".

Participant 1 had mostly general knowledge in this area. They follow the Sustainable Apparel Coalition which means that they start with checking if their suppliers have a management system. All approved suppliers report data once or twice a year. They do, however, have meetings every quarter with their suppliers as well shorter more frequent meetings. The collected data is either relevant to social sustainability, e.g. gender equality, safety, and wages, or environmental sustainability that mainly focuses on water, energy, and chemicals as well as sustainable sourcing. The data is reported through a system that is connected to their online supplier portal. However, it is not an online system since it was created a while ago. Participant 2 answered that after a supplier has been accepted, they formulate specific APLs based on audits and risk assessments. These are followed up through audits and data collection forms either yearly or every second/third year depending on the tool and the supplier. The data gathered by using the different tools is then collected through their online platforms; most of the data is not shared externally. When performing audits, they use the Responsible Business Alliances 130+ criteria. On top of this system, they also train all workers in their supply chain to make sure that they are aware of the business code of conduct and their anonymous whistle-blowing system.

Participant 3 reported that they have a detailed process that their suppliers need to go through to become their suppliers. Thereafter the suppliers report their sustainability through an internal SAP-based tool. Their carbon footprint is measured through a third party that uses actual data as much as possible but most of the utilized data is secondary data that is based on averages for their industry. This is due to insufficient availability of data from their suppliers, and it will take time until all suppliers can produce accurate data. They publish sustainability reports yearly that are based on "AST reporting", which is a global system on how to report, rate and rank businesses on sustainability. Discrepancies that are found through these audits are reported and then they work with the supplier in question to improve their practices and eliminate the issue. They also utilize certification for certain raw materials such as palm oil.

Examples of KPIs that they use are certified palm oil, regenerative farming, GHG emission reduction, number of trees planted, renewable energy on the sites, and deforestation-free.

Participant 4 answered that they collect data connected to their KPIs from their suppliers. It is collected annually, gathered through excel, and then inserted into their internal system. They also utilize different measures to reach their targets, some of the big changes are increase solar panels and sustainability trainings for their suppliers. Examples of their KPIs are GHG emissions, waste %, and water usage. Participant 5 answered that there are large differences in how they collect sustainability data within their group since the aspects that they want to influence vary from supply chain to supply chain. That is why there are different KPIs and important areas in each of their supply chains; collection of unnecessary data cannibalizes time that both they and their suppliers can use to improve their sustainability.

5.4 Sustainability performance measurement lessons

The answers to "What are some valuable lessons that you have learned on sustainability performance measurements?".

Participant 1 learned a lot when they created a new follow-up and performance data system in 2014. It is hard to create and design the structure of a new system. It is hard to integrate the system in the business and introducing it to one's suppliers. It is a challenge to collect data and make sure that the suppliers understand its purpose. The time it takes to control collected data should not be underestimated. Participant 2 answered that an initial challenge is to understand all aspects of the sustainability work of a business. It is important to be transparent when it comes to marketing since many businesses are accused of greenwashing and consumers are confused by green marketing. It is important to work proactively against discrepancies in the supply chain, bad news travels fast. Another lesson is that businesses/suppliers in different parts of the world have different attitudes and rules that they follow and that affects their behavior.

Participant 3 mentioned that single businesses cannot do anything by themselves, several businesses and suppliers need to work together to induce change and figure out solutions to sustainability issues. It is important to have a holistic sustainability view when making choices since not all choices are black and white. It takes time and resources to make the right decision. Participant 4 answered that it is easiest to improve sustainability in the beginning but improving the sustainability performance gradually becomes more challenging and requires larger investments. Participant 5 had learned that it is important to take all necessary time that is needed to create and define the performance measures before they are put to use. No one benefits by changing the measurements and KPI´s every year, which is why consistency and communication are key. It allows the suppliers to be aware of what is expected of them.

5.5 Ideal supply chain measurement

The answers to "If you had no limitations, in what way would you measure sustainability in supply chains?".

Participant 1 would focus on successful data collection businesses such as Facebook and the motivation of their customers to upload their data. The participant believes that it is important what the customers get back in the process, they need additional value. A vision would be that suppliers would get sustainability reports back based on the data that they have provided. The data collection will sustain itself if the suppliers feel like it provides them with additional value. The measurements would have a holistic approach with all three sustainability

dimensions and how they are integrated. Participant 2 would include more stakeholders in the process such as the workers and not only the bosses. Third-party audits would be performed every year, on top of detailed information on the suppliers' operations, as well as clear individual APLs for each supplier.

Participant 3 would create a system in which the numbers would automatically be updated, simplifying the process for all stakeholders. Knowledge sharing would go beyond what it is today and include more openness and transparency. Their current practice of employing scientists that research on sustainability issues would be continued. Participant 4 would monitor every process to make sure that everything is recycled and the waste reused. To achieve full control of all processes and ensuring that data is used optimally. Participant 5 started by noting that hardly any supplier works exclusively for one business. That is why affecting their measurement focuses can make a tremendous change on their total production. He/She also wanted to achieve a better understanding of their suppliers and their relationships with their suppliers and so on.

5.6 The most important action

Answers to "What would you believe is the most important action on your part to achieve a sustainable supply chain?".

Participant 1 believes that it is most important to create a united target and embrace the importance of parentship. Participant 2 believes that it is to steer the sustainability direction of their industry by staking out the direction for their competitors and advocate for change in industry forums. Participant 3 believes that the primary production, the farmers, is the key. They are often blamed but they want to be a part of the solution. Participant 4 believes that the most important action is to reduce unnecessary consumption which would require all employees to work toward the same goal. That is why all our employees must be trained on our environmental goals every year. Another important action is investments, both smaller ones such as creating t-shirts for events and larger ones such as putting up solar panels. Participant 5 believed that the most relevant actions are to set the right standards and work long-term to implement them. As a retailer, you are the gatekeeper. You are the one that defines and sets the standards.

5.7 Summary & observations

Suggestions to define *Sustainable production*:

- The three pillars and the interrelations between them.
- To include the entire supply chain and focus on a sustainable product portfolio.

Main aspects in the businesses supply chain strategies:

- Different codes, policies, goals as well as audits. Advocate for supplier ownership and policy development.
- Codes and policies, based on global sustainability guidelines. To perform both our own and third-party audits.
- Be part of or take global commitments. Audits performed continuously at all stakeholders.

The businesses different ways of collecting data:

- After suppliers are accepted, supplier APLs are made based on audits and risk assessments. Suppliers then report every year/second year/third year depending on the specific tool and supplier. Reported through their online platforms.
- Focuses on aspects that they want to influence. Large differences in focus and data collection occur between their supply chains. It is important to only gather necessary data.

Sustainability performance measurement lessons:

- It is hard to design and integrate a new system. It is also a challenge to collect data and make suppliers understand its purpose. The time it takes to collect data should not be underestimated.
- An initial challenge is to understand all aspects of sustainability work. It is also important to be transparent through marketing and work proactively against discrepancies in the supply chain. Another lesson is that businesses/suppliers in different parts of the world have different attitudes and rules that they follow and which affects their behavior.
- Several businesses need to work together to induce change. It is important to have a holistic sustainability view when making choices, since not all choices are black and white.
- It is important to thoughtfully create and define the performance measurements. Consistency and communication are key.

Ideal SSCM performance measurements:

- A system that copies successful data collection businesses, one where customers want to upload data. A system with individual sustainability reports for suppliers as an output. An integrated holistic TBL approach.
- Including more stakeholders in the process, such as workers. Third-party audits every year. Individual APLs for each supplier.
- An automated system with a lot of knowledge sharing.
- Affecting the supplier's sustainability management, both their measurements and their relationships with their suppliers.

The most important action:

- Create a united target and embrace the importance of partnership.
- Steering their industry by staking out the direction and advocate for change in industry forums.
- The primary production is the key, to enable and help them be part of the solution.
- Reducing unnecessary resource consumption through a clear unified goal for the entire business. That all employees are trained on sustainability annually. Sustainable investments, both small and large.
- To set the right standards and work long term to implement them.

6.0 IKEA

IKEA is a worldwide conglomerate that is well-known for its wide range of home furnishing products. The business is divided between two entities; INGKA Holding owns the IKEA Group that takes care of all services related to IKEA products and Inter IKEA that owns and manages the brand. The following chapter describes Inter IKEA, where this thesis was conducted.

6.1 IKEAs structure

Inter IKEA is divided into three core businesses (Business Franchise, Business Range, and Business Supply) according to figure 2, within "Core business supply" lies IKEA supply AG that is responsible for supplying the different IKEA products to all IKEA franchises. Within this segment there are two divisions that are responsible for measuring the sustainability performance of IKEAs suppliers, "Purchasing & logistics areas" and "Purchasing development". They together create the purchasing agenda and conduct measurements for over 1300 suppliers globally. It is in these departments that the SDs and the BDs are employed (See chapter 4.0 for a description of these two roles). It is relevant to note that these divisions also include several "sustainability compliance" teams that are acting as internal auditing resources within local areas. IKEA's full range of products is organized in a set of categories that gathers products that share similar materials, production techniques, and/or supplier base. Each of the following CAs consists of a category manager and several Business Development Teams. IKEA currently has seven CAs and one business unit:

- Metal, plastic and float glass (MPFG).
- Textile furnishings.
- Wood.
- Electronics & Specific HFB.
- IKEA components (business unit).
- Food.
- Indirect procurement.

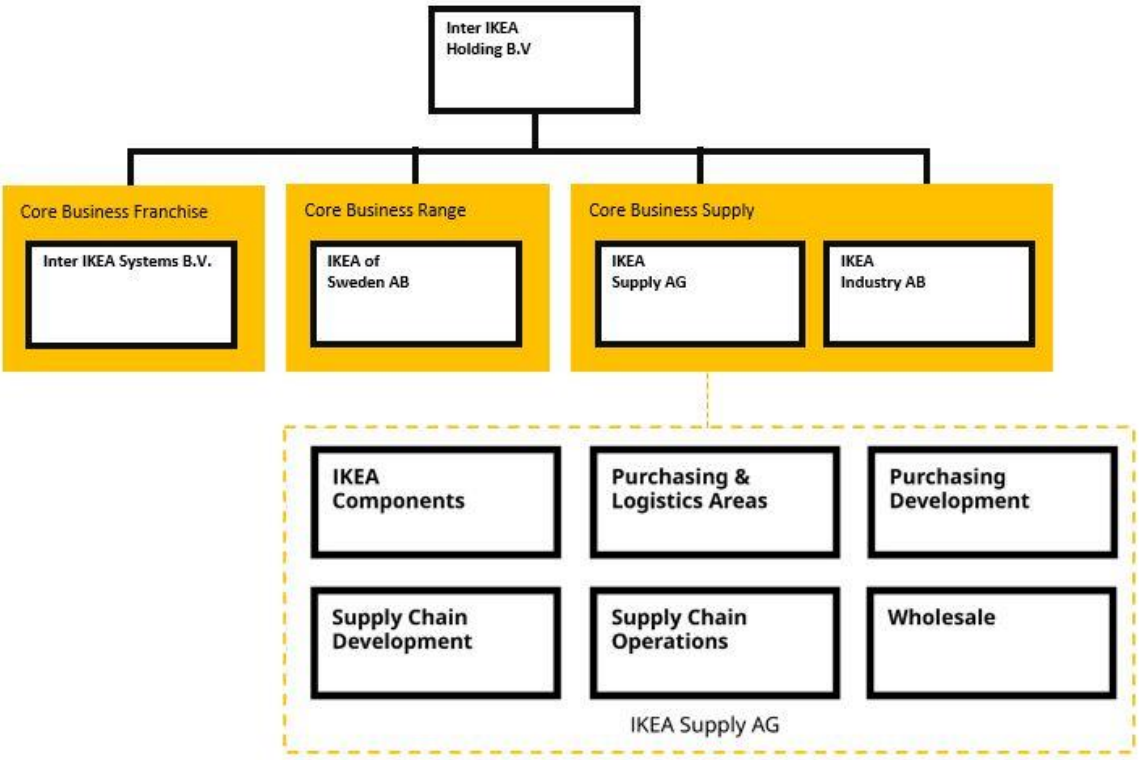

Figure 2 – The structure of Inter IKEA and the relevant departments for supplier sustainability.

6.2 Sustainability strategy

IKEA claims that their sustainability work is best characterized by their desire to balance economic growth, positive social impact, and environmental protection. They claim to have a long-term approach that is inspired by the Brundtland commissions definition of sustainable development where they want "… to meet the needs of people today without compromising the needs of future generations" (IKEA strategy, 2021). They have gotten international recognition for their commitment to increase the sustainability of their business model during the last decade (Forbes, 2021; Bloomberg, 2021). Their inspiration for their sustainability work is Ingvar Kamprad´s IKEA vision "To create a better everyday life for the many people". All CAs are involved in IKEAs sustainability efforts and they are connected through three main strategies that guide their sustainability work: their PPP strategy, the IKEA Direction "3 Roads Forward" and their supply strategy.

IKEAs PPP strategy describes the sustainability agenda for the total IKEA value chain and is built around the UNs SDGs. Just as the SDGs are IKEA´s commitments set for the year 2030, these guide their employees in their decision-making. The strategy is created as a roadmap that sets their long-term agenda and is created to stimulate action along the supply chain. It is reviewed annually to make sure that it is aligned with IKEA´s total strategic framework. It focuses on solving three major challenges that impact the business, climate change, unsustainable consumption, and inequality. Three focus areas have been identified as a result. The first area is "Healthy and sustainable living", which aims to enable more than 1 billion people to live a better everyday life. The second area is "Circular and climate positive" which focuses on transforming IKEA into a climate-positive business and regenerate resources. The third and last area is "Fair and equal" with the ambition to create a positive social impact for everyone in the IKEA value chain. They have defined eight enablers that can help them reach these goals, such as business incentives, advocacy, and co-creation & partnership.

The "3 Roads Forward" acts as the long-term direction for IKEA and it focuses on the solutions to three challenges, thereby its name. The first road is connected to socioeconomics, the second one to

logistics, and the third one is the most relevant one for this thesis since it is connected to sustainability. The challenge that the third road addresses are the fact that the way people live in today´s society has a big impact on people and the planet. IKEA aims to tackle this issue by creating a positive impact for people, society, and the planet.

The supply strategy is focused on making sure that IKEA can provide a supply chain for "…the hearts and homes of 3 billion people" (IKEA, 2021b). It clearly states three focus areas for supply from now to 2025 that are derived from the "3 Roads Forward" (see figure 3). The last focus area "A supply chain I trust" is heavily connected to sustainability with its focus on becoming climate positive, ensuring fair work conditions, and share its progress as well as its struggles. The strategy defines four strategic movements that are relevant to all focus areas and improving IKEA. First, "A more connected supply chain" will utilize new technologies and digitalization to make the chain more efficient, traceable, and integrated. Second, "Our partners make us better" has the objective to improve and deepen the cooperation between IKEA and their partners. Third, "Innovate to make a difference" aims to promote sustainable innovations that are beneficial for both IKEA, people, and the planet. The fourth and last, "Accuracy in planning, precision in execution" will re-engineer the supply chain network to enable a transition to more profitable growth.

Figure 3 – Similarities between IKEAs direction "3 Roads Forward" and supply strategy focus areas (IKEA, 2021c).

6.3 Current sustainability tools

IKEA currently has two main tools that are connected to its sustainability efforts, IWAY and SSI. IKEA has used IWAY to verify supplier's sustainability compliance since 2000 and recently, it has been further developed to also act as a sustainable development tool. SSI makes sure that the sustainability requirements are reached by annual measurements and promotion of further sustainability developments.

The supplier classification in IWAY and the SSI score are two of IKEA´s four sustainability KPIs, the third is GHG emissions and the fourth is connected to responsible sourcing of material. IKEA uses suppliers' score in each of these KPIs to prioritize them. For example, it is expected that the prioritized suppliers reach the upper levels of IWAY and achieves a high SSI score (see 6.3.1 and 6.3.2). Not enough achievements in the KPIs results in business consequence to the supplier. The supplier status is reevaluated and prioritized annually based on their achievements in the KPIs, those who have performed well are ranked higher and vice versa.

6.3.1 IWAY

IWAY is the IKEA Way of responsibly purchasing products, materials, and services. It is their code of conduct that sets the expectations on social, environmental, and working conditions as well as animal welfare, for all direct suppliers and deeper in the supply chain. It is based on several internationally recognized standards such as the ten principles of the UN Global Impact, the Universal Declaration of Human rights, and the convention on the rights of the Child (IKEA, 2021b). It secures that IKEA and its suppliers take responsibility for the impact they have on business, people, and society at large. IWAY is based on ten principles that are designed to define the IKEA standpoint on responsibly procured products, services, and materials:

1. IWAY principles are supported by effective routines and open dialogue.
2. Business is conducted lawfully and with integrity.
3. Children are protected and opportunities for learning and family life are promoted.
4. Fundamental labor rights are respected.
5. Workers have time off work, are paid responsibly, and have opportunities to develop competence.
6. Workers’ health and safety are protected.
7. Working and living conditions are suitable.
8. The planet is protected.
9. Resources, including water and waste, are managed sustainably and circularly.
10. Animals live decent lives.

IWAY also includes a staircase grading system with four levels: “Must”, “Basic”, “Advanced” and “Excellent”. Each level has different requirements that the suppliers must reach. The “Must” level consists of mandatory requirements that suppliers need to meet at all times to be a part of the IKEA supply chain. The “Basic” level includes requirements that involves all suppliers, who need to fulfill these within twelve months of their first delivery. The “Advanced” level includes steps that go beyond minimum compliance and defines additional targets towards sustainability. Excellence is requirements that exceed the advanced level. The different requirements for each of the ten principles are divided accordingly. In the current tool, announced and unannounced audits are performed regularly. With the new generation of IWAY, IWAY 6, the plan is to focus more on development and implementation support activities towards suppliers.

6.3.2 IKEA´s current SSI tool

IKEA´s current supplier sustainability performance measurement tool, SSI, was created in 2015 and has since then helped IKEA map and measure the sustainability performance of their home furnishing suppliers. It has been updated annually since then and covers suppliers in IKEA´s all home furnishing CAs except for the newly established category area food and

indirect procurement that focus on IWAY in the first place (see chapter 2.2.1). However, they still collect some of the important data through SSI data collection e.g., GHGs. The main purpose of the tool is to make sure that all dimensions of the different supplier's sustainability efforts are in alignment with IKEA´s sustainability strategy.

The scope of the tool extends upstream to their direct suppliers and their achieved score in the tool is used to decide on their supplier classification (see 6.3) and as a base evaluation for so-called APL meetings. In these meetings, with the supplier and a BD, individual goals are created for the supplier and evaluate their performance according to these set goals. Each CA works with the tool on different depths and has different goals for their suppliers. An example is CA wood where they divide suppliers into clusters where the minimum score shall be 50%. IKEA has tried to use the SSI score to benchmark their suppliers, but they did not like the results since they discovered that the weighting in the tool is not neutral and that it favors certain suppliers. Some CA´s use benchmarking to compare similar suppliers internally in their CA.

The tool collects information from all IKEA´s suppliers once per year. This information is then used to determine footprint data for IKEA´s annual sustainability report and to, in a fact-based way, measure the different supplier's development levels in sustainability and inspire them to make improvements. The tool is divided into seven different parts, four consist of questions to support suppliers' development and three focus on data collection where suppliers fill in data, for example on the amount of renewable electricity they use. These two segments will be more divided into two separate "Streams" in the new tool, this proposal focuses on the development part. The overall structure of this part is shown in figure 4; it is divided into four categories that are chosen due to the idea that they correspond to the process flow at the suppliers. Each category has a set number of sub-categories, and these contain different questions to the suppliers. Suppliers answer these questions either by share or the three choices "No" (0% of points), "Partly" (25% of points), or "Yes" (100% of points). The points possible to receive in every question depend on its weight factor (from 1-5). The factor of each question is based on the impact, the size of the necessary investment, and/or the importance of the action to IKEA.

The amount of points gathered by a respondent in an individual question directly translates into the percentage, in the range of 0-100, that they receive since each sub-category. An average score within each of the four categories is then calculated and used to calculate the final and total score of the tool, the Supplier sustainability score, which ranges from 0-100%. This value-seeking measurement approach is similar to the composite metrics approach (see chapter 3.7), it might lead to issues since sustainability performance is a complex area and the resulting data from the tool, the SSI score, is one single metric. The SSI score makes it easy to understand but also hard to interpret and utilize the data.

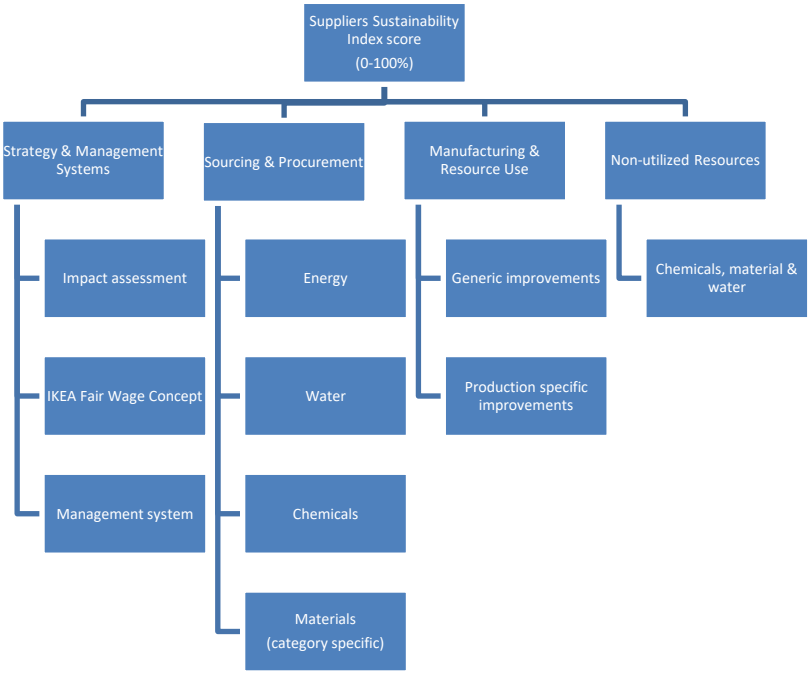

Figure 4 - The overall structure of IKEA´s current (SSI) tool, the part focused on sustainability development.

The current SSI tool is based on excel, the spreadsheet software program developed by Microsoft (Microsoft, 2021). It is sent out to suppliers, gathered, and analyzed manually through web services, and can therefore be considered an offline tool. This is an explanation of the tool's general outlook in Excel: The tool has several different excel sheets “Intro”, “Read this”, “Summary” and then one sheet for each category. The general structure of the category sheets is similar and is best described as segments of the different sub-categories. They start with a short explanation of the category and are then followed by the different sub-categories in order downwards on the vertical axis (see table 7).

The sub-categories can be described as rectangle “packages” in Excel with a vertical and horizontal axis. First on the horizontal axis is the number “#” of the question, the sub-category, “More info”, “How to verify”, “Weight factor”, “Your points”, “Answer”, “Comments”, “Awarded points” and “N/A points”. On the vertical axis sub-sub-categories are placed in order downwards (see table 7). Currently, the “More info” column is the same in all sheets and shows the text “Please see the SSI Verification guide” when a marker is placed on top of it. The “How to verify” column shows different symbols depending on if and how suppliers need to verify their response. It is either verified by a picture, document, or by listening/looking, these additional documents are either submitted together with the filled-in SSI file or revised during a follow-up meeting with the supplier and the responsible BD. The columns “Weight factor”, “Your points”, “Awarded points” and “N/A points” simply show one number depending on the column. “Answer” is where suppliers either respond in shares or by the available options (see above). In “Comments” suppliers provide information that supports their answer to the question if needed.

Table 7 – Example of the outlook of part of a sub-category in IKEA´s current SSI tool

Score	X %									
	#	Impact assessment	More info	How to verify	Weight factor	Your points	Answer	Comments	Awarded points	N/A points
Human & Children Rights	1.11	Question	?		X					
	1.1.2	Question	?		X					
Diversity	1.1.3	Question	?		X					

However, the tool is now quite old and has shown to be time-consuming for both IKEA and their suppliers with around 180 questions that need to be updated and answered every year. IKEA is therefore looking to replace it with a new one that better enables IKEA to reach their new goals and to further increase the sustainability within the supply chain of their business. A good tool allows IKEA to be even more fact-oriented and to show their fulfillment of agenda 2030. The idea is that this new tool will help engage the suppliers in leading the sustainability agenda with higher data accuracy, a tool that better reflects and supports the current business needs. The ambition is that this change will result in more accurate data in IKEA´s annual sustainability report. The option of expanding the reach of the new tool to include sub-suppliers will be explored throughout this process.

Alongside the SSI tool, IKEA provides their suppliers with the "IKEA Verification Guide for SSI tool CY2016". It is best described as a guideline to the SSI tool and guides the suppliers through each question of the tool. The general structure for how suppliers are guided through the different questions is that they are presented with the question, some background on the question, some "Good examples" and a table that explains which response they should select depending on what description describes them the best.

7.0 IKEA & SSCM

This chapter presents an overview of IKEA´s sustainability efforts in relation to the findings in this thesis. It creates a background to the proposal in chapter 8.0 by summarizing and connecting the general information from chapter 3.0, 4.0, 5.0 and 6.0.

7.1 A sustainable production for IKEA

IKEA has shown a desire to improve its sustainability through its PPP strategy. They do define *sustainable production* in their current tool but would like to update it according to the most recent research as well as integrating it with their renewed supplier sustainability performance and development tool. The UN and many models agree and they see it as a central part of sustainability (Krajnc and Glavič, 2003; Bradenburg et al, 2015). The author of this thesis believes that the definition by Glaviè and Lukman (2007) is the most suitable for IKEA since it is in line with their PPP strategy and has both a short- and long-term focus.

The interviews with the users of IKEA´s current tool (see chapter 4.0) contributed with additional characteristics of a Sustainable production: A production with high resource efficiency, that is climate neutral, environmentally friendly, produces no waste, and uses reusable energy (see chapter 4.1.1 for details). The external interviews further developed the understanding by adding the following views: A production in which the three sustainability pillars interact and that, in theory, can continue the same way forever (see chapter 5.1). These additional views were combined with the chosen definition to create a new definition for a Sustainable production:

Creating goods by processes and systems that are environmentally friendly through zero waste, renewable energy, and non-polluting, that conserves resources efficiently in an economically viable, circular, safe, and healthy way for employees, communities, and consumers, that is rewarding for all stakeholders in the short- and long term and where the three sustainability pillars interact and strengthen each other.

It is suggested that IKEA uses this definition internally and in their new tool.

7.2 SSCM at IKEA

During the last decades businesses such as IKEA have faced pressures from both internal and external stakeholders to improve the sustainability of their supply chains (Sánchez-Flores, 2020). This means a more complex system with many different stakeholders, which could explain the growth of SSCM.

IKEA launched its sustainability strategy, PPP, in 2012 and was therefore among the first businesses to acknowledge their responsibilities and taking their first actions to become sustainable. The strategy is built around the UN´s SDG´s. In their most recent version, published in 2018 and updated in 2020, they aim to become climate positive, create a positive impact for everyone across their supply chains and inspire 1 billion people to live within the boundaries of the earth by 2030. These are big ambitions, not uncommon among many large businesses, but what separates sustainable businesses from the rest is how they enable these transitions. IKEAs supply chain will therefore have a large part in achieving these commitments, especially their two SSCM tools IWAY and SSI. It is important to note that IKEA currently works with the total supply chain for certain products using external

certification bodies e.g. products made from wood, cotton, salmon etc. and new IWAY is designed in the way that it can serve whole supply chain.

The current SSI tool is used to measure sustainability goals and monitor progress in areas as e.g., 100% renewable electricity or share of the recycled waste. We can see for example in CA Wood significant movement in their suppliers' score during past year of the tool existence. IKEA is performing well when it comes to sustainability with comparison to many other businesses. In 2021 IKEA were ranked 4th in GlobeScans annual survey where they ask sustainability experts which businesses that they perceive as leaders in sustainability terms (GlobeScan, 2021). According to the findings of this thesis, IKEA is a sustainable business that works toward reducing its impact, but there is still room for several improvements. Just as other businesses, IKEA does face the challenge of the large investments that SSCM requires, i.e., the lack of green resources (e.g., availability of renewable energy) and the complexity of supply chains. IKEA currently has embraced several SSCM aspects and can continue to do so to further its sustainability efforts.

A comparison of IKEA with the businesses part of the external interview study was made based on their responses to question 2 and 3 in the interviews (see appendix 1.0). When it comes to their sustainability strategy, IKEA operates similar to business one and two. They work with IWAY, their code of conduct, policies, and individual plans for each supplier. They also work with large overall goals such as business 3 and 4. The main difference is found in business 5 that base their strategy on their risk assessments, an approach that enable them to focus on the most important areas. This is something that IKEA does indirectly through their PPP strategy and in their new version of IWAY 6 that will be more risk and impact focused. When it comes to their data collection and measurement IKEA is collecting its data annually, which is more often than four of the businesses (except for business 4). This makes sure that their suppliers are consistent in their measurements and provides stakeholders with the ability to make year-to-year comparisons.

IKEA´s tool to collect sustainability data is the same for most of their CAs, it contains some flexibility through parts that are relevant only to a few suppliers but are in general the same for all. This is similar to most of the businesses except for business 5 that varies their data collection from supply chain to supply chain. Overall, at least when it comes to their sustainability strategy, these different aspects lead to the conclusion that IKEA is a forerunner in sustainability. Individual aspects of their processes and operation are similar to some of the businesses, but in combination with each other, they produce a system at the forefront of sustainability with few counterparts. It is important to note that the interviews only provide a brief overlook of the different external businesses, which means that their actual operations might be more complex and more evolved when it comes to sustainability.

7.3 IKEA & the TBL

The TBL is frequently used within SSCM. It has been proven to have a positive impact on businesses' sustainability performance (Burritt and Schaltegger, 2014). IKEA is referring to TBL in their PPP strategy. There are three focus areas of their PPP strategy "Healthy & sustainable living", "Circular & climate positive" and "Fair & equal" cover all of the three sustainability dimensions. Another bridge to TBL is "Road" three in the IKEA´s high level direction "3 roads forward", which covers inequality, unsustainable consumption, and climate change. Their supply strategy connects to the TBL through its third focus area "A supply chain I trust" which focus on their responsibility for the entire supply chain.

7.4 SSCM performance framework & measurements at IKEA

An SSCM performance framework defines the management principles to be used in all relevant processes, such as the supplier selection, and the data collection tool. IKEA´s sustainability strategies can be used to form the base for their SSCM performance framework. Their PPP strategy describes IKEA´s sustainability agenda for the entire business and how they will apply it to work towards their vision. The IKEA direction "3 roads forward" stakes out their direction and what IKEA need to do to develop for the future. Lastly, their supply strategy applies these goals to IKEA´s supply chains and states more detailed focus areas. All together creates a good base for creating a full framework when including the four characteristics proposed by Ansari & Kant (2017).

IKEA currently has two tools for sustainability performance measurements, IWAY and SSI (see 6.3 for details). The interaction and bridges between these tools will have a large impact on the success of their sustainability efforts. IKEA is in the process of transforming IWAY into a development tool and the author believes that it is the right way to go to further its impact as a sustainability tool. The author suggests the following changes:

- That IKEA makes sure that SSI and IWAY work effortlessly alongside each other.
- That SSI and IWAY will be influenced by the UN SDGs and global frameworks to a higher extent. This change would connect the tools with the broader goals and work towards standardizing the measurements. This will likely also lead to a more easily understood purpose of the tool and clearer communication.
- That IKEA investigates how it can extend its sustainability impact across its supply chain.

7.5 Motivations, drivers and barriers in IKEA´s supply chain

IKEA has integrated sustainability as a part of one of its core values and has taken several sustainability commitments through its PPP strategy. It is hard to place them, as a business, into one of Vanpoucke et al´s (2016) three general business types (see chapter 3.6). Through their sustainability strategies, they convey that they see their commitments as a responsibility towards people and the planet. However, IKEA is a business, and its survival depends on its success and profitability. It is therefore likely that they, as many businesses, see sustainability both as a responsibility and a competitive advantage. In that case, they would be placed somewhere between a business with legitimization and competitiveness as motivation (see 3.6). Due to the nature of the current economically based society the author believe that it is unlikely that there exists a business that fully focuses on their ecological responsibility.

In addition to the motivations of businesses, the motivations of their stakeholders are highly relevant to their success. Mainly three different stakeholders use IKEA´s current tool. It is the SDs, the BDs, and the suppliers. The SDs responses to the interviews indicate that they are motivated to work with the tool since it enables them to experience best practices, interact and follow suppliers as well as it being "…the right thing to do". This shows that they primarily have gain and normative motivations (see chapter 3.6). The BDs were primarily motivated to use the tool to reduce IKEA´s environmental impact. This can be linked to the last motivation of the SDs and indicates that they have normative motivations.

Similarly, the suppliers responded that they too are motivated primarily by the effects of increased sustainability, but they were wider than the BDs and included social aspects as well. They also mentioned that they are motivated by improving the efficiency of their processes. This indicated that they, as sustainable developers, are driven by gain and normative motivations. It is also believed that all the respondents, to some extent, are motivated by certain feelings such as “feeling good” and therefore also have hedonic motivations (see chapter 3.6). Mainly since it is part of human nature, just as all animals, to be controlled by people's emotions. See chapter 8.5 for suggestions on how IKEA can shape the new tool to further promote and nurture these motivations.

The findings of this thesis suggest that both internal and external drivers are important for the development of SSCM at businesses (see chapter 3.6). The six following drivers are believed to be most relevant to IKEA based on chapter 4.0 and 6.0:

- Management commitment (Internal driver)
- Environmental conservation (Internal driver)
- Economic stability and profitability (Internal driver)
- Improve stakeholder relations (External driver)
- Monitoring performance (External driver)
- Management certifications (External driver)

The findings also suggests that the barriers are important for the SSCM (see chapter 3.6). The following drivers are believed to be the most relevant for IKEA based on chapter 4.0 and 6.0 and it is proposed that they form countermeasures against these:

- Alignment of goals with SSCM objectives.
- Insufficient communication in the supply chain.
- Transparency of information and knowledge.
- Reach sub-suppliers located upstream.

8.0 Proposal for a framework for IKEAs new sustainability performance and development tool

This chapter contains a proposal of a framework for IKEA´s new tool for sustainability performance and development. It covers several aspects surrounding the tool, including its overall content, and structure as well as some additional topics. Performance measurement frameworks consist of many different parts such as the measurement approach, the dimensions, and data collection. Unfortunately no standardized method to design such a tool has been found in the reviewed literature. Therefore, the findings in this thesis have been used to design a new multi-step approach for creating a tool (the proposals for the new tool is presented in their respective chapter):

1. Solidify the fundaments: goal(s), purpose, and fundamental principle.
2. Choose its scope.
3. Design a model that describes the tool.
4. Define structure.
5. Make it motivating and inspiring.
6. Establish sub-categories & questions.
7. Decide upon its weighting and scoring.
8. Create its outlook and choose medium.
9. A plan for data collection.
10. The outputs of the tool and ensuring stakeholder participation.
11. Create guidelines for the tool.

8.1 Fundaments: Goal(s), purpose & principle

The fundament of the tool ensures that its direction is set on a high level. According to the findings of Beske-Janssen et al (2015) and the external interviews (see chapter 5.5 & 5.6), the process of designing the tool will be initiated by defining its fundamental parts, its goal(s), purpose, and principle. There are two proposals in this chapter.

Proposal 1: Create universal tool-based goals for all suppliers.

IKEAs current tool defines the individual supplier goal but is lacking one common universal goal for all suppliers. Such a universal target would enable further sustainability in the supply chain and will create more clarity when working towards achieving such a goal. It is a clear indicator to the suppliers that they need to work towards achieving those targets. This thesis has two suggestions, on different levels, how IKEA can do this change. First, on a large scale, the goal can be directly connected to the suppliers score in the new tool. E.g., *That all IKEA suppliers will achieve a score of 60% by 2030.* Second, IKEA´s sustainability strategies and the UN SDGs can be used as a base to formulate the question in the new tool. The goals could be connected to the answer. For example, one question could be “What share of your material is either renewable or recycled?” and the goal could be *That all material in IKEA´s supply chain shall be either renewable or recycled by 2030* (UN SDG 12; UN, 2021) (IKEA, 2021a). A way of achieving this is to set intermittent goals for all suppliers towards reaching it, for example, that all suppliers shall reach a share of at least 50% by 2025.

Proposal 2: To keep the purpose of the current tool.

The current tool has a defined purpose that fits IKEA´s ambitions and commitments: *"To in a fact-based and transparent way measure a supplier´s development level in sustainability, based on the pre-conditions of its operations as well as inspire suppliers about potential improvements."*.

8.2 Scope

Deciding on the scope of performance measurement tools is a challenge for many businesses (see chapter 1.1). The findings suggest that academia encourages businesses to extend their scopes as much as possible (to include the entire supply chain) and emphasizes the importance of the number of stakeholders (see chapter 3.5 and 3.8). This chapter contains one proposal:

Proposal 3: To extend the scope of the new tool further upstream so that it also includes sub-suppliers.

One way of implementing this would be to require IKEA´s direct suppliers to ask their suppliers (IKEA´s sub-suppliers) to fill in the data collection part ("Stream 1") of the new tool (see figure 4). IKEA could support the direct suppliers with this change and set it up so that the data collection for both direct suppliers and sub-suppliers is gathered through the new tool. The idea is that this would require a minimum amount of extra effort from the direct suppliers. It would also strengthen the SSCM of IKEA´s direct suppliers and promote sustainability upwards in the supply chain. For IKEA, the additional amount of stakeholders would require more work initially and result in more in-data but if the new tool is online and automatic, it might not result in a significant amount of resources after the structure has been initialized (see chapter 8.8 for more details). Reporting their sustainability data through stream 1" of the new tool would be a good start for the sustainability development at the sub-suppliers. This structure could evolve in the future to include more upstream stakeholders as well as expand the amount of information that these stakeholders should submit, for example, that also sub-suppliers fill in the "General" part of the new tool (see chapter 8.3 for details). This naturally increases the complexity of the supply chain and requires resources from IKEA and their direct suppliers, but it is believed by the author to be a crucial step to achieve a truly sustainable supply chain.

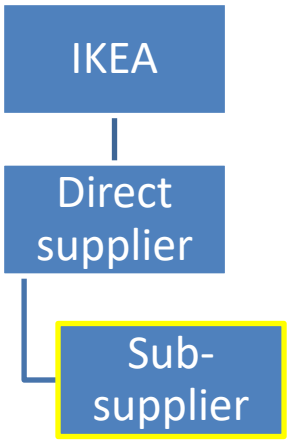

Figure 4 – Illustration of the suggested extended scope of the new tool. The box outlined with yellow color shows the suggested extension.

8.3 Structure

The current structure of the tool is very similar to one of the most common structures for performance measures (see chapter 3.8 and 6.3). However, feedback from the SDs has indicated that this structure does not fully catch the reality in specific cases (see chapter 4.2.1).
This chapter contains two proposals which together forms a new structure for IKEA´s new development tool (see figure 5).

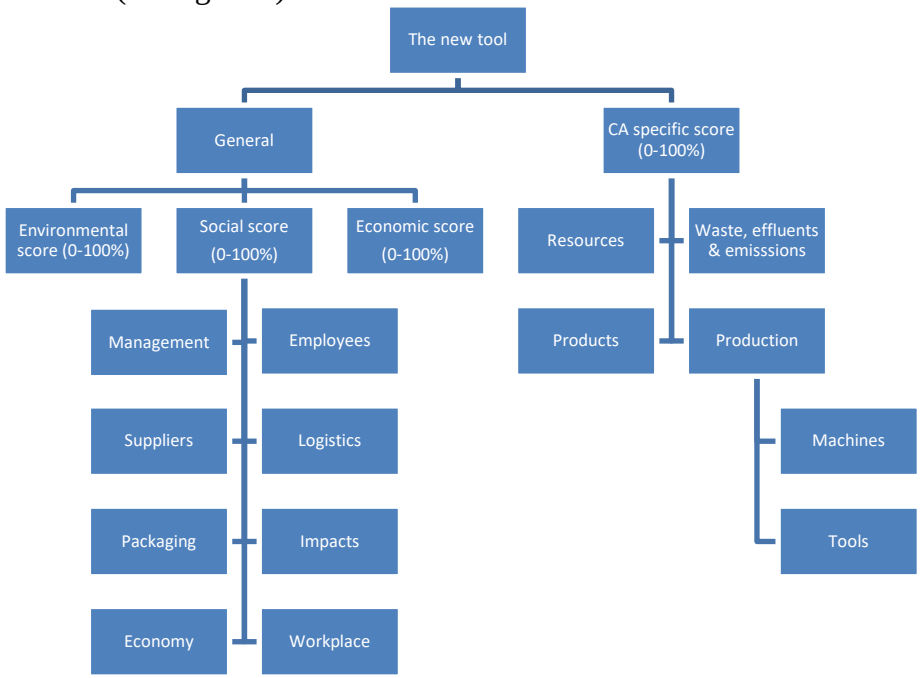

Figure 5 – The simplified structure of the new tool with categories, sub-categories and sub-subcategories. Note: All CA specific categories is shown as one.

Proposal 4: Integrate all three sustainability dimensions into the new tool.

This proposal focuses on updating the underlying dimensions of the tool according to the TBL. In contrast, the current tool focuses mainly on environmental sustainability. Based on the findings of this thesis (see chapter 3.4, 5.4 & 5.5), the new tool should equally incorporate all three of the sustainability dimensions: The environmental, economic, and social sustainability dimension (the TBL). The TBL should also be taken into consideration when selecting the questions for the new tool and be a significant part of the scoring in the tool (see 8.6).

First, that the TBL is a significant part of the scoring in the "General" part of the tool. It is suggested that there are three metrics and that each represent one of the three sustainability dimensions (see figure 5 and chapter 8.3). It is proposed that these three metrics uses the range of the current tool (0-100%) to make them easily understandable to the suppliers. For the "CA specific" part of the tool, it is suggested to have one metric (0-100%) like the one in the current tool (see figure 5). This suggestion is influenced by BSC principles where the user of the tool should be presented with several metrics to understand the complexity of the business (see chapter 3.7).

Second, that there are conditions that ensures a TBL division of the questions in the "General" part. The questions in the general part of the tool should be a balanced mix of questions from

each of the three sustainability dimensions. Conditions should be set to ensure that this mix is balanced in each category of the "General" part. However, it is important to note that some categories will be more socially focused, some more economically, and some more environmentally focused. It is therefore suggested that at least two questions in each category should be reserved for each TBL dimension, this leaves four questions (40%) that can be distributed freely. However, after all questions have been chosen at least 30% of the questions should belong to each TBL dimension. The remaining 10% can be distributed freely. The idea is that the "CA specific" part of the tool will primarily be focused on environmental sustainability because the areas connected to the social and economic sustainability dimension belong to the "General" part of the tool.

Proposal 5: Change the tool to enable more specific supplier questions.

The findings indicate that a tool that at least partially specializes its data collection to certain industries, CA´s, or supplier groups, would be better at providing a more correct evaluation of supplier's sustainability performance (see chapter 4.0 & 5.6). Therefore, it is suggested to change the structure of the tool (see chapter 6.3) and specialize certain parts to certain groups of suppliers. This change is thought to make the structure of the tool clearer for the suppliers as well as providing them with more relevant and specialized data. It is also believed to make the tool less time-consuming since suppliers can skip the parts/modules that are irrelevant for them.

It is proposed that the new tool will be divided into eight main parts, one that is referred to as "General" and seven remaining parts that are CA-specific. Suppliers will therefore only fill in two of these parts, "General" and then the CA part they belong to. The idea is that "General" will contain sustainability questions on topics that most of IKEA´s suppliers have in common, see the eight categories in figure 5. The CA-specific parts will focus on sustainability topics that are relevant for the different CA´s. They will have the same basic structure, which consists of the four categories shown in figure 5. All categories will have sub-categories and these sub-categories contain several questions (see figure 5).

8.5 A motivating and inspiring tool

The findings of this thesis (see chapter 3.6, 4.0, 5.0, and 7.5) suggest that there are many ways to motivate stakeholders. The two proposals in this chapter will focus on the motivations of IKEA´s suppliers. This chapter contains three proposals that are believed to increase suppliers' motivation to use the new tool and inspire them to work harder to improve their sustainability performance.

Proposal 6: To strengthen the performance-based reward system of the new tool.
No suppliers answered becoming a prioritized supplier as a motivation to use the current SSI in the interviews with the users of IKEA´s current tool (see chapter 4.1.2 & appendix 4.0). This could indicate that suppliers do not see a clear connection between their SSI performance and their supplier classification. It should be more connected to the supplier classification than it is today. IKEA should decide on what rewards that are suitable for them but increasing the rewards is believed to have a large impact on the motivation of the suppliers. An example

would be to that IKEA is transparent on which suppliers that have performed well and that have achieved a higher prioritization as a result.

Proposal 7: Design the new tool based on the systems used by successful data collection businesses.

Successful data collection businesses have designed systems where users willingly upload data to receive something they desire, e.g., access to the system. A similar structure is believed to be beneficial for IKEA´s new tool, it would likely result in more reliable data and improved relations between IKEA and their suppliers. However, it is crucial that suppliers value the benefits higher than their efforts to gather the data. This thesis has three design suggestions based on the suppliers' responses to the interviews with the users of IKEA´s current tool (see chapter 4.0). First, if the new tool is cloud-based, it can be integrated into an online sustainability platform where suppliers get access to valuable and desirable data (see chapter 8.7). Second, adding a new feature where suppliers get feedback or an illustration shortly after filling in the tool. This would benefit both their hedonic and gain motivation (see chapter 3.6) since they immediately get "rewarded" with data that they can use. Third, that suppliers would be sent a sustainability report based on their answers. This would likely have a big effect on suppliers' motivations, since they can use the report internally to show their progress and use it as a base when they create their sustainability report.

8.6 Sub-categories & questions

The sub-subcategories and the selected questions are a vital part of the new tool. This proposal will not suggest sub-categories to all categories of the new tool but will do so for one category of the new tools. For "Logistics" in the "General" part of the tool, the three sub-categories "Internal transports", "External transports" and "Deliveries" are suggested (see figure 6). This chapter contains three proposals for the new tool.

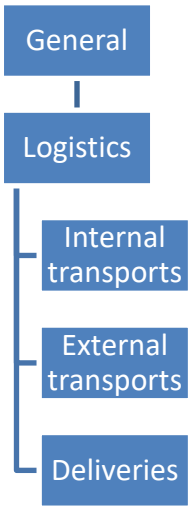

Figure 6 – Suggestion on sub-categories for one category of the "General" part of the tool.

Proposal 8: Reducing the amount of questions in the tool.

The findings of this thesis indicate that it is important to collect relevant data and that the current tool has an abundance of questions (see chapter 3.8 and chapter 4.0 & 5.0). That is why the questions of the new tool should be limited to a certain amount. It is proposed that the "General" part of the tool contains a maximum amount of 80 questions, ten questions per category. Similarly, it is proposed that the "CA specific" part of the tool contains a maximum of 40 questions, 10 questions per category.

Proposal 9: Question selection based on specific criteria.

The findings in the literature are contradictory since some authors suggest that businesses should create their indicators and others call for standardization of the indicators used in SSCM performance measurements (see chapter 3.8 and 3.10). It is therefore proposed that IKEA uses a combined approach of these two suggestions. That they create their own questions (indicators) based on the suggestions of global initiatives (e.g., the UN SDGs), the strategy and goals of IKEA (see chapter 6.2). There are also other important aspects that should be included. This proposal will not include a suggestion on a complete set of questions for the new tool, but it will provide important criteria for selecting them as well as a few examples. Based on the findings of this thesis (see chapter 3.8, 4.0, 5.0, and 7.0), the following criteria are proposed for choosing indicators/questions for IKEA´s new performance development tool:

1. The question needs to be relevant to at least one of the TBL dimensions
2. A similar question/indicator is recommended by a global initiative.
3. The questions need to be significant for IKEA´s sustainability objectives.
4. The impact of the action needs to be large enough.
5. The verification is not too time-consuming.

Examples on questions for the "General" part of the tool:

- For the "Management" category: *Do you have a sustainability management system for your business?*
- For the "Employee" category: *What is the share of females at levels of decision making in your business?*
- For the "Economy" category: *Have you investigated sustainability risks and opportunities that have the potential to substantially cause changes in your revenue?*
- For the "Impact" category: *Have you performed an impact analysis and taken action to eliminate your impact on the biodiversity in the area surrounding your facilities?*

Examples on questions for the "CA specific" part of the tool:

- For the "Resources" category: *What is the total share of new purchased wood that comes from more sustainable sources (MSS).*
- For the "Water, effluent & emissions" category: *What is the share of chemicals that are reused after your production processes.*
- For the "Product" category: *What is the combined share of renewable and recycled material in your product?*
- For the "Production" category: *Do you do sustainability comparisons when you purchase new machines?*

Proposal 10: That IKEA creates templates for verification.

Some questions might require a bit more documentation; it is recommended that IKEA provides the suppliers with a template document that they fill in. This is to reduce the burden on the BDs; it is simpler and faster to go through documents with a familiar structure.

8.7 Weighting & scoring

Two important parts of the tool are if and how the questions are weighted against each other as well as the available answers to the questions and the main metrics of the tool. The weighting has a large impact on suppliers' final score in a tool; some authors use it, and some disregard it. IKEA therefore has two choices here, either they remove the weighting in the new tool, or they keep it. Removing it would force IKEA to put more thought into what questions are the most crucial. The scoring in the tool also has a large effect on its usefulness and effectiveness. This chapter includes three proposals, one weighting proposal and two proposals for how IKEA can improve the scoring in the new tool.

Proposal 11: That the weighting of the question is based on sustainability impact and IKEA´s goals.

This proposal includes three suggestions on how to update the weighting of the new tool. First, it is suggested that the selection of weight factors in the tool are changed to be based on the importance to IKEA´s sustainability goals and the impact of each question/indicator (see chapter 3.8 and 6.3). The reason for this change away from taking the required investment into consideration is that even though the required investment on some indicators is substantially larger than others, what is most important in the end is the impact of the investments. The weighting should also depend on how relevant the questions are to IKEA´s sustainability goals and the goal of the tool (see chapter 6.2 and 8.1). This change is believed to direct supplier’s sustainability performance to focus on the actions that have the largest impact.

Second, it is suggested that the weighting range is changed from 1-5 to 3-5. Questions that have a lower weight than three are believed to have an impact smaller than the resources required to collect the data, the focus should be on the main questions in each sub-category.

Third, it is suggested that the weighting is reviewed annually according to risk assessments of the questions impact to IKEA´s goals and the current focus at IKEA. The weighting can then be changed, if needed, without changing the questions in the tool.

Proposal 12: Increasing the response choices to the questions.

Suppliers´ have shared their main challenges on the current scoring system of the tool (see chapter 4.2.1). Understandably, this scoring is challenging since it does not reward suppliers that increase their fulfillment rate of a specific sustainability metric/question. This thesis has two proposals in this topic. First, it is believed that the main issue is that suppliers are not able to provide answers in share (%) to questions that can and should be answered in that fashion. It is therefore suggested to go through all questions and make sure that suppliers can respond

in exact share (%) to such questions. Second, on other questions, where it's harder to measure the exact fulfillment degree. For example, "Do you work with promoting children's rights within your organization based on the impact of your operation?". It is suggested to extend the number of possible responses to 0, 25, 50, 75 & 100 % (see figure 7). This is believed to encourage suppliers to improve their fulfillment of certain questions, at least to some degree. It would be an effective way of rewarding suppliers that have invested resources to increase their fulfillment of a certain question but not enough to fulfill it completely, e.g., increasing their fulfillment from 0% to 50% or from 50% to 75%.

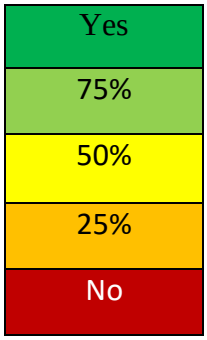

Figure 7 – Color coded illustration of the suggested available responses to questions that are not answered directly in share %.

8.8 Outlook & medium

This chapter contains two proposals, one regarding the outlook of the tool and two regarding the medium of the tool.

Proposal 13: To simplify the new outlook of the tool and remove unnecessary data.

Feedback on the current tool was that it is time-consuming, hard to understand and that the questions were unclear (see chapter 4.2). The literature also suggests a simple and easy-to-understand tool (see chapter 3.8). The outlook of the current SSI tool (see chapter 6.3) was analyzed based on these findings. Overall, the tool is simple and intuitive except for a few columns that present abundant or unnecessary information. The following two changes are suggested. First, that the "More info" column is removed; it is better to inform the suppliers of the existence of the verification guideline in other ways. Second, that the "Your points" column is removed; the column "Awarded points" shows the same information.

Proposal 14: That the new tool is online and part of an online sustainability platform.

Many of the current users of the tool desire that the new tool is online based (see chapter 3.8 & 4.0). It is therefore suggested that IKEA makes the new tool an online (cloud-based) one. There are many potential benefits by doing so, it would likely simplify the process for suppliers to fill in the tool and for BDs to verify the gathered data. Another benefit with a cloud-based tool is its ability to provide suppliers with their results at a faster rate. It would likely also make it easier to link IKEA´s different tools together as well as other already collected data (see chapter 7.5).

If IKEA choses to make the new tool cloud-based, it also enables them to create a more advanced online sustainability platform. Here, suppliers can find best practices, useful information, and a forum in which they can ask other IKEA suppliers questions on how they

solve certain issues such as a particularly challenging waste. The platform could also promote and induce business relations between certain suppliers when it comes to certain processes. These relationships have the potential to increase the circularity of the supply chain as well as resulting in lower costs for the supplier. Another benefit is that the proposed benchmarking in the new tool can be integrated into this new online platform, where it would be easy to access (see chapter 8.10 and proposal 18).

8.9 Data collection

Data collection is an important part of every performance measurement framework or tool since it gathers the information that is needed to analyze, grade, and categorize stakeholders. This thesis found that data quality and availability are challenges for data collection as well as only gathering necessary data (see chapter 3.12 and 4.0). This chapter contains one proposal:

Proposal 15: That the new tool collects data annually and remains unchanged in five-year periods.

Collecting data require resources from IKEA and their suppliers. The data is, however, necessary to ensure sustainability in SSCM (see chapter 3.0). This thesis suggests that IKEA continues to collect data annually for the new tool. It reduces the strain on the suppliers' resources, in comparison to collecting data more frequently, and allows them to focus on their processes and improving their sustainability. Suppliers can meet with their responsible BD to review their progress more frequently (see chapter 8.10).

Changing a tool frequently might lead to misunderstandings, errors and confused suppliers. The author believes that the feedback from the interviews with the users of IKEA´s current tool indicate that the current tool might have been changed too often, e.g., the comment of it being "too complicated" (see chapter 4.0). That is why it is suggested that the new tool remain unchanged for five years. This would ensure its consistency and make it easier to compare suppliers' year-to-year progress. It would also act as a certainty for suppliers and make it clear what IKEA expects of them.

8.10 Output & supplier participation

This chapter contains four proposals for the new tool that focus on utilizing the gathered data as well as increasing suppliers' participation.

Proposal 16: That the new tool is used as a pre-assessment when selecting new suppliers.

The ability to select appropriate suppliers is of tremendous importance for businesses with goals to pursue sustainability (see chapter 3.11). It is therefore proposed that IKEA, which is a business with clear sustainability goals, strengthens sustainability as a part of its initial process of selecting suppliers. This thesis proposes that the new tool could be used as a pre-assessment alongside IWAY, and potential suppliers could be asked to fill in the "General" part of the tool. This would provide IKEA with a good overview of potential supplier's current sustainability and would enable them to make a more informed choice. For example, if a potential supplier achieves a score that is considered too low, it might be better for IKEA to move forward with a similar potential supplier that achieves a higher score.

Proposal 17: That the new tool classifies suppliers based on their sustainability performance.

Supplier classification is a common way of utilizing the score of performance measurement tools (see chapter 3.11), it is also requested by the SDs in the interviews (see chapter 4.2.3). Based on these findings does this thesis suggest that the results of the "General" part of the new tool are used to categorize suppliers based on five levels: "Nonexistent", "Aware", "Intermediate", "Advanced" and "Sustainable" (or similar using IKEA terminology). These categories can be used in addition to the score of the "General" part of the tool to further clarify IKEA´s expectations to the suppliers. It is proposed that "Nonexistent" would be used as an aid when selecting suppliers (see above), all suppliers that do not reach the low expectations of "Aware" reach this classification and business consequences will occur. "Aware" can be compared to the "Must" classification in IWAY; it sets low requirements on the suppliers and indicates that they are aware of sustainability but have not taken any actions more than necessary. "Intermediate" should be relatively easy for suppliers to achieve once they have started to act and improve their sustainability. "Advanced" should be challenging to achieve. "Sustainable" should be characterized by high requirements on all sustainability levels and will be hard for suppliers to achieve. A suggestion is that IKEA would reward the few suppliers that achieve this classification with something very special. The suggested minimum requirements to achieve each classification is shown in table 8.

Table 8 -Suggested requirements to achieve the different supplier classifications.

Minimum score (in each metric) to achieve respective classification	**Supplier Classification**
90%	Sustainable
70%	Advanced
50%	Intermediate
25%	Aware
0-25 %	Nonexistent

Proposal 18: That benchmarking between suppliers will be a larger part of the new tool.

Through the interviews with the users of IKEA´s current tool, it was found that both suppliers and SDs desired more benchmarking in the new tool (see chapter 4.2.2, 4.2.3, and 6.3). This was kept in mind when designing the proposals of this thesis; the proposed structure of the tool is believed to make it possible to use benchmarking to a larger extent (see chapter 8.4). This thesis has five suggestions to how the benchmarking should be structured. First, that the names of the businesses/suppliers are removed in the benchmarking since the focus should be to enable suppliers to see their current score in relation to other suppliers.

Second, it is suggested that the benchmarking is divided into two parts in accordance with parts of the new tool (see chapter 8.3 and 8.4), the same characteristics are suggested for both. The idea is that the questions within the "Basic" main category of the tool are formulated in a way so that they will be relevant for all IKEA´s suppliers no matter their CA or industry. It is, therefore, possible to benchmark all suppliers based on their score in this part of the tool. However, it is important to note that there will be regional differences between suppliers that will affect their scores. The idea is that the "CA specific" parts of the tool will enable suppliers within specific categories to be benchmarked with each other. There might be different types of suppliers within CA´s, which is why it might not be suitable to benchmark

all suppliers in a CA with each other. It is therefore suggested to gather similar suppliers in clusters and benchmark them with each other.

Third, that gamification techniques are built into the benchmarking. Gamification is a concept where games or gamelike elements are added to a task to encourage participation (Merriam-Webster, 2021). This is believed to increase suppliers' motivations to use the tool. An example would be a notification when suppliers are among the top 3 similar suppliers in their "CA specific" part of the tool "Congratulations, (the name of the supplier) scored among the top 3 of suppliers in your category area!". Some smaller rewards for these achievements might be built into the tool, e.g., that IKEA sends a cake to a supplier that achieves a certain score.

Fourth, that suppliers in the "General" part are benchmarked through its three metrics. The three metrics mentioned in proposal X and shown in figure 5 that are used to benchmark all IKEA´s suppliers with each other. It is suggested that IKEA discusses the best way to use these three scores to benchmark suppliers. However, one suggestion is that suppliers are compared based on the lowest score in each of these dimensions. For example, if a supplier would achieve 60% environmental sustainability, 47% social sustainability, and 53% economic sustainability, their "primary benchmarking score" would be 47%.

Fifth, that suppliers in the "CA specific" part of the tool are benchmarked through its one metric (see figure 5) or use four metrics, one for each sub-category in the tool. Benchmarking with the first option would be simple and a similar approach to the one mentioned for the "General" part above could be used in the second option. The second option would provide SDs and BDs with more information on the supplier's differences and has the potential to induce a better understanding of each suppliers' challenges.

Proposal 19: That there will be more meetings connected to the new tool.

The interviews, both internally at IKEA and externally, found that good communication between the focal business and their suppliers as well as meetings with several suppliers were recommended/wanted (see chapter 4.0 & 5.0). This thesis has two suggestions for meetings connected to the new tool. First, it is suggested that IKEA organizes meetings with similar suppliers in each CA where they discuss challenges, best practices, the most recent benchmarking, and other relevant information in a controlled environment. Second, more frequent meetings with the suppliers and the responsible SD. This was asked for in the interviews (see chapter 4.0). More such meetings are believed to improve the dialogue between suppliers and BDs. It would also be an opportunity for the SD to inspire the suppliers, provide them with additional support and where they could verify data sent in through the tool.

8.11 Guidelines

This chapter contains one proposal for the guidelines of the new tool:

Proposal 20: To create an informative and inspirational guideline for the new tool.

The "verification guideline" of the current tool focuses on supporting suppliers in understanding the questions and verifying their answers (see chapter 6.3.2). Based on the findings in this thesis, it is proposed that the new tool should have a more general guideline

that also inspires suppliers and explains why the different questions are important. Three suggestions are presented on how to achieve this change.

First, it is proposed to have eight separated guidelines for the new tool, one for the “General” part and one for each “CA category”. It is suggested that all eight guidelines use the same structure as the one used in the current verification guideline, with a few changes.

Second, it is suggested that all new guidelines are developed to become more educational and focused on conveying the purpose of the measurements to the suppliers. Sustainability is a complex topic, and its many subcategories makes it hard to grasp and/or understand.

Third, it is suggested that the new guidelines have another layout. Based on the findings does the author believe that IKEA should make further efforts to inspire the suppliers and make them more connected to IKEA´s goals. They must know why they are measuring their processes and filling in the tool every year. IKEA should explain the supplier’s significance to reach the goals and why the goals are important. This could lead to that the suppliers feel more included and driven to achieve these goals. IKEA and its suppliers are a team that faces sustainability challenges together (IKEA´s PPP strategy). It is therefore suggested, for the“General” guideline of the new tool, to start with an introduction of sustainability, TBL and IKEA´s large sustainability goals. Thereafter is suggested that each category of the tool is initiated with educational information of that category as well as connecting it to the relevant smaller goals or objectives at IKEA. In that way the suppliers would be presented with the complete picture and has a higher chance to understand the importance of the questions in that category. The “CA specific” guidelines should be constructed in a similar fashion, but instead of a general sustainability introduction these guidelines should be initiated with a general presentation of the challenges in that category. Similarly, the sustainability introductions of each category should focus on the important targets for each category.

9.0 Discussion & Conclusions

This thesis conducted a literature review that focused on TBL performance measurements in SSCM. It was combined with an interview study that asked sustainability professionals at large multi-industrial businesses about their practices as well as an interview study that asked people within IKEA on their thoughts of their current tool. IKEA and the design of their new performance measurement tool was used as a case study to further the gathered knowledge and use it to propose a framework for the new tool of an existing business.

9.1 Answers to the RQs

Research question 1: *What are the key characteristics of performance measures within SSCM and how can they be utilized to describe the supply chain sustainability at large multi-industry businesses?*

According to the findings of this thesis (see chapter 3.4, 3.5, 3.8 & 3.11) key characteristics of performance measurements in SSCM are the TBL, a holistic supply chain approach, an environment for continuous improvements, effectivity, and efficiency. The TBL can be used to ensure that the performance measurements cover all three of the sustainability pillars: environmental, economic, and social sustainability. The holistic approach inspires the creators/users of the supply chain to extend its scope and the reach of the tool across the boundaries of their business. The environment that the tool creates provides businesses with a competitive advantage in relation to other businesses. The effectiveness of the performance measurements connects them to the objectives and commitments of the business and ensures that they are being met. The efficiency of the performance measurements, ensure that the social, economic, and environmental resources of the business are used to their full potential without being wasted.

Research question 2: *How can a TBL performance measurement framework be designed for large multi-industry businesses?*

They should be designed with a similar structure to the one proposed in chapter 8.0. The TBL should be kept in mind when the structure, measurements, and questions of the tool are designed. It is beneficial to design the performance measurements in a way so that the suppliers can be benchmarked towards each other, at least to some extent. Another important feature is that they design the measurements so that their various industries, business departments, or product categories are asked relevant questions. The easiest way to enable benchmarking is to have specific tools or a part of a performance measurement tool for each of these areas. For businesses that have suppliers and different supply chains spread across the globe it is good to be aware of cultural and regional differences that might affect suppliers' results.

Research question 3: *What are the characteristics of "sustainable production"?*

It is a production that uses resources in a circular way within the earth's capacity, it eliminates waste by reusing or recycling everything and it caters to all dimensions of sustainability. It focuses on both short- and long-term objectives. The definition in chapter 7.1 is based on these characteristics.

Research question 4: *What are the core challenges for the current performance measurement tool at IKEA?*

Seven core challenges have been identified. First, the tool underrates social and economic sustainability by mainly focusing on environmental sustainability. Second, it is time-consuming and resource demanding for suppliers as well as IKEA employees. Third, it is hard to use as a benchmarking tool since its structure presents an unbalanced view of the suppliers' sustainability efforts and favors specific types of suppliers. Fourth, the metric of the tool, the "SSI score", makes it hard to get an understanding of the difference in sustainability efforts between suppliers. For example, how does the efforts differ between a supplier that achieves 67% and one that achieves 73%? Fifth, it includes little data that is specific for certain CA´s or suppliers. Most of the tool is similar for all suppliers at IKEA, which naturally have very different processes, materials, and emissions. Sixth, it has a limited scope since it almost exclusively focuses on direct suppliers. Seventh, it includes few characteristics that motivate and inspire suppliers to develop their sustainability efforts.

Research question 5: *What are the most essential wishes for IKEA´s new tool for measuring the sustainability performance and the sustainable development of their suppliers?*

The author identified five wishes that were regarded as the most essential ones reported through the interviews with the users of IKEA´s current tool. First, the new tool should contain more supplier or CA specific questions. Second, it should be divided into one general and one specific part. Third, it should be online. Fourth, the tool should provide suppliers with a clear illustration as output, that in a simple way describe their progress. Fifth, it should include a staircase classification and the ability to benchmark suppliers against each other.

Research question 6: How can the framework for IKEA´s current performance measurement tool be
improved to better suit the goals of their sustainability agenda?

- It should have a clearly defined goal with an end date/year.
- It should expand its scope to include more stakeholders upwards in the supply chain.
- It should be structured in a way so that it ensures that all three sustainability dimensions are integrated.
- It should embrace aspects/features that increases the motivation of suppliers to develop their sustainability efforts.
- It should reduce the number of questions and the selection of questions should be more connected to IKEA´s sustainability goals.
- It should be cloud-based for simplicity and efficiency reasons.
- It should remain unchanged for longer periods to ensure stability and a clear sustainability direction to the suppliers.
- It should utilize the gathered data to provide the suppliers with valuable illustrations and information on their sustainability progress.
- It should include a more educational and inspiring guideline.

(For more details, see chapter 8.0).

9.2 Ranked recommendations

The most important recommendations proposed in chapter 8.0, according to the author, are ranked based on the expected impact an implementation would result in and the resources required for the implementation. The highest ranked actions are those who have a high impact and requires low amounts of resources.

1. Create universal tool-based goals for all suppliers (proposal 1).
2. Design the new tool similarly to the systems in successful data collection businesses (proposal 7).
3. Use the proposed tool structure (proposal 4, 5 & 6).
4. Weight the questions is based on sustainability impact and IKEA´s goals (proposal 11).
5. Decrease the number of questions in the tool (proposal 8).
6. Make benchmarking between suppliers a larger part of the new tool (proposal 18).
7. Make the new tool is cloud based and part of an online platform (proposal 14).
8. Use the new tool as a pre-assessment when selecting new suppliers (proposal 16).
9. Extend the scope of the tool (proposal 3).

9.3 Contribution to the field

This report contributes to the field of performance measurements in SSCM by presenting a general TBL SSCM framework that are more connected with practitioners and that are used on a real business through a case study. It further contributes to the field through its finding that TBL is a central part of SSCM performance measurements. It uses three different sources of information, one literature review, and two interview studies, to design the proposal for IKEA´s new tool. Performance measurements in SSCM is still a young and complex field that grows rapidly as more businesses embrace its principles. It consists of many different parts and sub-fields in areas such as benchmarking and data collection. This thesis provides an overview of several such areas through the literature review presented in chapter 3.0, which provides the reader with an initial understanding of the field. However, it is important to note that there are likely relevant views, methods, and articles that are outside the scope of this thesis.

The external view provides a deeper understanding of the field since it combines academic knowledge with practitioner knowledge, something that several authors in the field have called for. Due to the low number of participants, it cannot be viewed as an overview of all practitioners but rather a glimpse into how businesses utilize performance measurements and SSCM. The IKEA case and the interviews with the users of IKEA´s current tool is a good way of utilizing the gathered knowledge and create something more tangible than only presenting the findings. Their new performance measurement and development tool can be regarded to be a part of their SSCM.

9.4 Research gaps & future research

There are some research gaps in this thesis. First, the SD group in the interviews did not answer question three since they ran out of time, they also answered together as a group and not individually as all other participants. Second, the interviewed businesses were chosen due to their high sustainability rating globally, a larger group would have represented more of the many businesses in the world and provide more hands-on data. Third, the questions in the external interviews were designed to be wide but this resulted in less specific data that could have been used to provide a better picture of the most common tools and approaches.

Future research suggestions for similar studies would be to expand the number of external interviews, to widen the scope of the literature review and construct more specified questions for both interview studies. Another suggestion for similar future research is to present a proposal for the new tool to the employees at the chosen business; this will likely provide the authors with valuable feedback. More generally, there are a lot of potential subjects in the field of SSCM performance measurements. The author of this thesis has thought about the following topic when writing this report: To compare the tools used by businesses with each other to search for trends and gaps. Such research could be furthered by comparing these tools with the existing global frameworks, e.g., GRI and the SDGs.

Future research or analyses that IKEA could do is also highly relevant for them to further develop their sustainability efforts. It would be interesting to present the supplier's answers to BDs and discuss them; the same procedure can be used to present the BDs answers to the SDs. This would provide valuable feedback that could have initiated a constructive discussion on the most important features and aspects in the tool. Another suggestion would be that IKEA investigates if they can use AHP to choose the weighting factors in the new tool. Lastly, they could also investigate if the weighting factors should be shown in the tool. Showing them would provide suppliers` information on the actions that IKEA regards as the most important and removing them could potentially result in that the suppliers embrace a more holistic approach when it comes to sustainability.

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Appendixes

1.0 External interview questions

- Do you consent to that the information gathered in this interview will be used in my master thesis? Neither your name nor the name of the company that employ you will be shared. This interview will be given a number and referred to, e.g. “Interview nr 3 with a sustainability representative for a company in the vehicle industry”.

- What is your current position and your experience in sustainability?

- How did you start working with sustainability in supply chains?

- What does sustainable production mean to you? (Follow up question: Have your company defined it?)

- What is your overall strategy for ensuring sustainability along your supply chain? (Follow up question: Is It public?)

- What sustainability data do you collect from your suppliers and how do you use it to improve their sustainability performance? (Follow up questions: How do you collect it? Through one tool or several tools? Internal or external? Qualitatively or quantitatively? Or through a combination of both? Are there any difference in how you measure economic, social and environmental sustainability? What are your key performance indicators? How do you follow up the KPIs? Are they integrated in the business agenda?)

- What are some valuable lessons that you have learned on sustainability performance measurements? (Follow up questions: What are the biggest obstacles for keeping your supply chain sustainable?)

- If you had no limitations, in what way would you measure sustainability in supply chains? (Follow up questions: Would you use a version of the system you currently use or would you select a new one? What would be the key points?)

- What would you believe is the most important action on your part to achieve a sustainable supply chain?

2.0 Interview questions for the interviews with the users of IKEA´s current tool

The interviews were divided into two parts, the first part:

- "Interviewee name, role and years in role"
- "How long have you been working with SSI?"
- "A master student, Adam Turesson, is working alongside the IKEA team tasked with developing the new SSI tool, and his thesis will conclude in a proposal for the new tool. Do you consent to that the information in this interview will be used in his master thesis? For suppliers: Your name nor the name of the company that employ you will be shared. You will simply be given a number and be referred to as for example "Interviewee nr 4" at a company in the mattress industry. For IKEA employees: Your name will not be shared. You will be referred to as, for example, "BD nr 1 in category area wood"."

The second part:

1. "What does sustainable production mean to you?"

2. “What inspires, motivates and guides you to work with sustainability development?”
3. “What values/benefits do you see when working with full SSI?”
4. “What are the main challenges you have when working with full SSI?”
5. “How would you like to measure the sustainable production performance?”
6. “How would you like suppliers to report/share sustainability performance development”
7. “What are your wishes for the new SSI?”
8. “What are we missing?”
9. “Anything else?”

3.0 Table with the publications included in the literature review.

Table 9 – Table including all articles and publications that are part of the literature review with additional information on the issue they study and their relevance to this thesis.

Ref. No.	Source	Issue studied	Relevance
1	Acquaye et al, 2018	Mathematical model	Develops a performance measurement model with a lifecycle approach.
2	Ahi & Searcy, 2013	Theoretical	A thorough investigation of different SSCM definitions.
3	Ahi & Searcy, 2015a	Mathematical model	Develops a simple and easy-to-use TBL performance measurement model.
4	Ahi & Searcy, 2015b	Theoretical	Identifies multiple metrics for the sustainability dimension.
5	Ahi & Searcy, 2015c	Framework	An in-depth investigation of metrics used in SSCM.
6	Ahi et al, 2016	Framework	A multidimensional framework for supplier evaluations.
7	Ansari & Kant, 2017	Theoretical	Identifies the major contributions and gaps in SSCM literature.
8	Ashby et al, 2012	Review	A review of the environmental and social sustainability dimension.
9	Bai & Sarkis, 2016	Theoretical	Identification of major KPIs for sustainable supply chains.
10	Beske-Janssen et al, 2015	Review	Reviews the last two decades of SSCM & the state in 2015.
11	Bhanot et al, 2019	Method	Systematically analysis of literature from different perspectives based on various sustainability definitions.
12	Boukherroub et al, 2015	Framework	Presents a framework that links sustainability performance to supply chain decisions and coherent performance measures.
13	Bradenburg et al, 2015	Review	A quantitative model review of SSCM literature from the last 20 years.
14	BR et al, 2016	Framework	Identifies key sustainability factors for supply chains & presents a framework that utilizes the factors.
15	Carter & Washispack, 2018	Review	Provides a wide SSCM understanding through a review of reviews.

16	Chiarini, 2017	Theoretical	Analyzes the policies that European manufacturing companies uses in supplier performance measurement.
17	Cazeri et al, 2017	Review	Identification of main subjects and dimensions of GSCM performance measurement. literature/studies.
18	Dubey et al, 2015	Review	A suggestion of the use of Total Interpretive Structural Modeling (TISM) in SSCM.
19	Erzös & Jontar, 2020	Theoretical	Concludes indicators for performance measurements in SSCM.
20	Fahimnia et al, 2015	Review	Presents a roadmap for developing the SSCM field through systematic mapping.
21	Fallapour, 2020	Framework	Presents a new fuzzy modification of Analytical Hierarchy Process (AHP) for suppliers performance measurements with respect to carbon management criteria.
22	Ginnakis, 2020	Framework	Develops a sustainability performance measurement framework for supplier evaluation and selection, using the Analytic Network Process (ANP) method.
23	Gold et al, 2010	Review	Emphasizes the importance of partner-focused supply management as competition shifts towards the supply chain level.
24	Gold & Schleper, 2017	Theoretical	Relates sustainability with more traditional critical management studies and how It can be used to aid SSCM.
25	Hussein et al, 2016	Framework	Proposes a SSCM performance measurement framework as well as illuminating several important factors to develop the field.
26	Izadikhah et al, 2018	Mathematical model	Develops a new DEA model for SSCM performance measurements of suppliers in presence of negative data and volume discounts
27	Jain et al, 2020	Mathematical model	Develops a two-phase model for supplier selection using FIS and Fuzzy Kano philosophy.
28	Karthik et al, 2015	Framework	Proposes a decision support system for SSCM performance measurements of carry and forward agents.
29	Kazancoglu et al, 2018	Framework	Proposes a holistic GSCM performance measurements framework with multiple dimensions.
30	Kuhnen & Hanh, 2017	Theoretical	Provides a summary of the central indicators, important trends and gaps in the SLCA field.
31	Kuhnen & Hanh, 2018	Theoretical	Identifies social indicators as well as trends and gasps from an open system perspective.
32	Morali & Searcy, 2012	Theoretical	An exploration of the extent businesses integrates sustainability in their supply chain management.
33	Mura et al, 2018	Review	Shares a comprehensive review of the SSCM performance measurement literature.
34	Pimenta & Ball, 2015	Theoretical	Focuses on upstream SCM activities that commonly diffuses environmental sustainability in the chain.
35	Qorri, 2018	Framework	Proposes a framework and guidelines for SSCM performance measurements.
36	Rabbi, 2020	Mathematical model	Develops a model based on a Bayesian belief network (BBN) to predict SSCM performance as well as identification of measures and indicators.
37	Rajeev et al, 2017	Review	Classifies various factors in the three sustainability dimensions of supply chains.

38	Reefke & Sundaram, 2017	Theoretical	Provides an theory overview and an interview study with sustainability experts.
39	Saeed & Kersten, 2020a	Review	Identifies SSCM performance indicators and provides performance measurement guidance for organizations as well as a SSCM performance measurement literature review.
40	Saeed & Kersten, 2020b	Framework	Shares a analysis of the current state of SSCM performance measurements and the sustainability disclosure by businesses.
41	Santos et al, 2020	Model	Presents a model that considers the characteristic elements of the models in literature and affects sustainability maturity.
42	Schöggl et al, 2016	Framework	Proposes a framework for SSCM performance measurements and an overview of the available methods as well as approaches to aggregating sustainability indicators.
43	Seuring & Müller, 2008	Framework	Proposes a framework for summarizing SSCM research and a literature review of SSCM literature.
44	Sheperd & Gunther, 2005	Theoretical	A taxonomy of performance measurements and an evaluation of systems that evaluates performance measurement in SSCM.
45	Singh et al, 2016	Theoretical	An identification of GSCM barriers and factors through a literature review.
46	Sudisinghe & Seuring, 2020	Framework	Proposes a framework to understand the integration between the social and environmental dimension in SSCM.
47	Sulistio & Rini, 2015	Review	A multi-stage GSCM review and future agenda for the field.
48	Tajbakhsh & Hassini, 2015	Review	Integrates seven sustainability dimensions across supply chains that take the operational decisions into account.
49	Taticchi et al, 2015	Review	Includes both a narrative and a qualitative review of SSCM literature published 2000-2013.
50	Taticchi et al, 2013	Review	A critical review of SSCM literature and guidelines for future reports.
51	Tuni et al, 2018	Review	An examination on what parts of the supply chain that are involved in GSCM performance measurement, an clarification on the scope of the supply chain in SSCM.
52	Vanpoucke et al, 2016	Theoretical	Test of a framework for motivations in GSCM and shows that differences in motivations impact performance outcomes.
53	Varsei et al, 2014	Framework	Proposes a framework that incorporates key aspects of the TBL in sustainability and offers theoretical contributions to SSCM.
54	Wu et al, 2018	Framework	Proposes a framework that uses quality function development techniques and a house of quality that show how performance measurement can help achieve SSCM.
55	Xing et al, 2016	Theoretical	Proposes a cloud based life cycle assessment platform that enables life cycle data collection and exchange.
56	Zimon et al, 2019	Framework	Proposes a tree phased framework for implementing successful SSCM as well as how to align performance measurements with the UN 17 SDGs.

4.0 Figures and graphs for the interviews with the users of IKEA´s current tool at IKEA

The results for each topic are presented accordingly. It is important to note that all the SDs were interviewed together, which is why there are no frequency analysis presented for this group.

4.1 Answers to "What does sustainable production mean to you?"

According to the SDs sustainable production is a production that is:

- Climate neutral (no net CO2 emissions).
- Using 100% renewable energy.
- Producing no liquid discharge and no waste.
- Fair to the workers (social sustainability).
- Takes care of risks in the supply chain.
- Aims toward only using recycled materials.

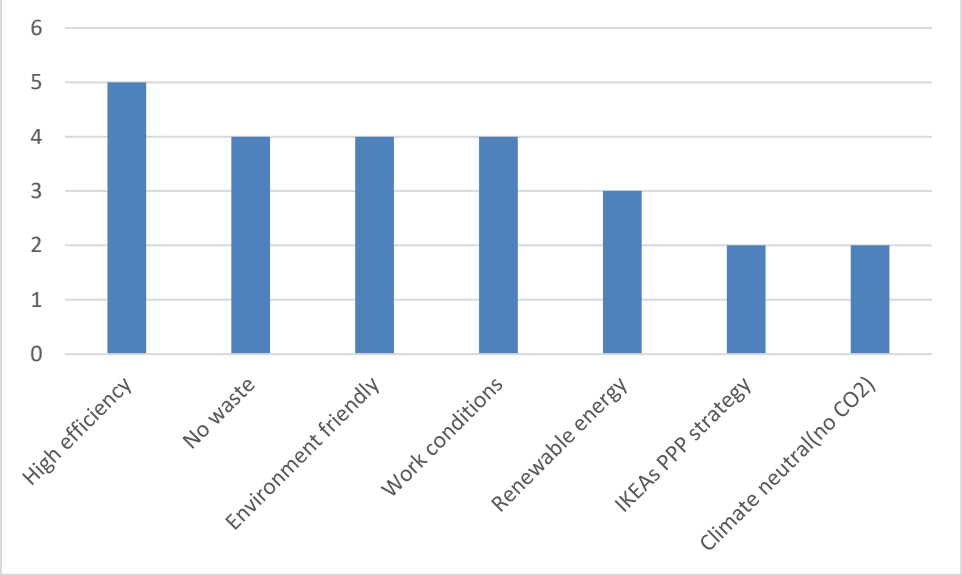

Figure 8 – The most frequent responses from the BDs on question 1, their definition on a sustainable production.

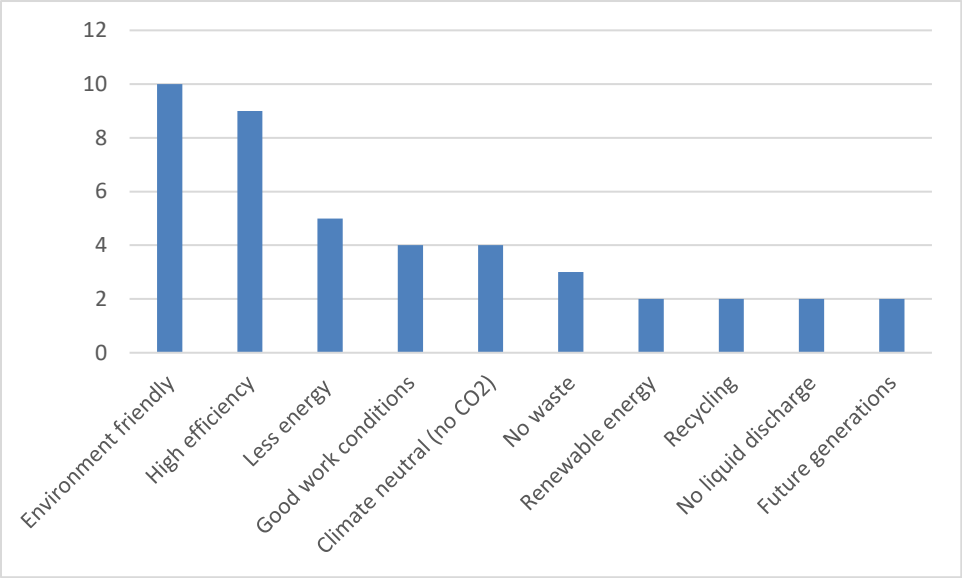

Figure 9 – The most frequent responses from the suppliers on question 1, their definition on a sustainable production.

4.2 Answers to "What inspires, motivates and guides you to work with sustainability development?"

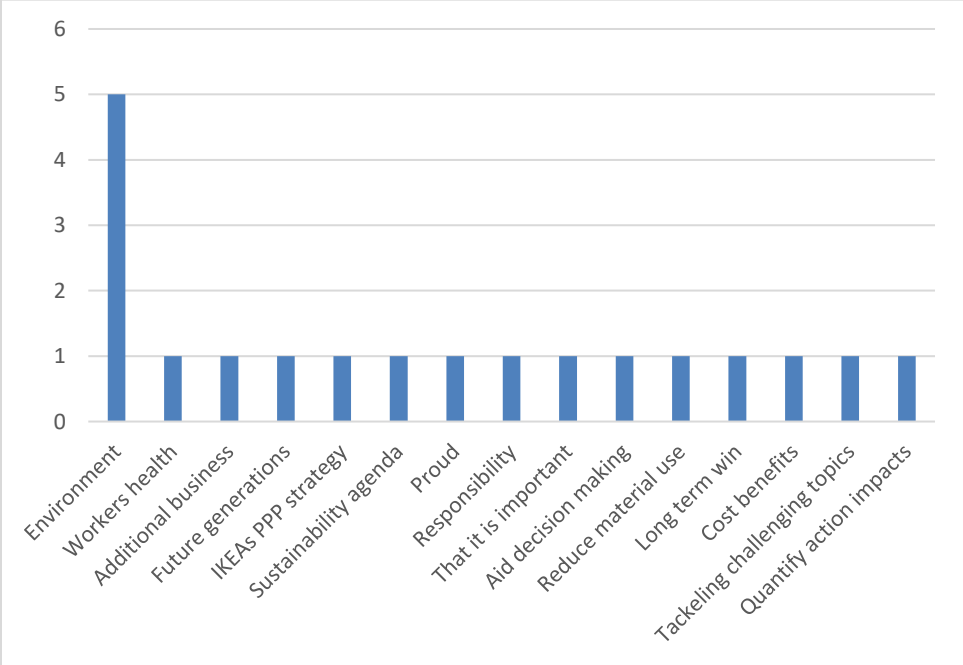

Figure 10 – The most frequent responses from the BDs on question 2, their motivation for working with sustainability development.

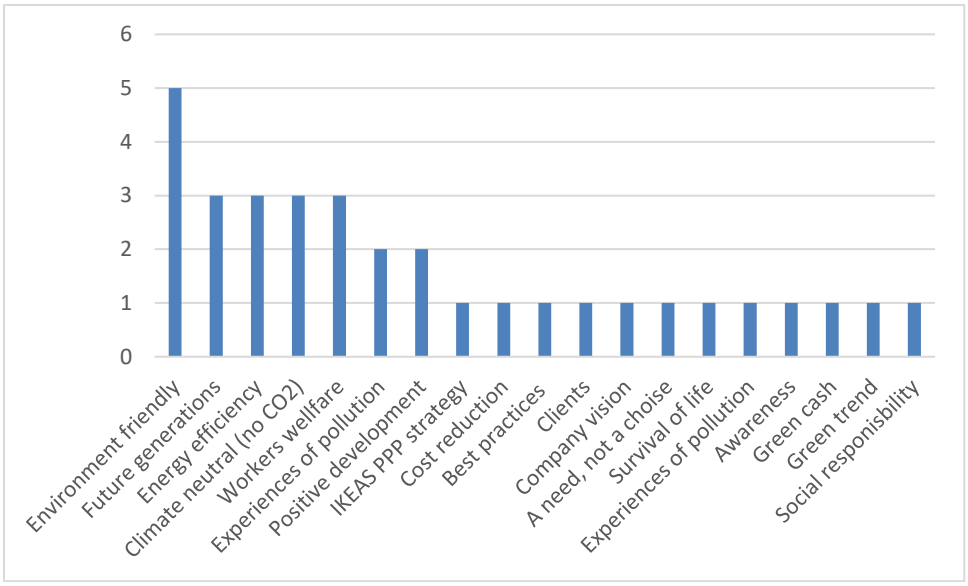

Figure 11 – The most frequent responses from the suppliers on question 2, their motivation for working with sustainability development.

4.3 Answers to "What values/benefits do you see when working with full SSI?"

The SDs provided no answers to this question since they ran out of time during their brainstorming session.

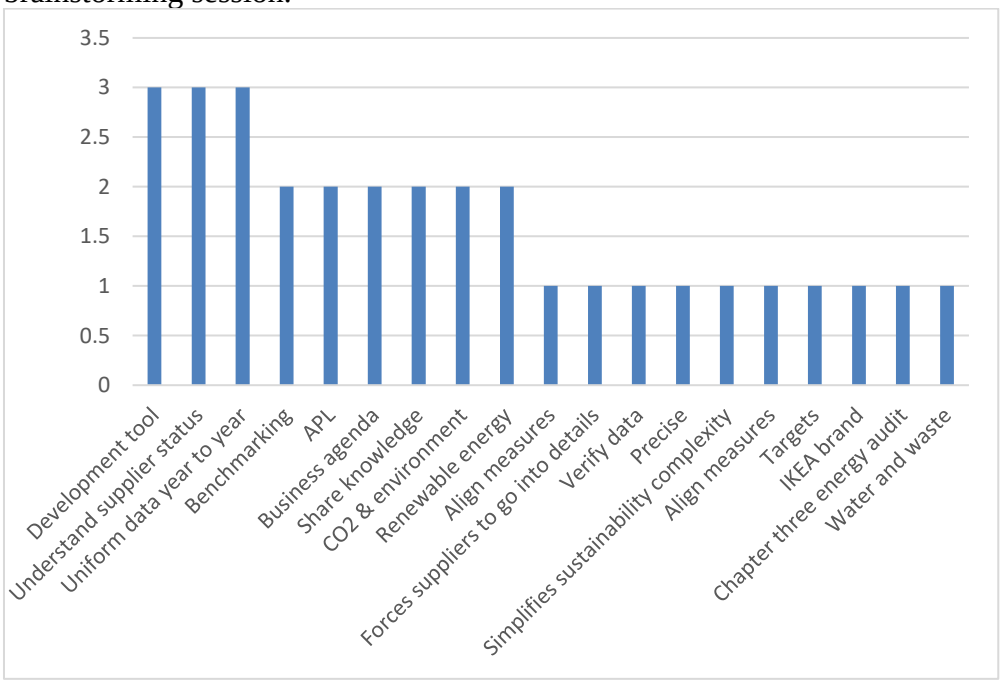

Figure 12 – The most frequent responses from the BDs on question 3, the benefits they see when working with IKEAs SSI tool.

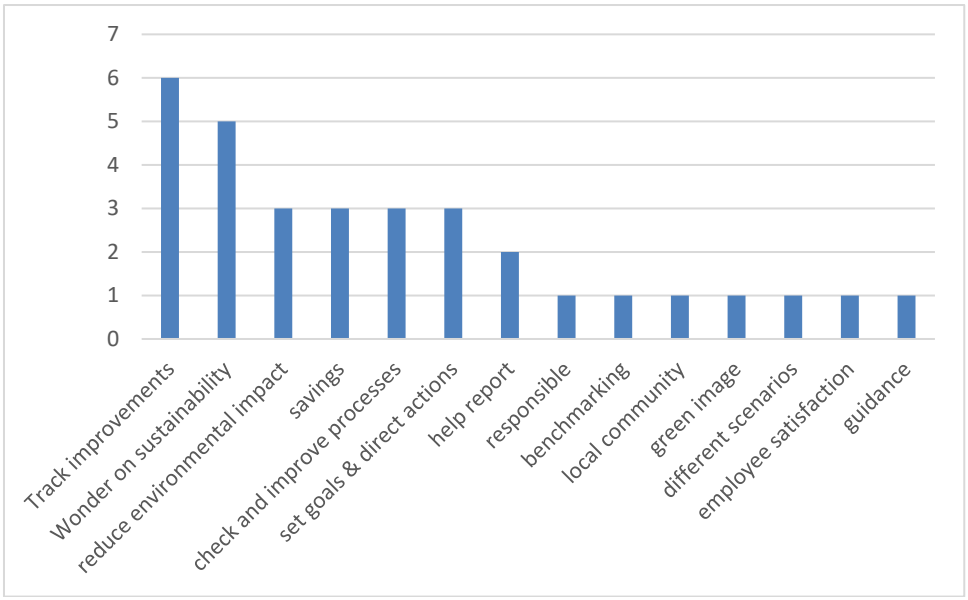

Figure 13 – The most frequent responses from the suppliers on question 3, the benefits they see when working with IKEAs SSI tool.

4.4 Answers to "What are the main challenges you have when working with full SSI?"

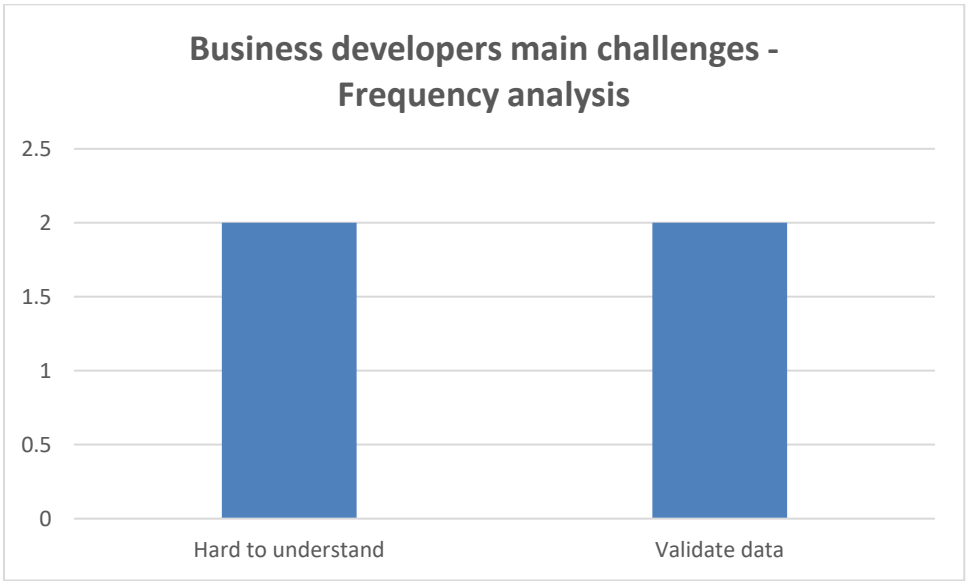

Figure 14 – The results of a frequency analysis of the BDs responses to question 4 in the interview questionnaire.

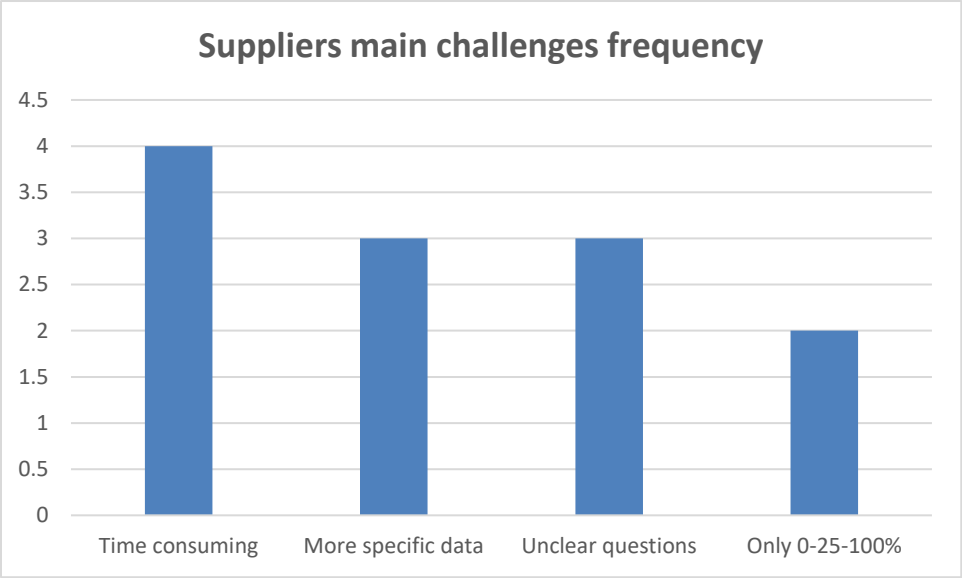

Figure 15 – The results of a frequency analysis on the supplier´s responses to question 4 in the interview questionnaire. "Only 0-25-100% refer to the current scoring system in the tool (see 6.3.2 and proposal 12).

Table 10 – The interviewees responses on their main challenges regarding data collection, divided into the three interview groups.

Main challenges*: Data Collection*		
Sustainability developers	**Business developers**	**Suppliers**
Time consuming	Collect the necessary data	Not enough specific data
	Resource demanding to validate the necessary data	Too much to share
	Time consuming	Only data relevant for sustainability, not much data regarding social and economical sustainability.
	More data should be collected regarding certain processes	Challenging to utilize data
		Waste and water sheets to simple
		Water recycling and zero liquid discharge should be asked separately in the tool
		Renewable energy share of suppliers does not get enough score
		Time consuming

Table 11 – The interviewees responses on their main challenges regarding tool design, divided into the three interview groups.

Main challenges*: Tool design*		
Sustainability developers	**Business developers**	**Suppliers**

Not inspirational	Financial not calendar year	The indicators should be better splitted indicators
	Not online	Improvements not rewarded
	Unclear summary	Costly improvements
	Staircase should be integrated	Gap between achievements & requirements
	More communication	SSI must simplify the process
		Can't see calculation formula
		Only available in English
		lack of understanding - non comparable data
		Limits to renewable energy

Table 12 – The interviewees responses on question 4, their main challenges regarding the development part of the tool. Divided into the three interview groups.

Main challenges: *Development*		
Sustainability developers	**Business developers**	**Suppliers**
	Unclear questions	Not industry specific
	That it is only possible to achieve either 0, 25 or 100% on some questions.	The tool is too general, barely any industry/CA specific questions.
	Some questions which are not feasible in all areas, "wherever possible" should be added to those questions	

Table 13 – The interviewees responses on question 4, their main challenges regarding the support of the current tool. Divided into the three interview groups.

Main challenges: Support		
Sustainability developers	**Business developers**	**Suppliers**
	It does not aid APLs	Unclear guidelines
		Guidelines for the tool
		No suggestion on how to choose necessary equipment

4.5 Answers to "How would you like to measure the sustainable production performance?" & "How would you like suppliers to report/share sustainability performance development?"

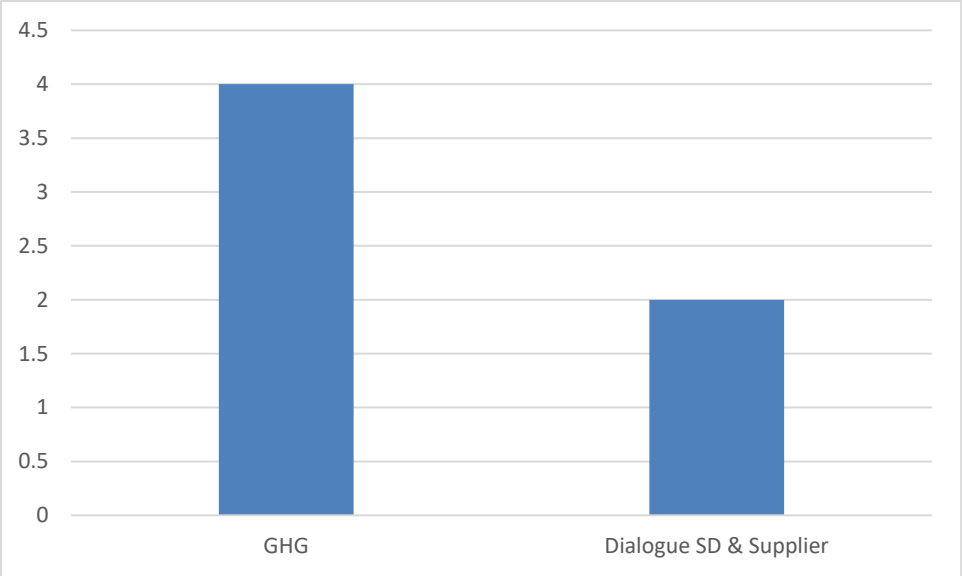

Figure 16 – A frequency analysis of the most common BDs responses on measurements and reporting.

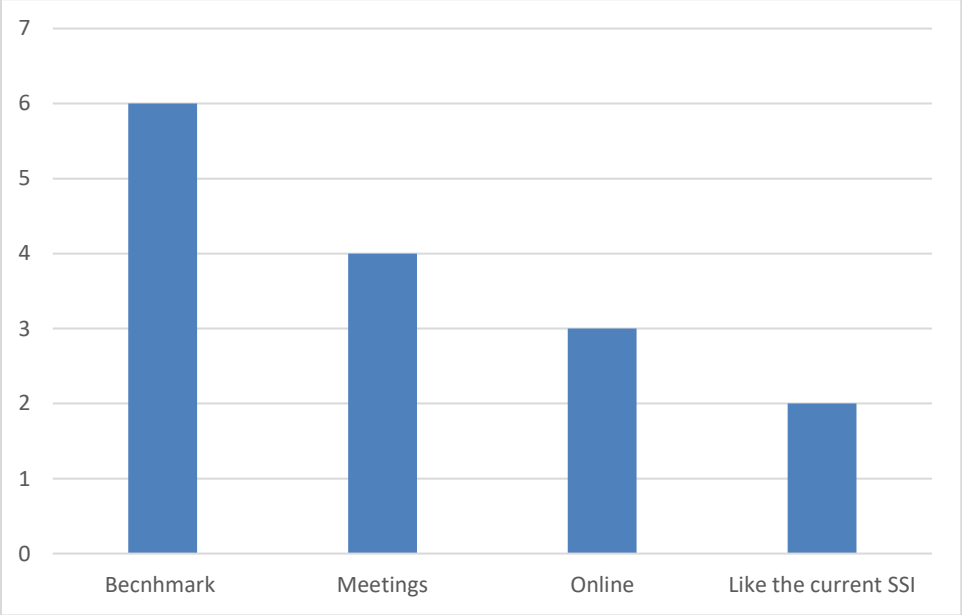

Figure 17 - A frequency analysis of the most common supplier responses on measurements and reporting.

Table 14 – The interviewees responses on question 5-6, their thoughts on measurements and reporting for the new tool connected to the data input. Divided into the three interview groups.

Measurements & reporting: Data input		
Sustainability developers	**Business developers**	**Suppliers**
KPI that triggers behaviours	end to end measurements	Amount of waste/processed material
Climate KPI: GHG, GHG on IKEA share or total	not absolute GHG	diversity maintenance

	GHG	consider compliance to government law and certification
	GHG done per machine group	Units 3: 1. KWH / Kgs- Total energy consumption / Total Raw material processed 2. Litres / Kgs- Water consumption for Processing / Total Raw material processed 3. Litres / Kgs- Total water consumption for domestic 4. Waste %- Total waste generated /Total Raw material processed
	Units: GHG, waste, water, renewable energy share, % of on-site generation, impact to surroundings, employee satisfaction index	Units 4: (1) % of Materials used in the process that are recycled 2) Direct energy consumption of green energy. 3)Energy saving in KW/h due to energy efficiency. 4) % of re-used water or recovered water. 5) GHG emission trend (the reduction over months or years). 6) total weight of waste sent to landfill. 7) % of recycled materials in goods sold. 8) Usage of specific "green" or "non dangerous" surface treatment (in % on the product)
	Units: energy efficiency, water efficiency, GHG emissions / indicators, worker satisfaction, community involvement, accident levels, workers engagement, working conditions and sick leave	

Table 15 – The interviewees responses on question 5-6, their thoughts on measurements and reporting for the new tool connected to the data output. Divided into the three interview groups.

Measurements & reporting: Data output		
Sustainability developers	**Business developers**	**Suppliers**
KPI that triggers behaviours	Difference between scores	Benchmark within categories
Climate KPI: GHG, GHG on IKEA share or total	Focus shift from numbers to trends	More accessible and understandable material
	Benchmark	
	Comparability year to year	
	One year report	
	Illustrate improvement	

	Challenge areas	
	Staircase	

Table 16 – The interviewees responses on question 5-6, their thoughts on measurements and reporting for the new tool connected to the development part and the system as a whole. Divided into the three interview groups.

Measurements & reporting: Development and system		
Sustainability developers	**Business developers**	**Suppliers**
	Common system	
	Online tool	
	connected with APL and timeline	
	Build on what we already have (resource group) created at IOS (data can be retrieved from this system)	
	encourage big investment	
	Specific questions	
	Avoid partly answers	

Table 17 – The interviewees responses on question 5-6, their thoughts on measurements and reporting for the new tool connected to the support. Divided into the three interview groups.

Measurements & reporting: Support		
Sustainability developers	**Business developers**	**Suppliers**
	Automatic monthly follow-up	
	Audits and not only self-report	
	Dialogue between SD and supplier in APL creation	
	good to have SD in driving seat for actions/development can support for instance once/quarter/once tertial.	
	Explain calculations	
	suggestions & advice	

4.6 Answers to "What are your wishes for the new SSI?" and "What are we missing?" respectively

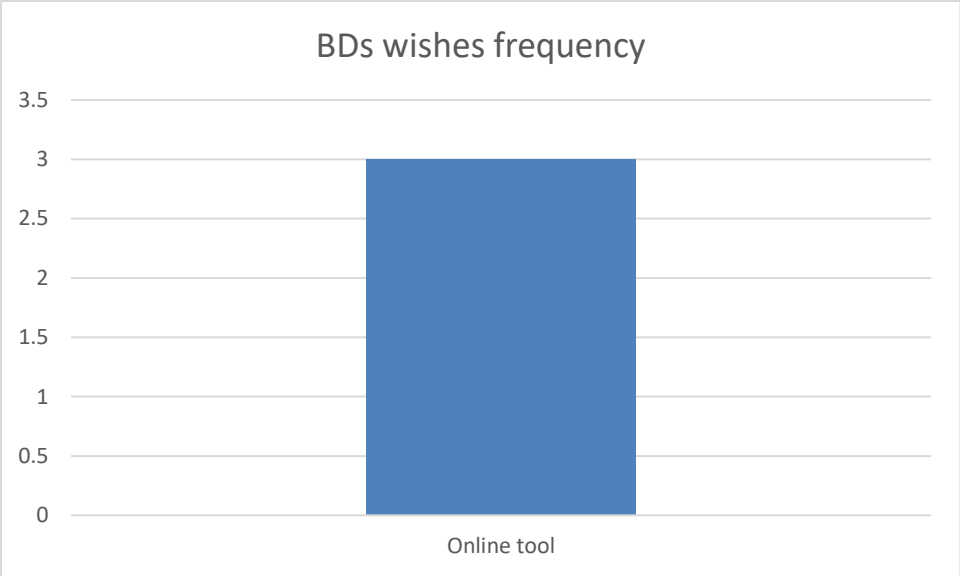

Figure 18 – The frequency analysis of the BDs wishes for the new tool.

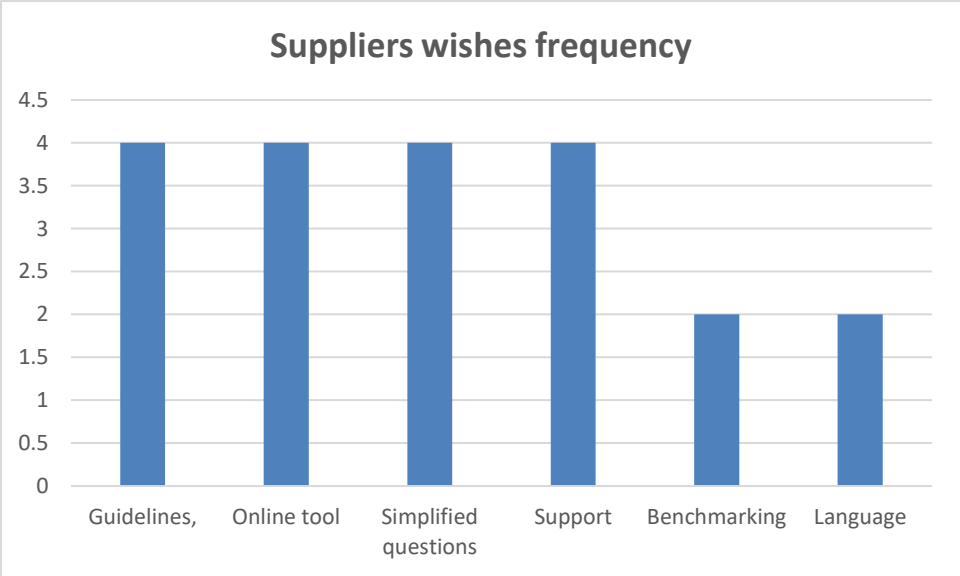

Figure 19 - The frequency analysis of the suppliers wishes for the new tool.

Table 18 – The interviewees responses on question 7-8, their wishes for the new tool connected to the data collection. Divided into the three interview groups.

Wishes: Data collection		
Sustainability developers	**Business developers**	**Suppliers**
Collect relevant data	measure: (climate footprint of used materials and recycled materials)	Measure: LCA instead of GHG and energy. include ozone depleting potential, include LCA, include CDHZ and detox program (textiles), co- and tri-generation
Optional supply chain data	GHG more in focus as an environmental KPI	Comment section

Strengthen the water part	Include exchange rate	Landfill and storage should be separately reported in gas distinction
Data upload every 3-4 months	Visualization	Simplified utility evidence
One figure covering it al	Clear summary/report	Carbon credits
		Gap analysis for min. req. or ind. standard
		Graphic tool output

Table 19 – The interviewees responses on question 7-8, their wishes for the new tool connected to the development part. Divided into the three interview groups.

Wishes: Development		
Sustainability developers	**Business developers**	**Suppliers**
Biodiversity	Information on Equipment	Simplified questions
Chemicals	APL: Creation base, on supplier level. Base for all + adjustable areas/parts.	decrease questions
Question alignment with corresponding function (e.g. chem specialist)	Upstream & downstream	more supplier-specific questions
Generic part + category	Detailed but high level	audit question
Specific	Flexible	efficient
Staircase classification	issue statement chapter	
Direct comments that the supplier can see		

Table 20 – The interviewees responses on question 7-8, their wishes for the new tool connected to the system in general. Divided into the three interview groups.

Wishes: System		
Sustainability developers	**Business developers**	**Suppliers**
full ownership of new system Integrating system into existing ones	One platform email notification from system on all actions	Intuitive user face
	Dream: one big system that cover the entire supply chain and that can output co2 footprint on supplier level	Utilize new media

Table 21 – The interviewees responses on question 7-8, their wishes for the new tool connected to support and sharing. Divided into the three interview groups.

Wishes: Support & sharing		
Sustainability developers	**Business developers**	**Suppliers**
Benchmarking	support cost analysis and risk control	easier contact with SSI supervisor

Energy efficiency guidelines	development direction and indication	Reflect on roadmap improvements
	Best practices	fair wages help from standards
	Benchmarking	Meeting
	Supplier meeting	Technology sharing
		Benchmarking

Table 22 – The interviewees responses on question 7-8, their wishes for the new tool connected to the entire tool. Divided into the three interview groups.

Wishes: Tool		
Sustainability developers	**Business developers**	**Suppliers**
Online tool	time efficient	online tool
Supplier ownership	properly tested before use	clear goals
	Online tool (e.g. Microsoft Power BI, SSCM as a reference)	including sub suppliers
	interactions with IWAY	score in different levels
	staircase	Simulation capacity
	links with responsible sourcing alternatives	Available in more languages
	tool sustainability (change/edit in 3-year cycles)	
	Internal clarity on IWAY and the SMD tool	

5.0 Descriptions of frameworks & methods

Zimon et al (2019) proposed a framework in which all its three parts (SSCM driver, players and practices) were influenced by "UN SDGs". The SSCM drivers were divided into internal and external drivers. The central players were the focal business that integrated with suppliers upstream and customers downstream. The SSCM practices consisted of sustainable supplier management, sustainable operations & risk management, and pressures & incentives management.

Saeed & Kersten (2020b) proposed a framework where internal and external drivers affected the framework, that the supply chain participants use to collect the required TBL indicator data that measures their sustainability performance. The supply chain participants in this design is linked in a series, which results in that the sustainability performance for the entire supply chain is the aggregation of each suppliers performance. The authors mention that there are other types of supply chain networks, parallel and combined.

Varsei et al (2014) proposed a framework in which drivers shaped the three sustainability dimensions in accordance with the enablers. Each sustainability dimension inspired a set of performance measures (indicators) that were needed to maintain sustainability.

Bhanot & They (2019) propose a framework that is directed through the business performance measurements and corporate performance that indirectly affects each other through their human issues and logistics departments. Inside this frame is the performance measurement system, the idea is that good governance leads to initiatives in social sustainability that results in positive effects for various dimensions such as social and environmental sustainability.

Vanpoucke et al (2016) propose a conceptual framework where stakeholder influence lay the foundation for a business´s motivations, which in turn leads to sustainability performances such as survival, profit and reduced footprint.

Singh et al (2016) propose a framework with a series of top-down steps that results in an effective SSCM. It starts with a commitment from the top management that initiates the development of a SSCM and a better integration in the supply chain (these two steps interact). Then it continues with the development of the tools and technology that the system requires, after that it's time to teach the system to the employees. This leads to sustainability improvements such as better packaging and pollution prevention that in turn enables the business to achieve a certification, e.g. ISO 14000.

Bradenburg et al (2015) propose a framework that describes the interaction between the goals, SC actors, stakeholder groups and SSCM practices. The focal business is in the center, surrounded by the suppliers and customers. They together create the business´s social, economic and environmental sustainability goals as well as the SSCM practices. The practices include risk, pressure and supplier management. All these processes/levels are influenced by the stakeholders which are governments, customers and NGOs.

Saeed & Kersten (2020b) propose a structure to create a SSCM performance measurement framework, it is divided into two phases. It starts with an analysis of sustainability standards and guidelines which is followed by an analysis of relevant scientific literature. These enable the identification of attribute categories and thereafter an initial list of indicators. The second phase starts with an multi-industry study that combined with the initial indicator list created a final list of indicator, these are then used in the creation of the SSCM PM framework.

Boukherroub et al (2015) propose a framework to shape SSCM through a business´s sustainability principles, it divides itself into three domains/sections (the performance measurement domain, the SC planning domain and the OR domain) and the following three flows with one level in each section. The objectives are used to create the sustainability criteria that is used in the consistency analysis. The variables are used to make supply chain decisions that then induces implementation decision variables and the consistency analysis. The measures shape the performance indicators that in turn lay the base for the objective functions that also are affected with by the earlier mentioned consistency analysis. Interaction between dimensions.

Dubey et al (2015) propose a model in which describes the interactions between 12 selected dimensions as well as the measures and indicators that connects them together.

Rajeev et al (2017) propose a structure for the issues that occurs when SSCM evolves. SSCM is in the center surrounded with the social, economic and environmetal dimension. There is also three subdimension in between the dimensions, such as socioeconomic, socioenvironmental and GrSCM. Outside these dimensions are the different challenges or issues that SSCM face, they can also be thought of as indicators.

Schöggl et al (2016) propose a framework to aggregate SSCM KPI´s. It consists of four levels. The first level is the information collection, it starts with creating qualitative indicators that then inspires the design of quantitative indicators. The qualitative indicators are created through governance (compliance and management systems) and social & environmental commitment (social and environmental categories). The quantitative indicators are divided into four categories compliance, management systems, social and environmental. These affects level two that is the information analyzation, it first does an detailed process chain analysis, then an approximation and lastly an aggregation. Level three is simply an plausibility check before level four where the indicator KPI´s are formed.

Ahi & Searcy (2015c) propose a conceptual SSCM performance measurement framework in the shape of a circle. The supply chain is in the center, it is surrounded by the next layer consisting of the supply chain stakeholders (supplier, focal firm, distributer, retailer, end-user and end of life management). The next layer is the sustainability context that is created by the outer layer, shaped by 13 sustainability dimensions: Environmental, social, volunteer, resilience, long-term, stakeholder, flow, coordination, relationship, value, efficiency, performance and economic.

Hussein et al (2016) created an illustration that shows the advantages of SSCM. Internal and external pressures effects the supply chain and its resources that are managed tough SSCM. The SSCM capabilities of the supply chain then induces environmental and social collaboration between its stakeholders. This leads to a (sustained) competitive advantage in the marketplace.

6.0 Other dimensions found in the reviewed articles

Social:
Motivation and encouragement, internal, external, volunteer, stakeholder, relationship, health and safety, workers and employees, strategic supplier collaboration, community development and social justice, social values & ethics.

Environmental:
Water, material and energy use, environmental wastes and emissions, hazardous waste, environmental sustainability risk analysis, environmental conservation, product portfolio, green product design, green warehousing and remanufacturing.

Economic:
Flow, value, efficiency, return and investment, products, economic stability, logistics optimization, procurement, R&D management.

Transversal:
Innovation and technology, strategic and business portfolio, resilience, long-term, coordination, performance focus, organizational, process, continuous improvement, supplier commitment program, enabling information technologies, sustainability benchmarking, global

sustainability standards, internal pressures, institutional pressures, corporate strategy, sustainability reports and commitment.

7.0 Comparison of the external business's sustainability efforts

Table 23 – Comparison of the external businesses sustainability efforts based on the external interviews.

Business	Sustainability strategy	Data collection and measurement
1	Works codes, policies & goals.	Transitioning to audits as an industry. Base requirements, part of coalition & collect data every/second year.
2	Codes & policies, based on global ones.	Own- and third-party audits. Members of RBA and uses their 130+ criteria for audits. Trainings in factories to make sure everyone know their CoC. Collect data every/second/third year.
3	Focus on big global commitments, such as halving their emissions by 2030.	Detailed process for pre-supplier status. Audits continuously, third party measures footprint.
4	Big goals, 40% emission reduction by 2030.	Collects data from their suppliers annually.
5	Strategy based on their risk assessments made every second year.	Large differences within their business on how data is collected, varies from supply chain to supply chain.

8.0 List of the most popular indicators and frameworks proposed by SSCM practitioners

- The global reporting initiatives (GRIs) sustainability reporting standards (Kuhnen & Hanh, 2017).
- The International organization for standardization (ISOs) environmental management system standard ISO 14001 & ISO 14031 (Hervani et al., 2005)
- ISO 26000 (Kuhnen & Hanh, 2017).
- The SCOR framework (Qorri, 2018).
- The Organization for Economic Co-operation and Developments (OECDs) work on sustainable development
- The UNEP and SETAC guidelines for social life cycle analysis (SCLA) of products and methodological sheets (Fontes et al., 2016)
- The worlds business council for sustainable development (Ginnakis, 2020).
- Dow Jones Sustainability Index (Searcy et al., 2012).

- The European commission´s eco management and audit scheme (EMAS) (Tsoulfas and Pappis 2006; Vachon and Klassen 2006a) (Morali & Searcy, 2012)
- The Carbon Disclosure Project (CDP) (Taticchi, Tonelli, and Pasqualino, 2013)
- The International federation of accountants (IFAC) (Taticchi, Tonelli, and Pasqualino, 2013)
- The Cleaner Production Programme(Tsoulfas and Pappis 2006; Vachon and Klassen 2006a) (Morali & Searcy, 2012)
- The Valdez Principles (Tsoulfas and Pappis 2006; Vachon and Klassen 2006a) (Morali & Searcy, 2012)
- Social accountability international (SAI) SA 8000 (Kuhnen & Hanh, 2017).
- The UN SDGs 56] & (Kuhnen & Hanh, 2017).
- The Roundtable for Product Social Metrics (Fontes et al., 2016).
- The Sustainability Consortium toolkits on social sustainability (TSC, 2015).

9.0 Bibliometric analysis

In accordance with the inclusion and exclusion criteria presented in chapter 2.1 a clear majority of the selected literature were published after 2014. The reason why there still is a few reports that disregard these criteria and these were selected through other terms (further explanation in chapter 2.1).

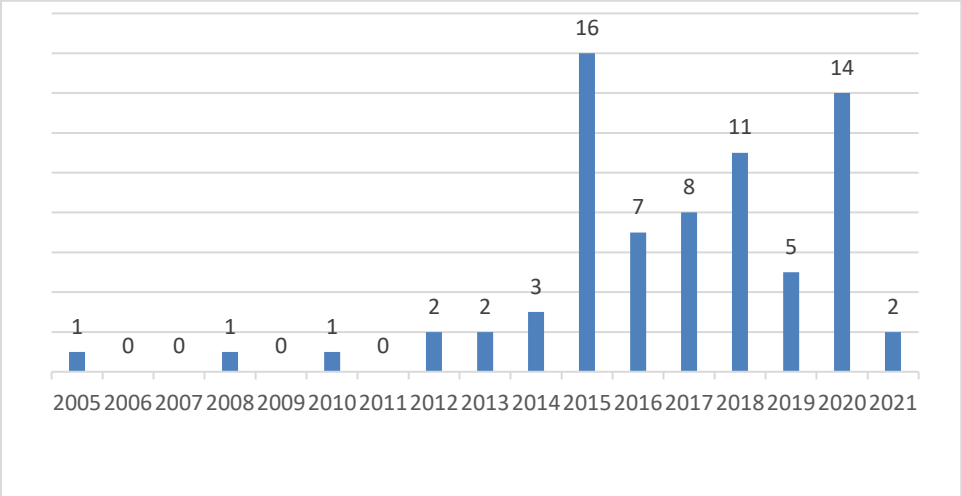

Figure 20 - Illustration showcasing the distribution of publication year in the included articles.

There were a great variety in publication journals in the chosen literature, this indicates that sustainability performance measurements in supply chains crosses several different fields. Figure 20 shows that there number of published articles have increased during the last decade. Figure 21 presents the publications of the chosen reports that published a minimum of two sources. The results show that the journals that focus on sustainability challenges were the ones that published the largest number of articles: Journal of Cleaner Production, Supply chain management: An international journal and Sustainability.

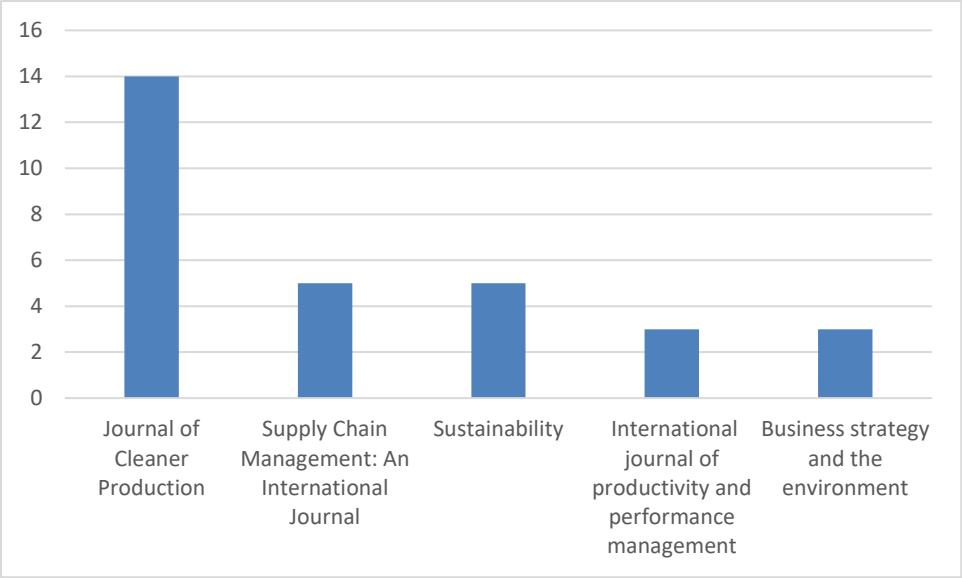

Figure 21 - The top five journals in the chosen literature

The chosen articles of the study were divided into four categories in accordance with their focus areas. Table 24 clearly shows that there was a lower amount of literature that focused on mathematical modeling.

Table 24 – categorization of the chosen reports.

Type of academic report:	Frequency:
Review	17
Framework	16
Theoretical	15
Mathematical model	8