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SUSTAINABILITY IN SUPPLY CHAINS

– Reports, management practices and indicators in leading Finnish companies

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APPLIED SCIENCES

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In the last decade, we have witnessed the emergence of sustainability issues as one of the most important business concerns in a firm's supply chain. An increasing number of firms have re-examined their supply chains and moved forward in their effort to build a more sustainable supply chain. This research aims to know how to develop sustainability in supply chains. In order to achieve this goal, the thesis focus on the study of information disclosed in Corporate Social Responsibility reports of different companies, and especially the best practices for reporting, management, and assessment of sustainability in the supply chain.

The literature review focuses on the topics of sustainability and supply chains. The separated research of sustainability and supply chain concepts, their current state and future trends leads to investigate the application of sustainability concept in supply chain and its development. CSR reports and sustainability reporting standards give a complementary information that will be used in the empirical part.

As preparatory work for the empirical part, some literature is researched to find out what methods were utilized in the past in reporting assessment, sustainability implementation, and indicators.

The empirical research is a comparative case study of CSR reports in five Finnish companies (Cargotec, Metso, Vaisala, Valmet, Wärtsilä). The companies have been selected based on past reporting practices trying to get a comparable dataset in a limited context. Each company has been analyzed separately as the preliminary step for the benchmarking about reporting, management practices and indicators.

Conclusions from the empirical research highlight the room for improvement in reporting practices and indicators. These results seem to point that companies will tackle sustainability in supply chains in the next few years once sustainability is fully implemented in their core activities, and sustainability leaders push their suppliers to follow sustainable practices.

KEYWORDS:

Sustainability, Corporate Social Responsibility, Sustainable Supply Chain, Sustainability reporting, Sustainability development, Indicators, Finland

Victor Manuel Piedrafita Acín

KESTÄVÄ TOIMITUSKETJU

- Raportit, johtamiskäytännöt ja indikaattorit johtavissa suomalaisissa yrityksissä

Viime vuosikymmenellä olemme todenneet, että kestävän kehityksen kysymykset ovat yksi tärkeimmistä liiketoiminnan huolenaiheista yrityksen toimitusketjussa. Yhä useammat yritykset ovat tarkastelleet uudelleen toimitusketjujaan ja edistyneet pyrkimyksissään rakentamaan kestävämmän toimitusketjun. Tämän tutkimuksen tarkoituksena on saada selville, kuinka kestävyyttä kehitetään toimitusketjuissa. Tämän tavoitteen saavuttamiseksi opinnäytetyö keskittyy eri yritysten yhteiskuntavastuuraportteihin sisältyvien tietojen tutkimiseen ja erityisesti toimitusketjun kestävän kehityksen raportointiin, johtamiseen ja arviointiin.

Kirjallisuuskatsauksessa keskitytään kestävän kehityksen ja toimitusketjujen aiheisiin. Kestävän kehityksen ja toimitusketjun käsitteiden erillinen tutkimus, niiden nykytila ja tulevaisuuden trendit johtavat tutkimaan kestävän kehityksen periaatteen soveltamista toimitusketjussa ja sen kehityksessä. CSR-raportit ja kestävän kehityksen raportointistandardit antavat täydentävää tietoa, jota käytetään empiirisessä osassa.

Empiirisen osan valmistelevana työnä tutkitaan kirjallisuutta ja selvitetään mitä menetelmiä aiemmin käytettiin arvioinnin raportoinnissa, kestävyyden toteutuksessa ja indikaattoreissa.

Empiirinen tutkimus on vertaileva tapaustutkimus yritysten yhteiskuntavastuuraportista viidessä suomalaisessa yrityksessä (Cargotec, Metso, Vaisala, Valmet, Wärtsilä). Yritykset on valittu aiempien raportointikäytäntöjen perusteella yrittäen saada vertailukelpoinen tietojoukko rajallisessa kontekstissa. Jokainen yritys on analysoitu erikseen alustusvaiheessa raportointia, hallinnointikäytäntöjä ja indikaattoreita varten.

Empiirisen tutkimuksen päätelmät korostavat raportointikäytäntöjen ja indikaattoreiden parantamista. Nämä tulokset näyttävät viittaavan siihen, että yritykset kohtaavat kestävän kehityksen toimitusketjuissa lähivuosina, kunhan kestävyys on täysin toteutettu yrityksen ydintoiminnassa ja kestävän kehityksen johtajat työntävät toimittajiaan kestävien käytäntöjen noudattamiseen.

ASIASANAT:

Kestävä kehitys, kestävä toimitusketju, kestävän kehityksen raportointi, kestävän kehityksen kehittäminen, indikaattorit, Suomi

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LIST OF ABBREVIATIONS (OR) SYMBOLS

APAC	Asia and Pacific
CAP	Corrective Action Plan
CBMF	Collaborative Buyer-Managed Forecasting
CERES	Coalition for Environmentally Responsible Economies
CoC	Code of Conduct
CPFR	Collaborative Planning, Forecasting and Replenishment
CSR	Corporate Social Responsability
DDM	Direct Digital Manufacturing
EICC	Electronic Industry Code of Conduct
EMEA	Europe, Middle East and Asia
ERP	Enterprise Resources Planning
ESG	Environmental, Social and corporate Governance
ESI	Early Supplier Involvement
EU	European Union
GRI	Global Reporting Initiative
ILO	International Labour Organization
IOIS	Inter-organizational Information Systems
IoT	Internet of Things
KPI	Key Performance Indicator
LNG	Liquid Natural Gas
MBA	Master in Business Administration
MRP	Material Resources Planning
MRPII	Material Resources Planning II
NGO	Non-Governmental Organization
P/SM	Purchasing and Supply Management
PQAP	Part quality assurance plan
QDCI	Quality, Delivery, Cost and Innovation

SAQ	Self-Assessment Questionnaire
SCI	Supplier Chain Integration
SCM	Supplier Chain Management
SCoC	Supplier Code of Conduct
SDG	Sustainable Development Goals
SECI	Socialization, Externalization, Combination, Internalization
SEDEX	Supplier Ethical Data Exchange
SME	Small and Medium Enterprise
SRM	Supplier Relationship Management
SSCM	Sustainable supply chain management
TBL	Triple Bottom Line
TQM	Total Quality Management
UNCTAD	United Nations Conference on Trade and Development
UNGC	United Nations Global Compact
USA	United States of America
VMI	Vendor-Managed Inventory
WCED	World Commission on Environment and Development

1 INTRODUCTION

1.1 Topic background

In the last decade, we have witnessed the emergence of sustainability issues as one of the most important business concerns in a firm's supply chain. An increasing number of firms have re-examined their supply chains and moved forward in their effort to build a more sustainable supply chain, by not only monitoring their suppliers' compliance, but also by fostering their capabilities to properly address various environmental and social challenges. The triple bottom line, indicating the combination of economic, social, and environmental criteria must be integrated into performance objectives for the management of the entire supply chain. This is why the management of environmental and social issues in the supply chain, namely sustainable supply chain management, has been increasingly paid much attention. (Lee et. al 2016, 1)
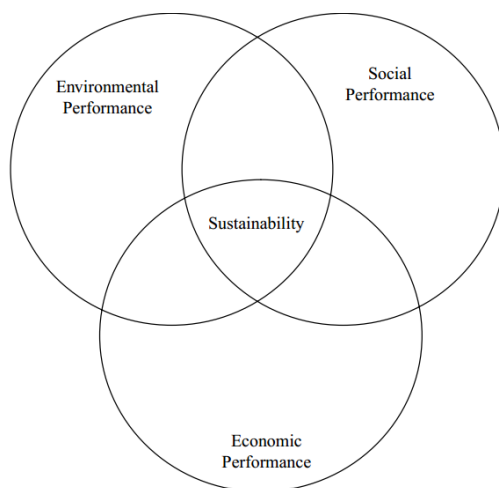
Figure 1. Sustainability: The triple bottom line (TBL) (Carter and Rogers 2008, 365)

FIBS, a Finnish organization that fosters sustainability, states as one of the key results of its Corporate Responsibility Survey 2017 Summary that "*Fair operating procedures, in other words, ethical business practices, fair competition, responsible supply chains and economic responsibility have become the most crucial corporate responsibility issues*". The inner pages of the report describe that "*Supply chain management has been the most challenging corporate responsibility issue for businesses in the past three years and this year even more companies find this to be true: currently,34% (28% in 2016,*

21% in 2015) of companies report supply chain management as their most challenging issue". (FIBS 2018a; FIBS 2018b)

What is the most challenging corporate responsibility issue for your company?
Select 1
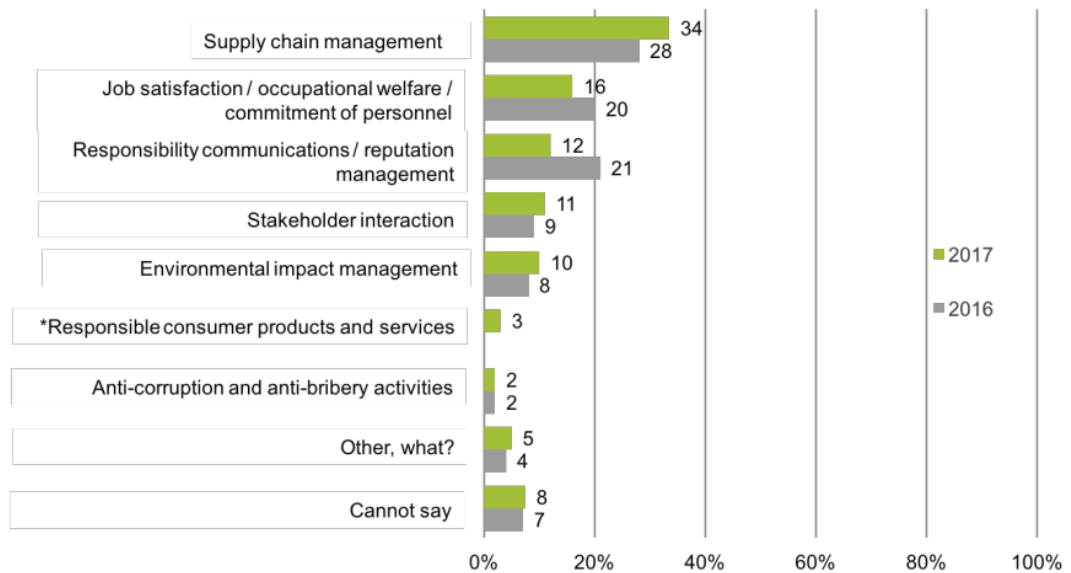
Figure 2. The most challenging corporate responsibility issues (FIBS 2018b).

As report conclusions "*There is ever more investment in Corporate Responsibility (CR) and supply chain issues – human rights are still considered to be one of the least important corporate responsibility issues. The positive development in CR issues needs to be further developed as should enhancing the awareness of the human rights impact of one's own businesses. The best way to manage supply chain responsibility is to benefit from and use the systematic training, networking and learning gained from the best practices and solutions developed by others*". In other words, sustainable and responsible supply chains have become in strategic goals for Finnish companies, but its implementation is the most challenging issue and need for resource, systematic training and learning form the best practices developed by others. (FIBS 2018b)

1.2 Objectives and research questions

For these reasons, it is worth knowing more about sustainability field, latest management practices and its challenging implementation in supply chain. As FIBS report recommends, the best way might be through best practices and solutions developed by others. The research proposal is to conduct an empirical analysis to the disclosed information (secondary data) of sustainability reports of leader companies to answer the following research questions:

RQ1: How do companies report about sustainability in their supply chain?

RQ2: How do companies implement sustainability in their supply chains?

RQ3: What indicators do companies use to assess sustainability in their supply chains?

This research aims to know how to develop sustainability in supply chains. In order to achieve this aim, the thesis objectives are to gather general knowledge of sustainability in supply chains (via literature review), and specifically about the best practices for reporting, management and assessment of sustainability in the supply chain (via sustainability reports review). Therefore, the research proposal will focus on the study of different companies and their sustainable supply chain practices disclosed in Corporate Social Responsibility reports.

The objectives that each research question pursue are:

1) RQ1: to learn how to report efficiently sustainability, in order to tackle the challenging issue *Responsibility communications* that FIBS also pointed out
2) RQ2: to know best sustainable supply chains practices to create a framework to develop companies' sustainable supply chain (*Supply chain management*)
3) RQ3: to gather indicators to assess suppliers 'sustainability and to report companies' sustainability (*Supply chain management*)

As summary, the research guideline of this thesis might be "*if according to my experience, suppliers are evaluated mainly by economic factors (and they should be by the TBL), and some organizations reports of increasing concern about sustainable supply chain management and responsibility communications, it would be interesting to research sustainability reporting referred to supply chain to learn how sustainability*

leaders reports about their supply chain (RQ1) and what management practices and indicators they use (RQ2 and RQ3)"

1.3 Why this topic? Personal perspective

The topic is fascinating because it merges part of my expertise in supply chain management with some concepts newly discovered in this MBA (such as fair logistics, social marketing, CSR or future studies).

By my own experience in supplier quality management so far, the so called Corporate Social Responsibility has a marginal importance in the assessment of suppliers, where conventional factors as quality, cost or delivery leads any evaluation and environmental and social aspects are only related with the compliance of ISO14001 or other standards.

Therefore, the empirical part of this research enables me to explore the new concept of sustainability management, assessment and reporting and leads me to improve my practical (and conventional) tacit knowledge with explicit knowledge disclosed in CSR reports.

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Figure 3. The SECI model of knowledge creation (Nonaka and Takeuchi 1995).

The data access is one of the most demanding part of the thesis, but I am optimistic because sustainability concept is more and more advertised in corporate web pages showing some eagerness to share information.

I also hope that research topic matches my career goals, providing better understanding of sustainability practices, its assessment in supply chains, as well as future trends and business opportunities in local supply chain.

The time for a proper thesis development is suitable to expected (4-6months) and the topic will be still current topic (e.g. according to DHL logistics trend radar "Fair and responsible logistics" will be a trend in the next 3 years).
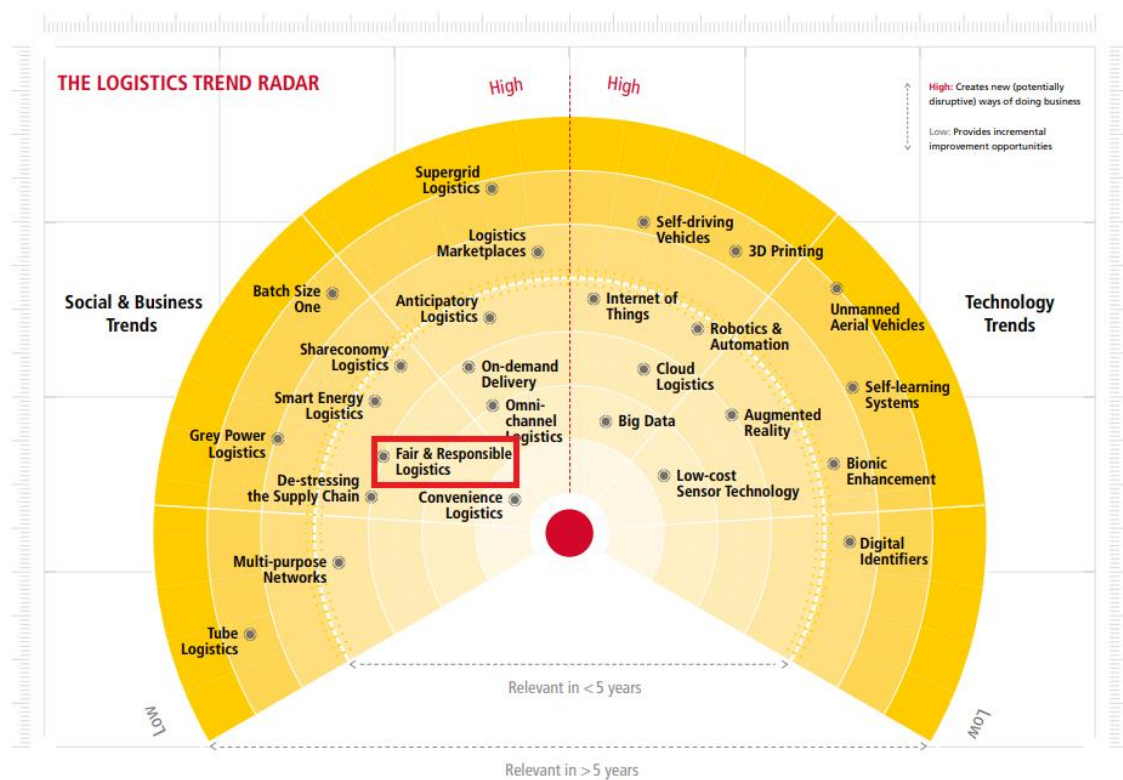
Figure 4. The logistic trend radar (DHL 2016).

1.4 Research development and limitations

For the theoretical part of the thesis I have applied a qualitative approach in order to explore literature on the topic thanks to academic books, journals, websites and articles, as well as publications of global organizations. Particularly, publications regarding the topics of sustainability and supply chains in general have be taken into consideration.

The literature research starts from the definition of sustainability and supply chain concepts, continue to review its history and development to depict it current state to finally outline possible future trends. After that, literature study shows the application of sustainability concept in supply chain and its development.

As preparatory work for the empirical part, I have also reviewed some literature for the research development, trying to find what previous researches did and tools / methods utilized in the past applicable to my own research framework. Therefore, this part that joins theory and practice will be the nexus between the theory and practice

In the empirical research I have prepared a comparative case study where I analyse and evaluate the CSR reporting practices in five Finnish companies. The companies have been selected on the basis of past reporting practices according to GRI trying to get a comparable dataset. The qualitative document analysis has been based on the CSR reports of selected companies released in 2018 referring to last operation year (2017). The condition of public report about Corporate Responsibility and its partial assurance by external third parties creates additional confidence in reported matters. I have first analysed each company separately and then continue to prepare benchmarking results and conclusions about reporting, management practices and indicators.
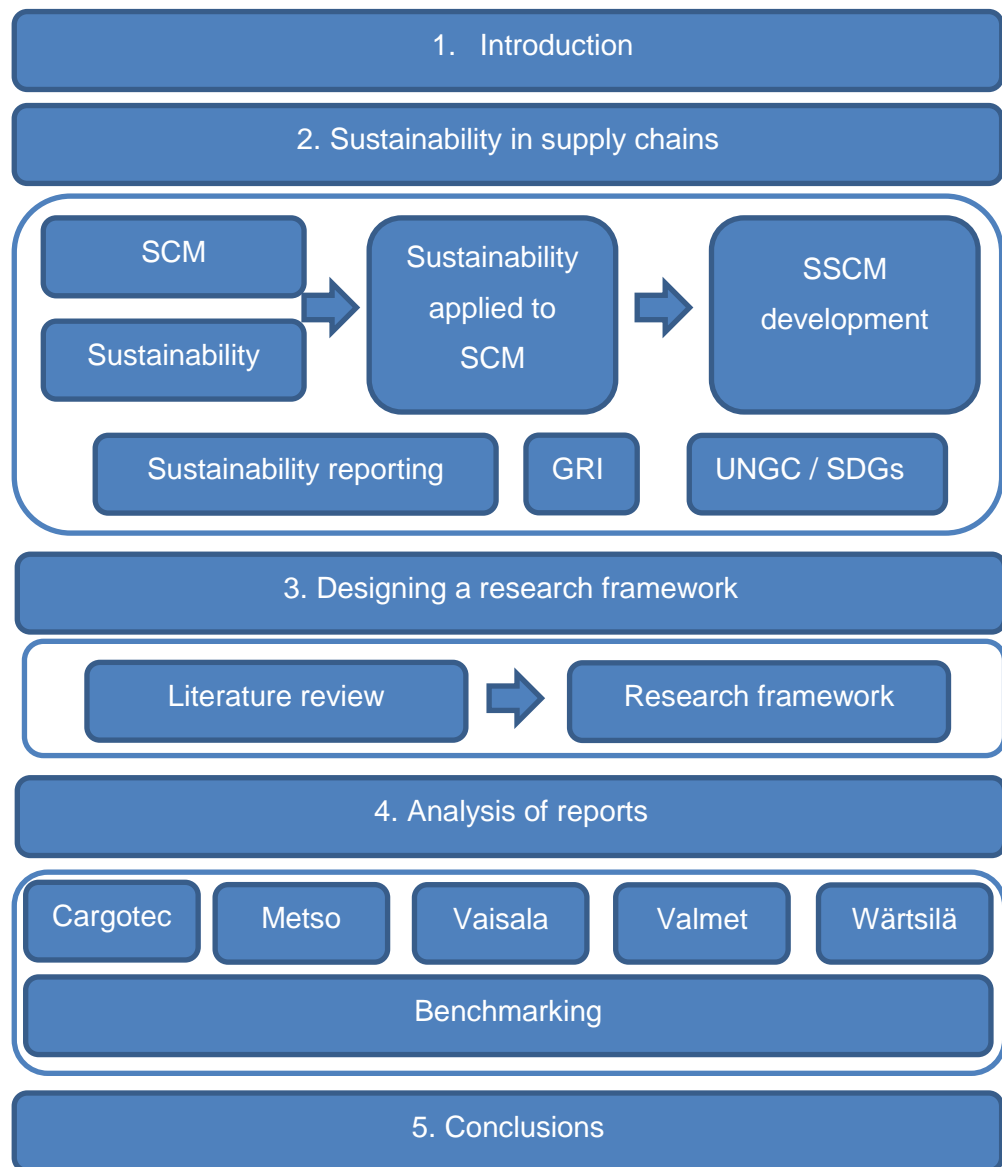
Figure 5. Thesis structure.

Some limitations have been defined by own researcher, such as number of companies, country or business sector in order to provide a restricted context to foreseeably extensive information, others are inherent to available data, such as research based only in publicly accessible reports (secondary data) and others are due to limited time frame. Therefore, this paper only includes parts of existing literature and cannot (and doesn´t aim) to give a comprehensive picture of the sustainability topic in supply chains.

2 SUSTAINABILITY IN SUPPLY CHAINS

2.1 Supply chain management (SCM)

2.1.1 Definition

The term supply chain management has been defined by Mentzer et al. (2001, 18) as, "*the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole*"

Supply chain consists of all part involved, directly or indirectly, in fulfilling a customer request and includes not only the manufacturer and suppliers, but also transporters, warehouses, retailers and even customers themselves. Supply chain functions include, but are not limited to, new product development, marketing, operations, distribution, finance and customer service. (Chopra and Meindl 2016, 13)

2.1.2 The evolution of SCM

SCM has evolved rapidly. In the beginning organizations began to improve their inventory management and production planning and control. (Stevens and Johnson 2016, 22)

The next phase was the systematization of materials, production, and transport management thanks to materials requirement planning (MRP) focusing on inventory control. Both MRP and MRPII were conceived in the 1960s but did not gain prominence until the 1980s, when evolved to become ERP, in an attempt to gain greater visibility over the entire enterprise. (Stevens and Johnson 2016, 22)

The mid to late 1980s led to the implementation of practices such as Total Quality Management (TQM) and LEAN. These practices focused on reducing inventory through improving quality and flow and involving suppliers in product and process design. (Stevens and Johnson 2016, 22)

The next phase included the introduction of other process improvement practices (e.g. six sigma). As the standardization of products and processes took place, there was increasing awareness that end customers were requiring ever increasing levels of choice and differentiation. This led companies to consider that they should be focussing on creating agile supply chains. (Stevens and Johnson 2016, 22)

In the 90´s, the growth of developing countries exporting to high wage economies encouraged firms to source from lower cost economies. This changed the topology of the supply chain as well as the magnitude, profile and direction of material, and information flows. The prevailing tendency was to control as much of its upstream and downstream activities as possible, while companies focused more on managing, in-house core competences. (Stevens and Johnson 2016, 23)

A key role of SCM is to minimize the risks and uncertainty associated with the naturally occurring unstable state of the supply chain. For example, the problem of the reliable "transmissivity" of information through the supply chain is characterized by "bullwhip" effect. (Stevens and Johnson 2016, 23)

In addition to the issues caused by information distortion and a global supply base, the twenty-first century is a time when organizations are facing pressure to have green and ethical supply chains. This requires organizations to become more transparent in terms of disclosing their sources of supply, which increases costs and may place pressure on moving away from the lowest cost economies where labor rights can be poor. (Stevens and Johnson 2016, 23)
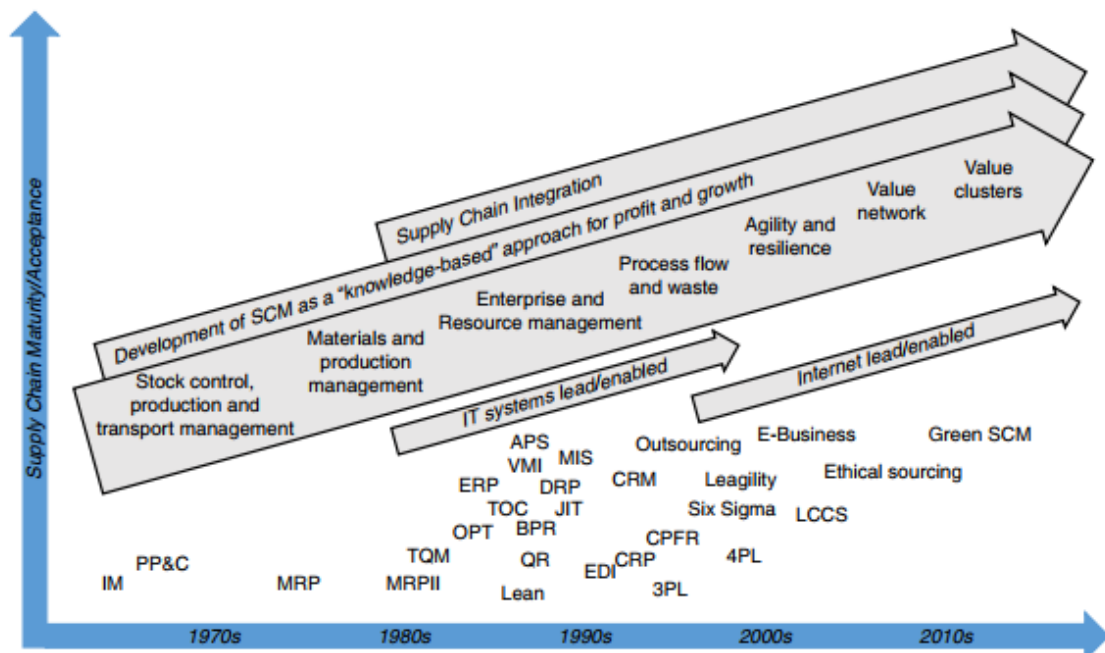
Notes: 3PL, third party logistics provider; 4PL, fourth party logistics provider; APS, advanced planning systems; BPR, business process re-engineering; CPFR, continuous planning, forecasting, and replenishment; CRM, customer relationship management; DRP, distribution resource planning; EDI, electronic data interchange; ERP, enterprise resource planning; IM, inventory management; LCCS, low-cost country sourcing; MIS, management information systems; MRP, material requirements planning; MRPII, manufacturing resource planning; OPT, optimized production technology; PP&C, production planning and control; QR, quick response; TOC, theory of constraints; TQM, total quality management; VMI, vendor managed inventory

Figure 6. A timeline of SCM. Strategies, tools and techniques (Stevens and Johnson 2016,37).

Nowadays it is expected that SCM can address the challenge of its increasing complexity, through integration (Supplier Chain Integration, SCI) and accelerating the flow of new practices across the supply network. In other words, reducing the gap between theory and practice (linked abstraction and operation), for instance, in Supplier Chain Planning (SCP) (Jonsson and Holmström 2015).

The fundamental need for "joined up" thinking and working and the need to integrate the supply chain has not changed for many years placing integration as one of the elements of creating driven supply chain strategy. (Kauremaa and Tanskanen 2016)

Multiple and relevant factors affect the success of Supplier Chain Integration (SCI), for instance, the design of inter-organizational information systems (IOIS), that are

subordinated, in turn, to inter-organizational interdependence, environmental uncertainty, product complexity, competitive and regulatory environment, security requirements, among others. (Kauremaa and Tanskanen 2016, 26)

As a result, the increasing pressure on the supply chain, together with the arrival of new supply chain strategies and tools, have elevated the role of Supply Chain Management (SCM) within many organizations (Stevens and Johnson 2016,37).

2.1.3 Supply chain drivers

Changes in the business environment, technology, economy, and customer preferences will drive the supply chain in the next years.

Business environment: Future supply chains will navigate an environment volatile, uncertain, complex, and ambiguous, becoming complex adaptive systems (Stevens and Johnson 2016, 38).

Technology: One of biggest changes will be led by technology, with trends in logistics such as big data, IoT, robotics, cloud services or low-cost sensors.

Direct digital manufacturing (DDM) using 3D printing can complement traditional mass production, mainly for manufactures that need to isolate manufacturing variability attributable to low volume parts. Over time, these manufacturers can develop DDM competences, enabling them to produce on-demand for other manufacturers and individuals, emerging as regional 3D supercentres. (Sasson and Johnson 2016, 91)

Economy: Re-shoring or near-shoring (or the re-location of production closer to the point of consumption) will increase as countries move from developing to developed and they become less attractive as manufacturing destinations as the cost benefits are eroded (Stevens and Johnson 2016, 38).

Customer preferences: Customers will require greater levels of customization and supply chain will move toward "markets of one" tailored to the individual, resulting in decentralized 'batch size one' production. This will require supply chains to adapt rapidly to changes in time and place of production. (Stevens and Johnson 2016, 38)

2.1.4 The forthcoming supply chain

Due to the aforementioned factors, the future in supply chain will be atomized in adaptive communities with strong needs of collaboration (Stevens and Johnson (2016, 38).

Collaboration can be seen as a tool that enables integration and global optimization of a supply chain, thanks to popular initiatives as Vendor-Managed Inventory (VMI) and Collaborative Planning, Forecasting and Replenishment (CPFR). In particular, demand exceptions management is a challenge and there is an intense research to develop new strategies. For instance, to overcome some limitations of VMI and CPFR tools, the replenishment model Collaborative Buyer-Managed Forecasting (CBMF) creates a proactive planning approach and a platform for close collaboration in the supply chain. The centralised forecasting transforms retailer sales data into a plan which serves the whole supply chain by creating one-order forecast. (Alftan et al., 2015)

Supply chain will be also adaptive, to demand and supply, and reactive and pro-active to wider geo-political, business, economic, environmental, and social factors. (Stevens and Johnson (2016, 38). In every day more complex and uncertain business environment, where supply chains are inherently unstable, a key role of SCM is to minimize the risks and uncertainty through supply chain risk management.

2.2 Sustainability. The triple bottom line

The most extended and accepted definition of sustainability was put forward in 1987 by the World Commission on Environment and Development. It stated that sustainable development is defined as "*a development that meets the needs of the present without compromising the ability of future generations to meet their own needs*" (WCED 1987 in Lysons and Farrington 2006, 93).

Sustainability, at a broader level, consists of three components: the natural environment, society, and economic performance. This perspective corresponds to the idea of the triple bottom line, a concept developed by Elkington (1998), which simultaneously considers economic, environmental and social goals from a microeconomic perspective. (Carter and Rogers 2008,364)

The triple bottom line suggests that at the intersection of social, environmental, and economic performance, there are activities that organizations can participate in which not only positively affect the natural environment and society, but which also result in economic benefits and competitive advantage for the organizations (Carter and Rogers 2008,364-365)

2.3 Sustainability applied to SCM. Sustainable supply chain management (SSCM)

Other facets of sustainability not included in sustainability explicit definitions are risk management, transparency, strategy, and culture. The relationships between these facets of sustainability and the core triple bottom line framework are:

Risk management**:** Within the context of sustainability, an organization must understand and manage its economic, environmental, and social risks in the supply chain and corporations are increasingly recognizing that risk management is a part of their sustainability (Carter and Rogers 2008,366).

Transparency: Transparency is driven by the rapid speed of communication nowadays. Maintaining the secrecy of corporate wrongdoings has become very difficult and risky. In the long term, it is simple and cheaper for a company to operate with transparency concerning economic, social, and environmental topics. Transparency includes not only reporting to stakeholders, but actively using stakeholder feedback to improve supply chain processes. Transparency can be improved through vertical coordination across a supply chain as well as horizontal coordination across networks. For example, common auditing procedures increases transparency and supplier sustainability while lowering operation costs. (Carter and Rogers 2008,367)

Strategy: An organization's sustainability initiatives and its corporate strategy must be closely interlaced rather than separate programs that are managed independently of one another (Carter and Rogers 2008,367).

Culture: Organizations that become sustainable enterprises do not simply overlay sustainability initiatives with corporate strategies. These organizations also have their company generating the internal drive and passion to foster innovation and a sense of purpose beyond the economic performance. (Carter and Rogers 2008,367-368)

Based on the triple bottom line and the four supporting facets of sustainability reviewed above – risk management, transparency, strategy, and culture, SSCM could be defined as " *the strategic, transparent integration and achievement of an organization's social, environmental, and economic goals in the systemic coordination of key interorganizational business processes for improving the long-term economic performance of the individual company and its supply chain*" (Carter and Rogers 2008,368). In other words, the integration of environmental, social, and economic criteria that allow an organization to achieve long-term economic viability.

This definition is conceptualized in the figure below:
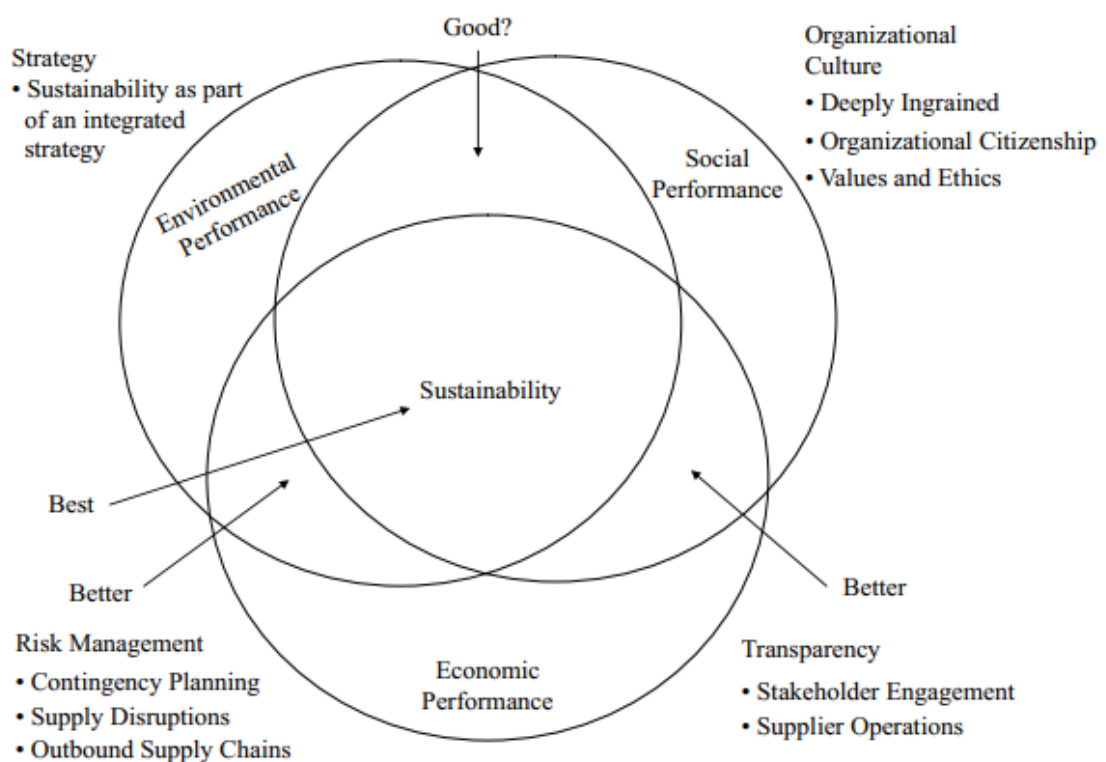
Figure 7. Sustainable supply chain management (Carter and Rogers 2008,369)

The term "good", which labels the intersection of social and environmental components, has question marks because omits the economic component of the triple bottom line. The social and environmental dimensions of SSCM must be undertaken with an explicit recognition of the economic goals of the firm. (Carter and Rogers 2008, 369)

According to Seuring and Müller (2008, 1700), it is possible to define sustainable supply chain management "*as the management of material, information and capital flows as*

well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e. economic, environmental and social, into account which are derived from customer and stakeholders´ requirements." Although it is rather general, this definition has the advantage of demonstrating the link between supply chain management and sustainable development.

2.4 Sustainable supply chain development

Supply chains have become so global and highly complex that maintaining resilient supply chains is a key success factor for business in a fast-changing world. Quality, cost, delivery and reliability have been the focus of supply chain professionals for a long time but over the past few years sustainability has been added to the procurement criteria for many companies. (UNGC 2016a, 4)

Workforce health and safety incidents. labour disputes, geopolitical conflicts, environmental disasters and new legislation in areas such as conflict minerals have contributed to the growing awareness of supply chain risks among stakeholders. Moreover, by improving environmental. social and governance (ESG) performance throughout their supply chains, companies can enhance processes, save costs, increase labour productivity, develop product innovation, achieve market differentiation and have a significant impact on society. (UNGC 2016a, 4)

In spite of growing stakeholder pressure and evident advantages, many companies still do not have a comprehensive understanding of the performance, risks and sustainability impacts of their supply chain. Companies vary significantly in their approaching programs to supply chain sustainability, that can be categorized in different levels or development phases:

1. With minimum guidelines, companies have a poor understanding of supplier risks and basic development of sustainability.
2. Improving program is characterized by a minimum level of expectations with a focus on risk and compliance, and basic auditing or assessment of high risk suppliers.

3. As a program becomes more <u>established</u>, companies set clear expectations for suppliers and develop processes to screen, select and manage suppliers against those expectations.

4. As companies move towards a more <u>mature</u> program, they require suppliers to cascade the requirements further down in the supply chain, and identifying opportunities to improve supplier performance. Mature companies address integrate these practices and processes with product design and development to explore opportunities for enhancing sustainability.

5. Companies at the <u>leadership</u> level of maturity create shared value with their suppliers, treating their suppliers as an extension of their business and engaging in meaningful two-way dialogue. (UNGC 2016a, 4)

Basic	Improving	Established	Mature	Leading
▸ Minimum standards or guidelines ▸ Poor understanding of supplier risks	▸ Focus on risk and compliance ▸ Assess against supplier code of conduct or contractual terms and conditions ▸ Focus on audit approach for high-risk areas ▸ Transactional relationships with suppliers	▸ Understand the significant issues to prioritize suppliers based on risk ▸ Optional or mandatory processes in place to screen, select and manage suppliers based on sustainability criteria ▸ Focus on short-term risks ▸ Include site visits of suppliers in monitoring ▸ Reporting KPIs on sustainable supply chains	▸ Sustainability requirements globally aligned, adopting the highest standard ▸ Apply leading standards and certification programs ▸ Monitoring and visibility beyond Tier 1 ▸ Process to screen, select and manage suppliers based on sustainability criteria – integrated with other processes ▸ Suppliers segregated based on performance, impacting spend allocation ▸ Conduct training ▸ KPIs for measuring supply chain sustainability performance – integrated scorecard ▸ Work with suppliers to identify areas for improvement ▸ Engaged with government to develop regulation ▸ Rely on suppliers to cascade requirements on to suppliers	▸ Sustainability part of the company's culture and DNA ▸ Suppliers considered an extension of the business ▸ Engaged more in asking and less in telling ▸ Make sustainability part of the upstream design or purchasing decisions ▸ Work with suppliers to build capacity and embed a culture of sustainability ▸ Selecting suppliers based on sustainability criteria (even where cost is higher) ▸ Focus on long-term risk and opportunity ▸ Prominent lead in industry initiatives and working groups ▸ Ahead of emerging regulation ▸ Transparency about performance – reporting metrics beyond number of audits to include outcomes

Figure 8. Maturity model (UNGC 2016a, 31)

As regards the current state and future development of sustainability in supply chains, <u>supply chain sustainability is a current topic</u> and companies are embracing responsibility in their supply chain management to improve their impacts on the workforce, local communities and the environment in the places where they procure their products and services. (UNGC 2016a, 6)

Operational, financial, regulatory and reputational risks continue to be the major drivers for supply chain sustainability. The proliferation of regulations and standards creates significant challenges to business, such as increased time and effort dedicated to compliance issues. Supply chain programs are evolving beyond regulatory compliance to focus on creating shared value with stakeholders. As companies start to apply a sustainability approach to their process products and services the inputs to them and its social and environmental conditions will be under growing scrutiny. (UNGC 2016a, 6)

Most companies are applying a cross-functional approach to managing supply chain sustainability where sustainability requirements, key performance indicators (KPIs) and assessment criteria are increasingly integrated in the business processes mainly managed by procurement and sourcing functions. The success of this approach depends on formalized channels of communication and reporting, and practices such as working groups that stimulate internal collaboration and knowledge exchange. Only a few companies have fully embedded sustainability into their business models, typically with strong support from executive leadership. (UNGC 2016a, 6)

Companies with a mature level in their relationships with the supply chain are expanding their relationships significantly beyond auditing and monitoring, and are investing in training, capacity building and incentives for the top performers. They work with suppliers toward shared commitments as they recognize that suppliers play an important role in achieving their sustainability goals. (UNGC 2016a, 7)

Companies still do not have a good understanding of the risks deeper in the supply chain, therefore transparency and traceability, especially beyond Tier I suppliers have been identified as a major challenge. Sustainability leaders encourage suppliers to sustainability practices with their own suppliers and thus reach further in the supply chain. In addition, the increased availability of advanced tracking technologies has led to the development of cloud-base software solutions focused on supply chain transparency. Technology can help companies to get a better understanding of the supplier performance over time, make business decisions and ultimately improve processes, while improving supplier relations. Technology solutions are also evolving to include inputs not only from audits, but also from own workers' information, government and nongovernmental organization (NGO) databased and the local press in order to create a comprehensive performance profile for suppliers. Technology will continue to play an increasing role in supply chain sustainability, offering modular, cloud-based. sector

specific solutions, with the potential of global cluster databases being created in the future. (UNGC 2016a, 7)

And last, companies have recognized that <u>multi-stakeholder collaborations</u> on a specific sector, geography, issues and commodities have less costs, increases leverage with suppliers, facilitates knowledge exchange and helps enhance credibility. (UNGC 2016a, 7)

2.5 Sustainability reporting

2.5.1 Sustainability and CSR terms

In a world where Sustainability and CSR terms are slowly becoming interwoven it is worth reviewing both concept and find its similarities and differences. Traditionally, CSR refers to businesses' responsibility to act ethically and consider their impacts on the society and it does not necessarily include sustainability. Sustainability on the other hand is concerned with preserving resources and operating in a way without compromising the ability of future generations to meet their own needs''. (Knowles 2014)

In business management CSR should be embedded in the company's strategy level, mission and vision: who it is, what it wants to represent and achieve. Sustainability, meanwhile, is in the operative level of that company, for example in how it uses energy. (Knowles 2014)

A clear difference therefore is in time frame. CSR looks backwards at performance, typically over the last 12 months. Meanwhile sustainability, that is increasingly featured in dedicated reports, has a more prominent forward-facing focus, with targets to secure the future. (Knowles 2014)

Therefore, differences are so small that companies can use the term CSR or sustainability reports indistinctly to report valuable information to their stakeholder about past performance and practices and future strategies and development.

Companies are increasingly motivated to report sustainability issues and related risks because of a heightened awareness about economic, social and environmental topics. Moreover, disclosure requirements are transitioning from voluntary to mandatory as

sustainability reporting becomes required not only by regulators, but also by stakeholders. (English and Schooley 2014, 26)

2.6 Sustainability reporting standardization. GRI guidelines

Sustainability reporting can be considered as synonymous with other terms for non-financial reporting; triple bottom line (TBL) reporting, corporate social responsibility (CSR) reporting, corporate responsibility (CR) reporting and more. (GRI 2018a)

According to Global Reporting Initiative (GRI) a sustainability report is "*a report published by a company or organization about the economic, environmental and social impacts caused by its everyday activities. A sustainability report also presents the organization's values and governance model, and demonstrates the link between its strategy and its commitment to a sustainable global economy*". (GRI 2018a)

Many companies began providing corporate sustainability reports to document their compliance with environmental regulations and have since broadened their reporting practices. The reporting level on sustainability can vary from companies that almost never report to companies that integrate financial and sustainability measures into their financial reporting. Regardless its reporting practices and quality, a company will be always pressured for more transparency. Initiatives for sustainability reporting standardization will continue to evolve as more companies begin reporting and as companies already reporting broaden their scope. Companies considering sustainability reporting can use the GRI's latest set of standards as a starting point. (English and Schooley 2014, 27)

The GRI guidelines (Global Reporting Initiative) have become the de facto international standard for reporting environmental, social, and economic performance and they are the most widely used around the world. (GRI 2018b)

GRI is an international independent organization that helps businesses, governments and other organizations understand and communicate the impact of business on critical sustainability issues such as climate change, human rights, corruption and many others. (GRI 2018b)

With thousands of reporters in over 90 countries, GRI provides the most widely used standards on sustainability reporting and disclosure, enabling businesses, governments,

civil society and citizens to make better decisions based on information that matters. In fact, 93% of the largest 250 corporations report on their sustainability performance using GRI guidelines. (GRI 2018b)

In 2013, GRI released the G4 *Sustainability Reporting Guidelines*. The G4 include Supply Chain Standard Disclosures among other disclosures. In turn, the G4 Guidelines have been superseded by the GRI Standards, released on 19 October 2016. Use of the GRI Standards will be required for all reports or other materials published on or after 1 July 2018. (GRI 2018c)

2.7 Other sustainability standardization initiatives

2.7.1 United Nations Global Compact (UNGC)

The United Nations Global Compact is a call to companies everywhere to:

- align their operations and strategies with ten universally accepted principles in the areas of human rights, labour, environment and anti-corruption, and
- to take action in support of issues embodied in the Sustainable Development Goals. (UNGC 2018a)

Corporate sustainability starts with a company's value system and a principles-based approach to doing business. By incorporating the Ten Principles of the UN Global Compact into strategies, policies and procedures companies are not only asserting their basic responsibilities to society and environment, but also setting the scenario for long run success. (UNGC 2018b)

The Ten Principles of the United Nations Global Compact are derived from: the Universal Declaration of Human Rights, the International Labour Organization's Declaration on Fundamental Principles and Rights at Work, the Rio Declaration on Environment and Development, and the United Nations Convention Against Corruption. (UNGC 2018b)

- Human Rights
  - o Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights; and
  - o Principle 2: make sure that they are not complicit in human rights abuses.

- Labour
    - Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;
    - Principle 4: the elimination of all forms of forced and compulsory labour;
    - Principle 5: the effective abolition of child labour; and
    - Principle 6: the elimination of discrimination in respect of employment and occupation.
- Environment
    - Principle 7: Businesses should support a precautionary approach to environmental challenges;
    - Principle 8: undertake initiatives to promote greater environmental responsibility; and
    - Principle 9: encourage the development and diffusion of environmentally friendly technologies.
- Anti-Corruption
    - Principle 10: Businesses should work against corruption in all its forms, including extortion and bribery. (UNGC 2018b)

2.7.2 Sustainable Development Goals (SDGs)

The Sustainable Development Goals(SDGs) are a set of 17 Global Goals, officially known as "Transforming our World: the 2030 Agenda for Sustainable Development" developed from 2012 to 2015 by the United Nations to define the future global development framework that would succeed the Millennium Development Goals. The SDGs cover a broad range of social issues like poverty, hunger, health, education, climate change, gender equality and social justice. (UNGC 2018c)

Figure 9. Sustainable Development Goals (SDGs). (UNGC 2018c)

The following graphic illustrates some of the primary linkages between the UN Global Compact's Ten Principles and the SDGs
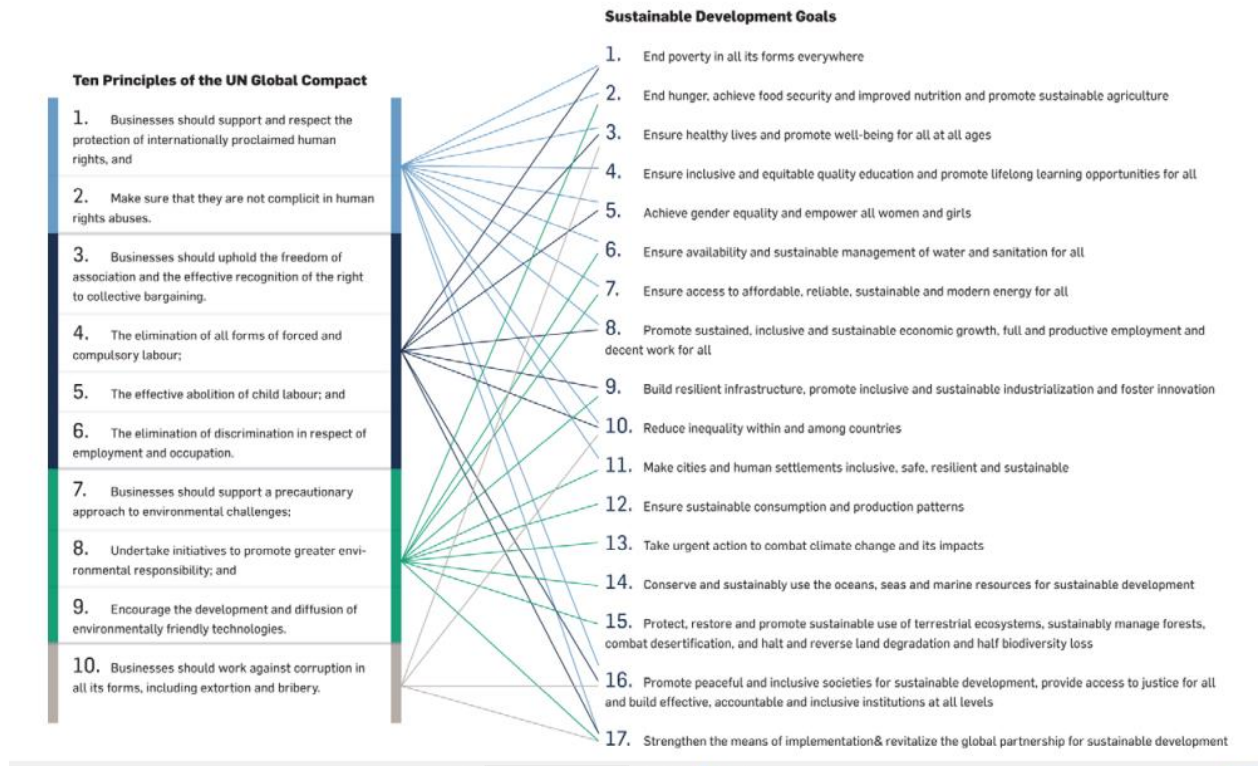
Figure 10. UNGC Ten Principles and SDGs linkages. (UNGC 2016b, 6).

Basically, sustainability begins with a company's values and culture and the UNGC Ten Principles provide a universal definition for responsible business. This means making sure that a company identifies and accounts for any impacts its activity may have on society and the environment, stabilising a culture of integrity and compliance. On the other hand, SDGs give the practical approach to integrate abovementioned principles.

3 DESIGNING A RESEARCH FRAMEWORK

3.1 Literature review for a research development

As preparatory work for the empirical part, I have also reviewed some literature for the research development, trying to find what previous researches did and what tools / methods utilized in the past applicable to my own research framework. Therefore, this part will be the nexus between the theory and empirical part.

For this assignment, I did a broad literature review with keywords like "supply chain", "sustainable", "assessment", "GRI" (Global Reporting Initiative), et cetera and I decided to look through four journal papers and one conference paper.

3.1.1 Sustainability reporting and its assessment

Skoloudis, A., Evangelinos, K., Kourmousis F. 2009. Development of an Evaluation Methodology for Triple Bottom Line Reports Using International Standards on Reporting.

The article proposes a benchmark tool that allows the examination of how well an organization's reporting practices stand against the current "de facto" standard GRI (information quality and inclusiveness). The authors devised a scoring system for each one of GRI topics and created an index of the GRI scoring criteria. Each topic was allocated a score between 0 and 4 points, with the basic rating qualification scale set as shown in table below:

Table 1.Basic rating qualification scale (Skoloudis et. al 2009, 304).

Points	Rating qualifications/requirements	Example—direct CO2 emissions
0	The report does not include any information relevant to the specific GRI topic. No coverage.	No relevant information is provided in the assessed report
1	The report provides generic or brief statements, without specific information on the organization's approach to the topic	We monitor our CO2 emissions
2	The report includes valuable information on the topic but there are still major gaps in coverage. The organization identifies the assessed issue, but fails to present it sufficiently	In 2006, the Company's total emissions of CO2 were equivalent to 800,000 tonnes
3	The provided information is adequate and clear. It is evident that the reporting organization has developed the necessary systems and processes for data collection on the assessed topic and attempts to present it in a consistent manner	Our Head Offices and plants in Greece produced 500,000 tonnes of CO2, while the rest of our abroad operations result to 300,000 tonnes of CO2
4	Coverage of the specific issue can be characterized as ''full'' in the report. It provides the organization's policy, procedures/programs and relevant monitoring results for addressing the issue. The organization meets the GRI requirements	In 2006, the Company's total emissions of CO2 were equivalent to 800,000 tonnes. Our Head Offices and plants in Greece produced 500,000 tonnes of CO2, while the rest of our abroad operations result to 300,000 tonnes of CO2. This is a 5% reduction from last year's emissions. It is our stated commitment to reduce our CO2 emissions by a targeted 25% by the end of 2008, compared to its 1990 level

Finally, the report concludes that the overall disclosure quality of TBL reports is still rather low in terms of comprehensiveness and materiality. This research was done in 2009 in Greece, so it is worth reviewing conclusions reached by researchers 10 years later in other country.

Boston College 2010. How to read a corporate social responsibility report.

CSR reports are valuable to many different types of readers and stakeholders, from investors, employees, academics, community activists, corporate managers and others. As it is hard to cover all approaches, so I selected the role as a researcher, my current

role, but also as a purchaser or supplier chain specialist, that is my professional role and the most common role reading these CSR reports, 55% (Boston Collegue 2010,12).

As a purchaser, CSR reports should allow to identify companies with positive social and environmental records, practices and goals, and even the ones with supply chain policies closer to own company strategy. As researcher, I would like to extract data from current and past performance, and get reliable and comparable secondary data for my research.

For both, or for all kind of CSR report readers, the first and last question should be: **how thorough and credible is this report?**

From CSR reports analysis, I can get an overall reporting quality evaluation through following questions proposed by this document and preferably through my adaptation to sustainability reported in supply chain topic.

Table 2. Nine questions about thorough CSR reporting (Boston College 2010, 16).

	Boston original	Adapted to Sustainable Supply Chain
CSR report	Is this a CSR report or a community affairs report?	Is this a report that talk about SUSTAINABLE Supply Chain or just supply chain with some environmental and social aspects / topics?
CSR practices	Does the report provide details on CSR practices as well as policies?	Does the report provide details practices and policies/frameworks about Sustainable Supply Chain?
Systematic data	Does the CSR report provide systematic data or just anecdotes?	Does the report provide systematic data or just anecdotes of company´s supply chain?
Comparable format	Does the company report data in a comparable format?	Does the company report data in a comparable format?
Future goals / past practices	Does the report present future goals as well as past practices?	Does the company report future goals and past practices in its supply chain?
Bad / good news	Does the report include bad news as well as good news?	Does the report include bad news as well as good news?
Greatest challenges	Does the report address the company's greatest challenges?	Does the report address the company's greatest challenges in its supply chain?
Integration	Does the company integrate CSR reporting with its traditional business strategy and its financial reporting?	Does the company integrate Sustainable Supply Chain reporting with its traditional business strategy and its financial reporting?

But apart from reporting with quality, <u>quantity and structure of information</u> to readers is important as well. As minimum, a thorough sustainability report in supply chain should reply affirmatively to adapted questions:

Table 3. Key elements of CSR reporting (Boston College 2010, 24-31).

	Boston original	**Adapted to Sustainable Supply Chain**
Top management commitment	Introductory letters from chief executive officers are opportunities to demonstrate commitment to CSR from the top.	Any commitment from management level (e.g.Introductory letter) to Sustainable Supply chain?
Framework	Mission and values statements provide a framework against which policies and practices can be assessed.	Sustainable Supply chain activities are based on any superior framework or strategy plan?
Focus	Key facts and figures show where a company is concentrating its most important CSR efforts and how much progress it is making.	Key facts and figures show where a company is concentrating its most important sustainability efforts in its supply chain and how much progress it is making.
Progress	Graphs and tables compare a company's progress in meeting goals over time and in comparison, with peers.	Graphs and tables compare a company's progress in meeting goals over time and in comparison, with peers related to Sustainable Supply Chain activities
GRI reporting	GRI indexes identify which key social and environmental data points, as identified by the Global Reporting Initiative, are included and where to find them.	GRI indexes identify which key social and environmental data points related to Sustainable Supply Chain activities are included and where to find them.
Assurance	Letters of assurance or CSR auditors' statements provide confidence that companies' reporting processes are reliable.	Letters of assurance related to Sustainable Supply Chain activities provide confidence that companies' reporting processes are reliable.
Stakeholder feedback	Interviews and surveys from stakeholders provide input from independent third-parties on the strengths and weaknesses of particular reports.	Interviews and surveys from stakeholders related to Sustainable Supply Chain activities (supplies, auditors, purchasers) provide input from independent third-parties on the strengths and weaknesses of particular reports.

Therefore, Boston College describes in this document a comprehensive way to evaluate reporting practices in companies.

3.1.2 Sustainability implementation in supply chains

UNCTAD 2012. Corporate Social Responsibility in Global Value Chains.

In its chapter "II. Implementation of CSR Codes of Conduct" the document offers a comprehensive review of programmes to ensure supplier compliance with company´s Code of Conduct.

Tools and instruments

| Code of conduct | Self-Assessment Questionnaire | Auditing Checklist | Corrective Action Plans | Auditing Checklist (According to CAP) | Capacity Building Programmes |

CSR code adoption → Self evaluation → On-Site Audit → Improvement → Re-Audit → Support

Code implementation cycle for suppliers

Every 6 month to 4 years
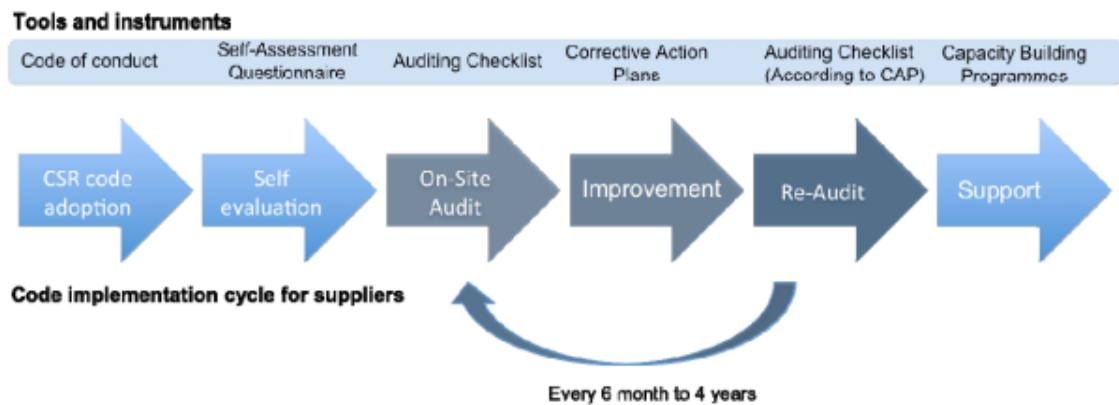
Source: UNCTAD

Figure 11. Overview of typical code implementation process (UNCTAD 2012, 9).

Such implementation programmes consist of assessment and monitoring procedures which can generally be divided into six steps:

1. CSR code adoption, i.e. agreement by the supplier, often included in contract)
2. an initial self-evaluation
3. an on site audit
4. improvement, i.e. the development and implementation of a corrective action plan (CAP)
5. a re-audit
6. and capacity building activities *(UNCTAD 2012, 9)*

Leppelt T., Foerstl K., Reuter C., Hartmann E. 2011. Sustainability management beyond organizational boundaries - sustainable supplier relationship management in the chemical industry.

Here the authors research the sustainable supplier relationship management because they consider that it has become crucial in companies' sustainability efforts. A firm's corporate image, heavily depends on its supply chain and the sustainability performance of every chain link, including suppliers and sub-suppliers. In a multiple case study of seven European chemical companies, they investigate how firms lead their supplier relations in order to manage sustainability even beyond their corporate boundaries.

This paper is interesting because it shows how sustainability leaders within an industry introduce sustainability into their supplier relationship management processes and how using different information sources and data collection techniques (e.g. personal interviews, questionnaires, publicly available reports) I can compare the content of the multiple data sources, also referred to as triangulation.

3.1.3 Sustainability indicators in a supply chain

Schöggl J. , Fritz M., Baumgartner R. 2016. Sustainability Assessment in Automotive and Electronics Supply Chains—A Set of Indicators Defined in a Multi-Stakeholder Approach

This paper states that sustainability assessment is gaining increasing importance since more rigorous regulations and growing customer pressure are driving the change towards sustainable supply chains. This implies a rising use of resources for data collection, monitoring, exchange and assessment.
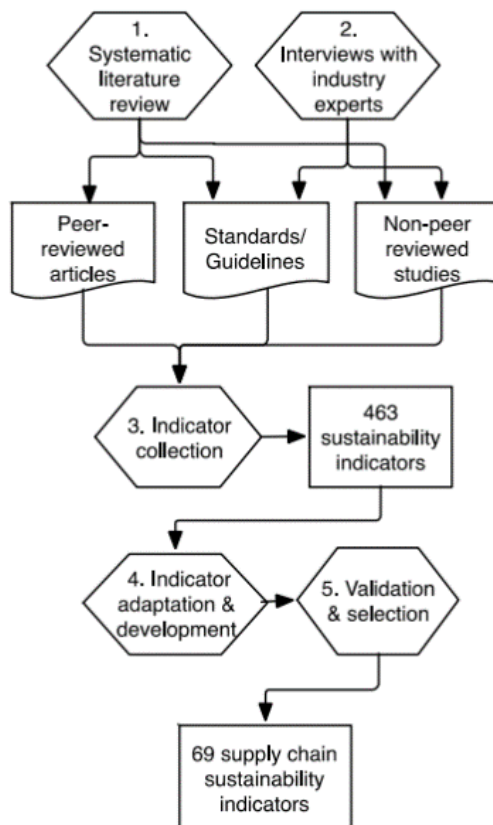
Figure 12. Overview of the 5-step research process for developing the set of supply chain sustainability indicators (Schöggl et. al 2016, 4)

This paper is interesting because define the process (5 steps) to develop sustainable indicators in a specific supply chain. Systematic literature review (peer-review articles, standard/ guidelines and non-peer reviewed studies) (1) along with interviews with industry experts (2) leads to a collection of indicator (3) that after adaptation and development (4) are validated by experts (5) to be use in the industry. Moreover, as result of the research, it provides a set of 69 supply chain indicators that facilitates the sustainability assessment of the European automotive and electronics industries, and some interesting ideas such as the Supply chain data exchange hub.

3.2 Research framework adapted to research questions

The use of secondary data, data that has been gathered for another purpose, but may be suitable for own research, is growing in relevance and importance in purchasing and supply management research. Secondary data have many benefits:

- avoid survey fatigue
- cost less resources because of data availability
- is more objective
- offers credibility if data information was audited and data collection was reliable
- offers clarity if the information is standardized
- and allows trend analysis (Ellram and Tate 2016, 251)

Secondary data does have its limitations, ranging from biases in collection and reporting to difficulties in identifying and accessing appropriate sources of secondary data. Secondary data also requires finding a clear unit of analysis and timeframe that suit with the purpose of our research. Secondary data is effective in supply chain research to address several research topic areas such as sustainability or financial performance. (Ellram and Tate 2016, 251)

For voluntarily reported data such as sustainability reports disclosed in company websites, there is no commitment to audit the data. While it is unlikely that companies would distort such data, self-reported data tend to be presented in a favourable light. In addition, because there is no requirement that companies disclose everything, reports will likely emphasize what is perceived as important, and areas where they excel, rather than disclose all relevant activities. (Jose and Lee 2007, 318).

There is a lack of common language and measurement for many types of data such as sustainability reporting and supplier performance. Terminology may differ by industry and by country. Hence, there may be differential interpretation of what companies are truly doing. (Fratocchi, et al. 2014)

Besides these limitations, data mining and refining can be an arduous task. Depending on the format of the data, there may be a huge amount of time required to transform the data into a useable form, then cleanse the data for errors and standardize the format of the data just to prepare it for analysis. (Ellram and Tate 2016,251)

3.2.1 RQ1: How do companies report about sustainability in their supply chain?

The GRI Sustainability Disclosure Database is an extensive repository of sustainability reports that helps to locate the information needed about GRI reports. (GRI 2018d)

Currently the Sustainability Disclosure Database includes thousands of reports published from 1999 until present. Approximately 65% of the reports are GRI reports and the remaining 35% are reports that are not based on the GRI Guidelines or GRI Standard, but include sustainability disclosures. The complete version contains detailed metadata on thousands of reports from all over the world published since 1999. It provides valuable input for research and analysis. (GRI 2018d)

The GRI Reports List gives a detailed overview of all reports included in GRI's Sustainability Disclosure Database. A limited version of the Reports List is available free of charge and provides details about reports published in the last two years. The complete Version of the GRI Reports List (Excel) is available as a one-off order (800€), or as a monthly subscription (5500€), where buyers will receive an updated list every month. Fortunately, its access is free for students. (GRI 2018e)

The GRI Reports List format is Microsoft Excel worksheet and content analysis requires of Microsoft Office suite software or compatible. The use of filters and other basic tools will ease the preliminary studies and narrow down to specific companies with defined characteristics. So far, the research process does not have any limitations with the proper resources (computer, software) and skills (worksheet literate)

The research will be limited to sustainability reports (unit of analysis) publicly accessible in selected companies' websites and within them, to the content related to sustainable supply chain.

The number of sustainability reports to research will not be more than five (by limitations of time), focused on industrial corporations, and with latest and common release date, considering that all of them report about annual activities.

In order to adapt this secondary data to the research subjects, I must understand first that the use of GRI dataset has the objective of screening those sustainability reports that best fit with research question:

- RQ1: How do companies report about sustainability in their supply chain?

and how these reports lead me to answer:

- RQ2: How do companies implement sustainability in their supply chains?
- RQ3: What indicators do companies use to assess sustainability in their supply chains?

with the information included in own reports, references or supplements.

In fact, the topic becomes in "**Learning from sustainability leaders about how to develop, monitor and report sustainability in supply chains**"

Report selection and access

Previously to any kind of processing in the database, the Data Legend of the Sustainability Disclosure Database (GRI 2018f) was downloaded and studied for a more accurate analysis of data.

I decided to limit this research with the following parameters:

1. Country: Finland. I consider that the status of Finland in sustainability (2nd in Robecosam country sustainability ranking, as October 2017) (Robecosam 2018) help to me to find quality sources of data in the sustainability report of Finnish companies, and to develop own career or business opportunities in local industry.
2. Publication year: 2017 (referring to data reports 2016).
3. Report type: G4 as most advanced review of the standard, with information in the database (in Autumn 2016 GRI-standards were released but no reports were disclosed for 2016 reporting period).
4. External assurance: Yes. To increase the credibility of the data by companies as PricewaterhouseCoopers, DNV, Ernst & Young or KPMG. These companies independently assess the report against GRI principles for defining content and quality.
5. Sector: Conglomerates, Energy, Equipment, Technology hardware. Because of my experience in industrial sector, and my career development objectives.
6. 2018 data report are not still updated in the Sustainability Disclosure Database (file named *2018-03-02*-GRI-Reports-List-Complete).

It seems there is a decalage since companies release CSR and/or sustainability reports and these are registered in GRI organization. Because of that, 2018 reports are not still updated in the Sustainability Disclosure Database that I got at the beginning of March 2018 (file named *2018-03-02*-GRI-Reports-List-Complete). As the objective is to evaluate latest sustainability practices I will analyse sustainability report published in 2018 (referring to 2017 activity period), but I will select companies in a query to the GRI report list based on report published in 2017.

Sustainability reports are easily reachable from corporate website with keywords such as "annual", "corporate responsibility" or "sustainability report" and "2017", as the latest reporting period.

GRI aspects / topics criteria

Once the candidates have been chosen in accordance with the research parameters, I require know what information to assess.

2017 has been a transition year for GRI reporting standards, from G4 Guidelines to GRI Standards. Since the GRI Standards will be effective for reports or other materials published on or after 1 July 2018, the G4 Guidelines will remain valid until then. Although earlier adoption of the GRI Standards has been encouraged, some 2017 reports have been disclosed according to G4. (GRI 2018g)

The GRI aspects to be evaluated related to supply chain and supplier concepts will be:

Table 4. Supply chain aspects (GRI 2018h).

Disclosure	Description
GENERAL STANDARD DISCLOSURES	
	Organisational profile
G4-12 **GRI 102-9**	Description of supply chain
	GRI Standard – Revised disclosure: G4-12 has been expanded to be more specific on the reporting expectations. Now reporting organizations are also required to report the main elements of the supply chain, as they relate to the organization's activities, primary brands, products, and services.
G4-13 **GRI 102-10**	Significant changes to the organization and its supply chain. GRI Standard – No revision
SPECIFIC STANDARD DISCLOSURES	
	ECONOMIC
	Procurement practices
G4-EC9 **GRI 204-1**	Proportion of spending on local suppliers at significant locations of operation
	GRI Standard – No revision
	ENVIRONMENTAL
	Supplier environmental assessment
G4-EN32 **GRI 308-1**	Percentage of new suppliers screened using environmental criteria
	GRI Standard – No revision
G4-EN33 **GRI 308-1**	Significant actual and potential negative environmental impacts in the supply chain and actions taken
	GRI Standard – No revision
	SOCIAL
	Supplier assessment for labour practices
G4-LA14 **GRI 414-1**	Percentage of new suppliers that were screened using labour practices criteria
	GRI Standard – Revised disclosure: G4-LA14, G4-HR10 and G4-SO9 have been combined into one disclosure (now Disclosure 414-1). Organizations are no longer required to report this information separately for labour practices criteria, human rights criteria, and criteria for impacts on society. Instead, organizations are now required to report the percentage of new suppliers that were screened using social criteria
G4-LA15 **GRI 414-2**	Significant actual and potential negative impacts for labour practices in the supply chain and actions taken
	GRI Standard – Revised disclosure: G4-LA15, G4-HR11 and G4-SO10 have been combined into one disclosure (now Disclosure 414-2). Organizations are no longer required to report this information separately for labour practices criteria, human rights criteria, and criteria for impacts on society. Instead, organizations are now required to report the percentage of new suppliers that were screened using social criteria
	Supplier human rights assessment
G4-HR4 **GRI 412-3**	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk
	GRI Standard – Revised disclosure: The term 'employee rights' has been changed to 'workers' rights'. This change was due to the 'employee'/'worker' terminology review.
G4-HR5 **GRI 408-1**	Operations and suppliers at significant risk for incidents of child labour GRI Standard – No revision
G4-HR6 **GRI 409-1**	Operations and suppliers at significant risk for incidents of forced of compulsory labour GRI Standard – No revision
G4-HR10 **GRI 414-1**	Percentage of new suppliers that were screened using human rights criteria
	GRI Standard – Revised disclosure: G4-LA14, G4-HR10 and G4-SO9 have been combined into one disclosure (now Disclosure 414-1)
G4-HR11 **GRI 414-2**	Significant actual and potential negative human rights impacts in the supply chain and actions taken
	GRI Standard – Revised disclosure: G4-LA15, G4-HR11 and G4-SO10 have been combined into one disclosure (now Disclosure 414-2)
	Supplier assessment for impacts on society
G4-SO9 **GRI 414-1**	Percentage of new suppliers that were screened using criteria for impacts on society
	GRI Standard – Revised disclosure: G4-LA14, G4-HR10 and G4-SO9 have been combined into one disclosure (now Disclosure 414-1)
G4-SO10 **GRI 414-2**	Significant actual and potential negative impacts on society in the supply chain and actions taken. GRI Standard – Revised disclosure: G4-LA15, G4-HR11 and G4-SO10 have been combined into one disclosure (now Disclosure 414-2)

As a usual situation in current integrated supply chain, many aspects that are related to internal and core operation can reach supply chain, for example G4-HR8 (GRI 411-1) Rights of Indigenous Peoples. There are other disclosure items that give a better comprehension of reporting practices, companies stakeholders and report assurance but that after some reflections I decided to discard these topics from a systematic assessment but not as an information source.

Table 5.Reporting comprehension aspects/topics (GRI 2018h)

G4 Disclosure	GRI Standard Number	GRI Standard Title	Disclosure Number	Disclosure Title
G4-18	GRI 102	General Disclosures	102-46	Defining report content and topic Boundaries
G4-19	GRI 102	General Disclosures	102-47	List of material topics
G4-20	GRI 103	Management Approach	103-1	Explanation of the material topic and its Boundary
G4-21	GRI 103	Management Approach	103-1	Explanation of the material topic and its Boundary
G4-24	GRI 102	General Disclosures	102-40	List of stakeholder groups
G4-25	GRI 102	General Disclosures	102-42	Identifying and selecting stakeholders
G4-26	GRI 102	General Disclosures	102-43	Approach to stakeholder engagement
G4-32-c	GRI 102	General Disclosures	102-56	External assurance
G4-33	GRI 102	General Disclosures	102-56	External assurance

Items to analyse: Keywords

Fratocchi, et al. (2014) warns of a lack of common language and terminology for sustainability reporting and supplier performance and there may be misinterpretation of what companies are truly doing and measuring. For this reason, in order to access where the core of information is positioned in long reports, to know more about the use of some words to define specific concepts and to avoid the above-mentioned misinterpretations, I decided to count and locate the following keywords:

- Supplier

- Supply chain
- Sustainable supply chain
- Responsible supply chain
- Sourcing
- Procurement
- Supplier assessment
- Audits
- Self-assessment
- Criteria
- Supplier performance
- Code of conduct
- Supplier code of conduct
- Supplier policy
- Supply chain policy

Method selection and reference

The chosen methodology is a qualitative research of GRI reports screened by abovementioned criteria of report selection. Once reports have been selected, the content is analysed and assessed per supply chain aspects.

Every unit of analysis, in other words any sustainability or CSR report that follows the GRI guideline, have been analysed and assessed in its supply chain aspect following two methods:

1. The methodology used by Skoloudis et. al (2009) in the journal paper "*Development of an Evaluation Methodology for Triple Bottom Line Reports Using International Standards on Reporting*". The aim is to get a numerical assessment of reporting practices by companies.

2. The adapted questions to supply chain from the original contained in Boston College (2010). "*How to read a corporate social responsibility report*". The objective is to get a subjective evaluation of reporting quality, content and structure, that answer the main questions that any CSR/ sustainability report should be questioned "*How thorough and credible is this report?*".

After that, and as conclusion of this thesis, a comparative case study or benchmarking of all companies, can give a better understanding of best reporting practices. Additionally, the comparison of both methods results can help to find similarities and differences, and hence methods strengths and weaknesses in their application.

Research questions review after RQ1

It is worth reviewing the original research questions and adapt them to a narrower context provided by the secondary data limitations (GRI database) and criteria described in the previous chapter.

- RQ1: How do *Finnish leaders in industrial sector report* about sustainability in their supply chain?
- RQ2: How do *Finnish leaders in industrial sector* implement sustainability in their supply chains?
- RQ3: What indicators do *Finnish leaders in industrial sector* use to assess sustainability in their supply chains?

and after reflecting, above questions can become a sole topic:

"Learning from sustainability reporting leaders of Finland about how to assess sustainability in supply chains".

3.2.2 RQ2: How do *Finnish leaders in industrial sector* implement sustainability in their supply chains?

Sustainability reports also inform about companies' best practices to assess, monitor and implement sustainability in their supply chain. Therefore, a research of report contents let me gather information about assessment methods for supplier such as self-assessment questionnaires (SAQ) or audits, monitor tools such as ratings or sustainability building programs.

Jose and Lee, 2007 noticed that when there is no requirement for the companies to disclose everything, reports will likely emphasize on what is perceived as important, and areas where they excel, rather than disclose all relevant activities. Thus, I consider that this research can be enhanced by several semi-structured interviews that let me know

about real know-how and experience of a supplier manager tackling sustainable supply chain monitoring, assessment and development. As I have not got any access to primary data in the proposed thesis timeframe (4-6 months), I rely on the credibility of data disclosed and audited partly by reputed assurance firms, and I add this task as future research development.

In any case, the use of other studies with relevant information about sustainability development in supply chains, e.g. UNCTAD 2012. Corporate Social Responsibility in Global Value Chains, is a good guidance to compile best practices and create a framework.

3.2.3 RQ3: What indicators do *Finnish leaders in industrial sector* use to assess sustainability in their supply chains?

The objectives, methodology and results of Schöggl et. al in the journal paper "Sustainability Assessment in Automotive and Electronics Supply Chains—A Set of Indicators Defined in a Multi-Stakeholder Approach" have had an inspiring effect in this research proposal and lead me to an ideal second stage scenario where I take part in the activity of a company in its procurement or supply chain management, as an employee or a collaborator.

In order to develop sustainable indicators in a specific supply chain, the 5-steps process defined by Schöggl et. al includes a systematic literature review (peer-review articles, standard/ guidelines and non-peer reviewed studies) (1) along with interviews with industry experts (2). The results lead to a collection of indicators (3). that after adaptation and development (4) are validated by experts (5) to be used in the industry. Because of difficulties to access to companies that are eager to develop this kind of indicators, and offer this development to aliens, I focus this part in the systematic literature review (GRI reports) (1) that leads to a collection of indicators (3) used and disclosed by Finnish leader companies.
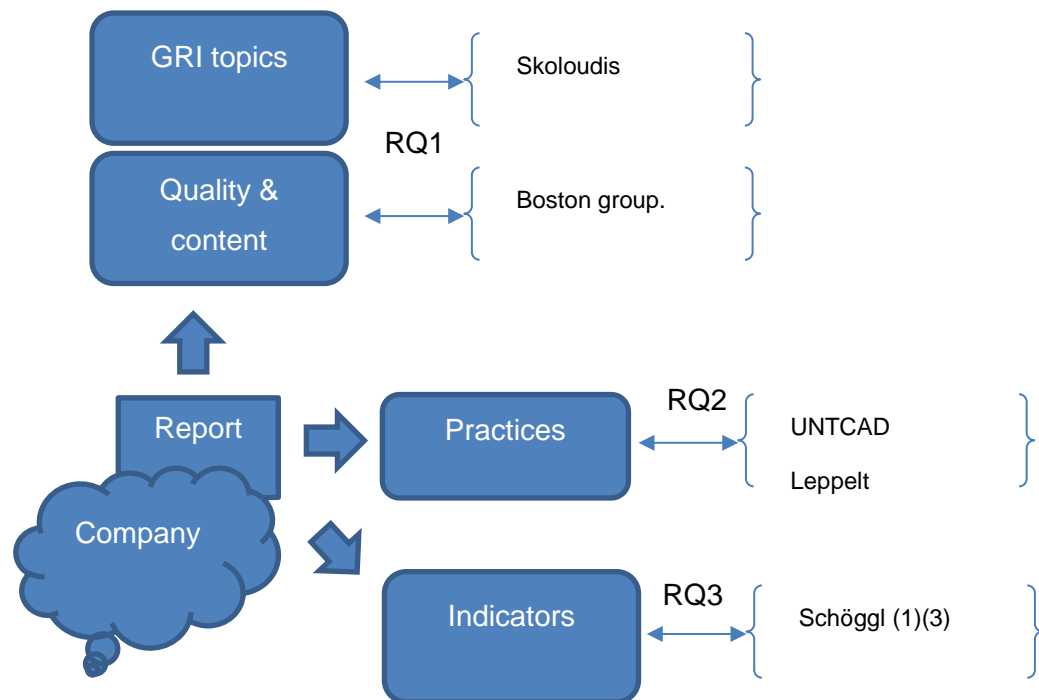
Figure 13. Research framework diagram.

Above diagram explains schematically how through the reporting activity of companies, this research will find answers to questions related to reporting, management practices and indicators in the Sustainable Supply Chain of leading Finnish companies, thanks to methodologies provided by previous researches.

4 ANALYSIS OF REPORTS

4.1 Reports selection and first common analysis

The screening of reports has been done according to the criteria previously mentioned, and five companies were chosen.

Table 6. Sustainability report screening results.

Name	Sector	Country	Publication Year	Type	External Assurance	Assurance Provider
Cargotec	Equipment	Finland	2018	G4	Yes	DNV
Metso	Equipment	Finland	2018	GRI	Yes	PricewaterhouseCoopers
Vaisala	Technology Hardware	Finland	2018	G4	Yes	Ernst & Young
Valmet	Conglomerates	Finland	2018	GRI	Yes	PricewaterhouseCoopers
Wärtsilä	Energy	Finland	2018	GRI	Yes	KPMG

I confirm what authors like Ellram and Tate (2016) announced about the use of secondary data sources in supplier management research, the data cleansing has been a big problem and I needed a tremendous amount of time to transform the data into a useable form to prepare it for analysis and reporting.

In addition, I found that reports are longer than expected, so it was clever to use a keywords location method to focus my attention on parts that deal with defined research questions.

Table 7. Sustainability reports length.

Company	Title	Lenght (Pages)
Cargotec	Annual review 2017	68
Metso	Annual review 2017	44
Metso	Sustainability Supplement 2017	40
Vaisala	Annual report 2017	191
Valmet	Annual review 2017	56
Valmet	GRI Supplement 2017	38
Wärtsilä	Annual report 2017	256
Wärtsilä	Annual report 2017 - Sustainability	58

After a first analysis to reports using keywords I realized that different companies use different terminology for similar o equal concept, as Fratocchi, et al. (2014) remarked.

Table 8. Keyword analysis.

Concept		Supply chain management and purchasing						Supplier assessment				Code of conduct		
Firm	Supplier	Supply chain	Sustainable supply chain	Responsible supply chain	Sourcing	Procurement		Supplier assessment	Audits	Self-assessment	Criteria	Code of conduct	Supplier code of conduct	Supply chain policy
Cargotec	108	9	0	0	5	2		**6**	4	3	24	25	5	0
Metso (AR)	5	8	0	2	1	1		0	3	0	0	6	0	0
Metso (SS)	85	25	2	**49**	0	17		1	**35**	1	10	33	0	0
Vaisala	96	**31**	0	5	6	3		3	7	0	**19**	39	**7**	0
Valmet	77	26	**8**	0	6	**20**		0	15	5	2	5	0	**5**
Valmet (GRI)	43	17	**8**	0	0	9		0	10	2	15	11	0	**5**
Wärtsilä (AR)	**114**	16	0	0	**7**	6		4	16	0	9	**53**	0	2
Wärtsilä (SS)	56	10	0	0	0	1		2	5	0	3	33	0	0

Note: AR= Annnual Report, SS= Sustainability Supplement.

Concepts and keywords are associated in the following way:

- Supply chain management and purchasing concept were sometimes referred to in keywords as "supply chain", "sustainable supply chain", "responsible supply chain", "sourcing" and "procurement".
- Supplier assessment was also referred to as "audits", "self-assessment" and "criteria".
- Code of conduct, referring to general companies' activities (included supply chain) is further developed in specific "supplier code of conduct" or "supply chain policy".

This keyword analysis gave me an insight about the structure of the reports. They usually have a chapter that is focused on sustainable supply chain.

Table 9. Chapter about sustainable supply chain - name and location.

Company	Title	Pages	Chapter
Cargotec	Annual review 2017	39-61	Sustainability
Metso	Annual review 2017	16	Sustainability in the supply chain
Metso	Sustainability Supplement 2017	22-23	Responsible supply chain
Vaisala	Annual report 2017	176-177	Responsible supply chains
Valmet	Annual review 2017	28-31	Supply chain, Auditing suppliers for sustainability
Valmet	GRI Supplement 2017	14	Sustainable supply chain
Wärtsilä	Annual report 2017	63	Supply chain management
Wärtsilä	Annual report 2017 - Sustainability	22	Supply chain management

Looking though these chapters I found interesting information to answer research questions. I detail the findings in every company section.

GRI aspects and topics disclosure

The table below shows GRI aspects included in sustainability report and its disclosure chapter and page:

Table 10. GRI aspect and topics analysed.

G4	GRI Standard				G4	GRI	G4	GRI	GRI
G4 Disclosure	GRI Standard Number	GRI Standard Title	Disclosure Number	Disclosure Title	Cargotec	Metso	Vaisala	Valmet	Wärtsilä
G4-12	**GRI 102**	**General Disclosures**	**102-9**	Supply chain	G4-12	AR, p. 12-13, 16-17 SS, p. 22	176	AR28-30, GR14	Supply chain management
G4-EC9	**GRI 204**	**Procurement Practices**	**204-1**	Proportion of spending on local suppliers		KPIs p. 27			
G4-EN32	**GRI 308**	**Supplier Environmental Assessment**	**308-1**	New suppliers that were screened using environmental criteria	G4-EN32		176-177		
G4-EN33	**GRI 308**	**Supplier Environmental Assessment**	**308-2**	Negative environmental impacts in the supply chain and actions taken	See G4-EN32				
G4-LA14	**GRI 414**	**Supplier Social Assessment**	**414-1**	New suppliers that were screened using social criteria	See G4-EN32			AR30,GR31	
G4-LA15	**GRI 414**	**Supplier Social Assessment**	**414-2**	Negative social impacts in the supply chain and actions taken					
G4-HR4	**GRI 407**	**Freedom of Association and Collective Bargaining**	**407-1**	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	G4-HR4		176-177.		
G4-HR5	**GRI 408**	**Child Labor**	**408-1**	Operations and suppliers at significant risk for incidents of child labor	See G4-HR4		176-177.		
G4-HR6	**GRI 409**	**Forced or Compulsory Labor**	**409-1**	Operations and suppliers at significant risk for incidents of forced or compulsory labor	See G4-HR4		176-177.	GR31, AR 28-30	
G4-HR10	**GRI 414**	**Supplier Social Assessment**	**414-1**	New suppliers that were screened using social criteria	See G4-EN32		176-177		
G4-HR11	**GRI 414**	**Supplier Social Assessment**	**414-2**	Negative social impacts in the supply chain and actions taken					
G4-SO9	**GRI 414**	**Supplier Social Assessment**	**414-1**	New suppliers that were screened using social criteria	See G4-EN32		176-177		
G4-SO10	**GRI 414**	**Supplier Social Assessment**	**414-2**	Negative social impacts in the supply chain and actions taken					

The first and overall results of this part of the research have been greatly disappointing. First, by the absence of reporting of many aspects, mainly related to the disclosure of impacts in the supply chain. And third, by the difficulty to access valuable data located in different parts of the report.

I found also references to UN global compact principles, SDGs and their correlation with GRI aspects. But before continuing with common results from analysed reports, I will first disclose information in each report that help to answer the research questions of this thesis.

- RQ1: How do *Finnish leaders in industrial sector report* about sustainability in their supply chain?
- RQ2: How do *Finnish leaders in industrial sector* implement sustainability in their supply chains?
- RQ3: What indicators do *Finnish leaders in industrial sector* use to assess sustainability in their supply chains?

4.2 Cargotec

4.2.1 Company description

Cargotec is a provider of cargo and load handling solutions with the goal of becoming the leader in intelligent cargo handling. Its business areas, Kalmar, Hiab and MacGregor offer products and services in cargo and load handling solutions around the world. Kalmar provides cargo handling equipment and automated terminals. Hiab leads the global market in on-road load handling solutions and MacGregor provides engineering services for marine cargo and offshore load handling. (Cargotec 2018a)

Cargotec's corporate headquarters is in Helsinki, Finland, while the business areas' production facilities are located in Asia, Europe and USA. At the end of 2017, Cargotec had a total of 11,251 employees (31 Dec 2016: 11,184) with operations in more than 100 countries. Sales in 2017 totalled EUR 3,3 billion. (Cargotec 2018a)

4.2.2 Sustainability strategy

Sustainability is part of Cargotec mission "*Our cargo handling solutions and services make global trade smarter, better and more sustainable* "and vision" We *want to lead the*

industry transformation and turn cargo handling into an intelligent and sustainable business". (Cargotec 2018b)

Among the several concurrent megatrends that drive Cargotec strategy we can find the "Environmental awareness". Due to increasing concern to the environment the customer needs of eco-efficient products are estimated to grow and give a competitive advantage. (Cargotec 2018b)

As sustainable development has become a globally agreed norm, Cargotec has an opportunity to set the standard for sustainability in its industry with the eco-efficiency concept. The concept consists of solutions that can improve the customer´s sustainability either with cleaner technologies, software or services supporting circular economy. (Cargotec 2018b)

During 2017, Cargotec´s sustainability work concentrated on ensuring more qualified processes and tools to follow and manage its sustainability actions. In sourcing functions, Cargotec focused on upgrading screening processes with its supplier sustainability management programme, and released a specific Supplier Code of Conduct document (see Cargotec 2018c). By the end of 2017, all strategic suppliers had received this documentation. (Cargotec 2018b)
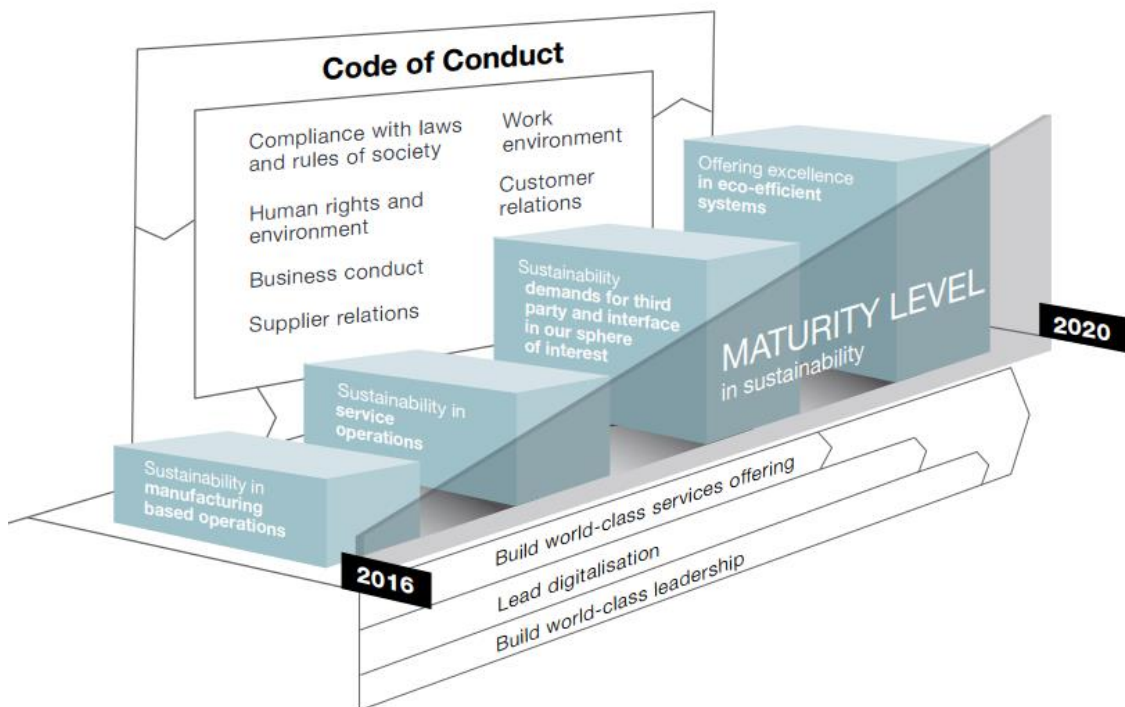
Figure 14. Cargotec´s sustainability roadmap (Cargotec 2018b).

4.2.3 Supply chain description

Cargotec appreciates long-term and localised suppliers throughout each business area, and it screens its supplier on the basis of QDCI management approach (Quality, Delivery, Cost and Innovation). Compliance with laws and regulations as well as respect for international human rights are required of each supplier. (Cargotec 2018b, G4-12)

In Kalmar, the total number of direct suppliers was around 1,100, with a geographically detailed spending at the end of 2017 as follows: 29 percent of purchases were from America, 52 percent from Europe and Middle East, and 19 percent from APAC (Asia-Pacific). In 2017, the top 100 suppliers represented 75 percent of the spend. Kalmar runs enhanced Supplier Relationship Management programmes with a few selected strategic partners to generate for both competitive advantages, business benefits and customer values. (Cargotec 2018b, G4-12)

Hiab had a total of 907 direct suppliers at the end of 2017, of which 38 were preferred suppliers. Focusing on these preferred suppliers enables continuous development of the supply chain management. Hiab also runs extended Supplier Relationship Management programmes together with a few selected suppliers. In 2017, the top 100 suppliers meant 83 percent of the supply volume. The major share of Hiab suppliers was from Europe (82%) while the rest of the suppliers were from America (14%) and Asia (4%). (Cargotec 2018b, G4-12)

MacGregor has a history of more than 20 years of collaboration with preferred suppliers. At the end of 2017, MacGregor had approximately 850 direct suppliers. The top 100 suppliers covered approximately 75 percent of the supply volume. Approximately 45 percent of the supplier volume was from Asia and 54.5 percent from EMEA (Europe, Middle East and Asia) and 0.5 percent from North America. (Cargotec 2018b, G4-12)

4.2.4 Sustainable supply chain

Sustainability activities in Cargotec´s supply chain are named as Responsible Supply Chain in its webpage (although no mention in the sustainability report). Along this research we will use the terms Sustainable Supply Chain or Responsible Supply Chain indistinctly. (Cargotec 2018b)

General sustainability roadmap can be translated into particular targets for Cargotec´s sustainable supply chain.

Goals

2017 targets: Assess all new suppliers and half of the existing strategic suppliers against the new Cargotec Supplier Requirements (see Cargotec 2018d) by the end of the year ➔ G4-EN32: In 2017, 79 percent of new direct material suppliers were audited against the labour practice, human rights and environmental management criteria. (Cargotec 2018b)

2018 targets: Take into the sustainability self-assessment tool process ALL strategic suppliers. The Supplier Code of Conduct (see Cargotec 2018f) communicated to suppliers that cover 80 percent of the direct sourcing spend. (Cargotec 2018b)

Policies

Each supplier is required to comply with laws and regulations and respect the international human rights and as abovementioned, they are actions to inform suppliers about the company´s Supplier Code of Conduct and assess them against Supplier requirement document. (Cargotec 2018b)

Supplier Code of Conduct: Cargotec's Code of Conduct and related policies state that Cargotec, its suppliers and agents are committed to respect international human rights. Fully aligned with Cargotec's own Code of Conduct, Cargotec has a specific supplier Code of Conduct, which has been delivered to strategic suppliers during 2017. The process is on-going to reach 80 percent of the direct sourcing spending in 2018. Freedom of association, abolition of child labour and forced and compulsory labour are examples of the basic principles that Cargotec demands from its suppliers. Cargotec has signed the UN Global Compact initiative. (Cargotec 2018b)

Operational practices

Risk assessment: Cargotec conducted a supplier sustainability risk analysis during 2016. The risk for human rights violation is increased in its supply chain in certain countries and therefore the Supplier Code of Conduct process aims to mitigate any risk. (Cargotec 2018b, G4-HR4)

Self-evaluation: Cargotec aims to screen any sustainability risk with a self-assessment tool. (Cargotec 2018b, G4-HR4)

Sustainability assessment: Cargotec´s focus is to ensure a sustainable supplier performance on the basis of QDCI approach and clear sustainability criteria for its suppliers. The criteria, a 20 percent of the questions in the supplier assessment, include elements to audit the compliance of the supplier regarding the management of labour practices, human rights, anti-corruption and the environment. (Cargotec 2018b, G4-EN32)

Supplier support and integration: Cargotec has sustainability programmes for supplier management and collaboration development that are currently being integrated to the standard supplier management and audit progress. (Cargotec 2018b, G4-HR4)

Reported topics and indicators

GRI disclosure table – RQ1

Table 11. Cargotec GRI disclosure.

G4	GRI Standard				G4	
G4 Disclosure	GRI Standard Number	GRI Standard Title	Disclosure Number	DisclosureTitle	Cargotec	Assessment according to Skoloudis et al. method
G4-12	**GRI 102**	**General Disclosures**	**102-9**	Supply chain	G4-12	2
G4-EC9	**GRI 204**	**Procurement Practices**	**204-1**	Proportion of spending on local suppliers		0
G4-EN32	**GRI 308**	**Supplier Environmental Assessment**	**308-1**	New suppliers that were screened using environmental criteria	G4-EN32	4
G4-EN33	**GRI 308**	**Supplier Environmental Assessment**	**308-2**	Negative environmental impacts in the supply chain and actions taken	See G4-EN32	1
G4-LA14	**GRI 414**	**Supplier Social Assessment**	**414-1**	New suppliers that were screened using social criteria	See G4-EN32	3
G4-LA15	**GRI 414**	**Supplier Social Assessment**	**414-2**	Negative social impacts in the supply chain and actions taken		0
G4-HR4	**GRI 407**	**Freedom of Association and Collective Bargaining**	**407-1**	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	G4-HR4	4
G4-HR5	**GRI 408**	**Child Labor**	**408-1**	Operations and suppliers at significant risk for incidents of child labor	See G4-HR4	4
G4-HR6	**GRI 409**	**Forced or Compulsory Labor**	**409-1**	Operations and suppliers at significant risk for incidents of forced or compulsory labor	See G4-HR4	4
G4-HR10	**GRI 414**	**Supplier Social Assessment**	**414-1**	New suppliers that were screened using social criteria	See G4-EN32	3
G4-HR11	**GRI 414**	**Supplier Social Assessment**	**414-2**	Negative social impacts in the supply chain and actions taken		0
G4-SO9	**GRI 414**	**Supplier Social Assessment**	**414-1**	New suppliers that were screened using social criteria	See G4-EN32	3
G4-SO10	**GRI 414**	**Supplier Social Assessment**	**414-2**	Negative social impacts in the supply chain and actions taken		0

<u>GRI numeric indicator – RQ3</u>

G4-EN32, G4-LA14 and G4-HR10: In 2017, 79 percent of new direct material suppliers were audited against the labour practice, human rights and environmental management criteria. (Cargotec 2018b)

Report quality, quantity and structure – RQ1

About <u>reporting quality evaluation</u>, this document is a report that talk about sustainability development in Cargotec´s supply chain. The company adds sustainability concept to its mission and vision statements. The main sustainability development driver for its supply chain is the megatrend "Environmental awareness" and its competitive advantage with Eco-efficient solutions. Moreover, company´s strategy is adapted to a sustainability roadmap for 2016-2020 framework with clear implementation stages. The third one aims to "*Sustainability demands for third party and interface in our sphere of interest*".

The report also provides systematic data for the three business areas supply chain description e.g.Top 100 supplier spend and geographical areas share, although different geographical areas prevent a comparable analysis. The report follows the GRI G4 guidelines and disclose 9 of 14 sustainability aspects under t analysis. Unfortunately, only three G4 disclosure (G4-EN32, G4-LA14 and G4-HR10) provide numeric information for easy comparison with peers. It is a surprising that the aspect G4-EC9 - Proportion of spending on local suppliers is unreported, further after a comprehensive supply chain geographical description.

The document also lists current and future targets but it fails to report if targets were achieved because of the use of different "units" (See section Goals-2017 targets).

About results, the report uses a neutral tone and there is not a fact (a bad new or good one) that affects this balance, and even there is no mention to greatest challenges for applying sustainability in Cargotec´s supply chain that endanger this neutrality.

About <u>quantity and structure of information</u>, the document is a moderately long report that integrate GRI indicators in the sustainability part. Although this is the company with most GRI aspects disclosed, probably the try to add information in a table format, following strictly the GRI structure can make it less easy-reading to some stakeholders (need to jump from a GRI aspect to other) and attractive than other reports with a defined Supply chain chapter. Actually, some information about sustainability and supply chain

is clearer in the corporate webpage than in the annual report. And as a curious fact, there is no mentions to the concept sustainable / responsible supply chain in the report, just in webpage.

There is not a clear commitment from the top management to Sustainable Supply Chain although the developed roadmap for sustainability seems to focus the attention on it during 2017-2018 and demonstrates progress to the targets. Cargotec commissioned DNV to conduct a limited assurance that at least reach one of three aspects under analysis, G4-EN32, G4-LA14 and G4-HR10.

Although Cargotec has signed the UN Global Compact initiative, there is no mention to the application of the 10 principles or linkage to GRI aspects.

Best practices ecosystem – RQ2

Cargotec seems to use different practices and documents to foster sustainability in its supply chain. Inspired in UNCTAD 2012 document, according to already mentioned summary of best operational practices, and a further research in corporate and business areas webpages, this ecosystem can be divided in:

- Core operational practices: Risk assessment, self-evaluation, sustainability assessment, supplier support and integration
- Support operational practices:
- Support documents: Supplier Code of Conduct, Supplier requirement, Supplier Quality manual (see Cargotec 2018e).

4.3 Metso

4.3.1 Company description

Metso is an industrial company serving the mining, aggregates, recycling, oil, gas, pulp, paper and process industries. Metso helps customers improve their operational efficiency to build new and sustainable ways of growing. (Metso 2018g)

Metso products range from mining and aggregates processing systems to industrial valves and controls. Metso´s customers are supported a global network of over 80

service centres and about 6,000 services professionals. Metso has an uncompromising attitude towards safety. Metso is listed on the Nasdaq Helsinki Ltd, Finland, and had sales of about EUR 2.6 billion in 2016. Metso employs over 11,000 persons in more than 50 countries. (Metso 2018g)

4.3.2 Sustainability strategy

Metso states in its corporate webpage "*We strongly believe in the value stemming from sustainable business operations, thus sustainability is an integral part of Metso's strategy.* (Metso 2018h)

Metso aims to solve global social and environmental challenges to succeed in the long term and create value for all the company's stakeholders, including society. Finding ways to address sustainability challenges can most certainly give rise to new business opportunities. (Metso 2018h)
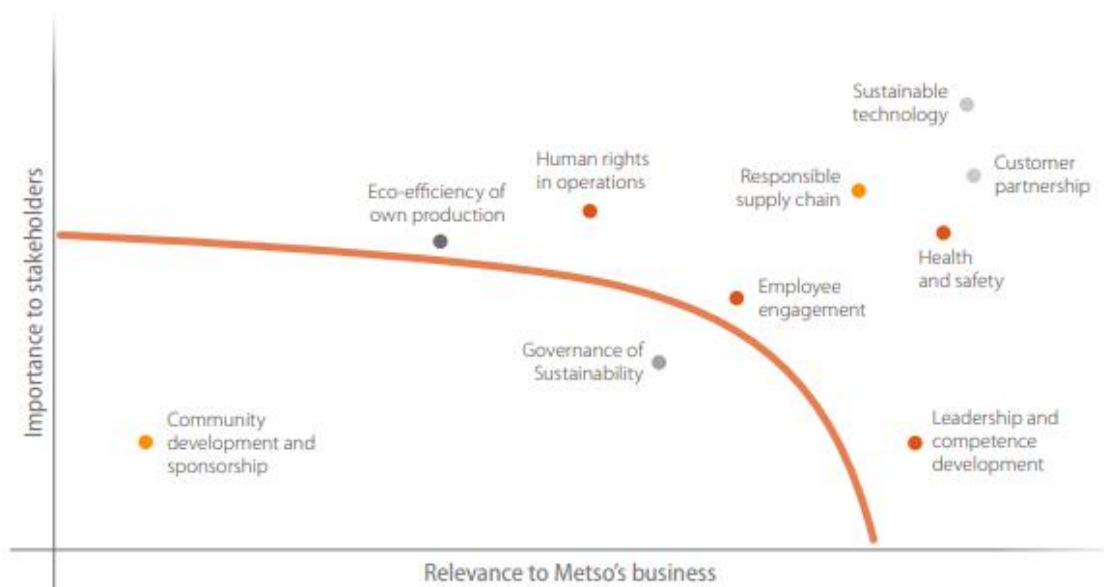
Figure 15. Materiality matrix (Metso 2018b)

The matrix displays Metso's most material topics from the point of view of our stakeholders and business. While the horizontal axis represents the topic's relevance to Metso's business, the vertical axis represents the topic's importance for stakeholders. Therefore, topics that are located on the right side of the curve are the most important material topics and they have been coded to correspond to the sectors of Metso's sustainability agenda. Among them "Responsible Supply Chain". (Metso 2018b)

4.3.3 Supply chain description

There is not a clear description of number of suppliers, activities and location

4.3.4 Sustainable supply chain

Most information describing Metso's supply chain practices are included in the called Sustainability supplement (Metso 2018b) while Annual review (Metso 2018a) just introduce the topic to general stakeholder and readers in the chapter "Sustainability in the supply chain" where it links sustainability to Responsible Supply Chain concept.

In the sustainability supplement the information is concentrated in the chapter "Supply chain management".

Goals

Metso wants to ensure sustainable business operations throughout its supply chain by developing best sustainability management. Metso´s suppliers should respect and share the same high standards set for Metso in its policies. (Metso 2018b)

Responsible supply chain is one of 5 focus areas in Metso´s sustainability agenda.

Table 12. Responsible supply chain action plan (Metso 2018b).

Sustainability targets and action plan 2016–2018	Progress in 2017

• Third-party sustainability audits for higher- and medium-risk supplier base; minimum 15 per year.
• Established sustainability follow-up tools and processes:
    ○ 100% of new suppliers in high-risk areas screened on sustainability issues.
    ○ Existing high- and medium-risk supplier base screened on sustainability issues.
• Procurement personnel trained on sustainability.
• Compliance with chemical legislation and restricted materials through systematic qualification process.
	• More systematic sustainability screening of new and existing suppliers started in higher-risk areas.
	• 15 third-party sustainability supplier audits conducted in China, India, Turkey and Brazil.
	• 43 internal sustainability supplier audits conducted in China, India and Turkey.
	• Improvements in the tracking of completed corrective actions.
	• Sustainability training organized for procurement and supplier quality personnel in China, Finland, Sweden, Turkey, Russia, Brazil and South Africa.
	• Internal program on restricted materials ongoing

Policies

Metso's Code of Conduct (see Metso 2018c) and sustainable development criteria for suppliers (see Metso 2018d) set the standards that Metso expect its suppliers to follow, and they are the starting point for any new or existing business relationship. Furthermore, Metso closely follows and comply with the legislation on restricted materials. (Metso 2018b)

Operational practices

Risk mapping: Metso carry out a risk mapping of sustainability related risks within its existing and new suppliers. For the risk mapping, Metso takes into account the type of product produced, volume purchased and geographical location. Metso utilizes a Human Rights Dataset to identify the risk countries related to social and environmental aspects. Based on these assessments, Metso decides if there is a need for third-party or internal sustainability supplier audits on the suppliers with the highest potential risks in their operations. (Metso 2018b)

Audits: Metso conducts third-party sustainability supplier audits and it also started to conduct internal sustainability supplier audits, where Metso Procurement and Quality Assurance make on-site visits in higher-risk countries to check the sustainability practices and performance of Metso´s suppliers. (Metso 2018b)

Corrective action plans: After each sustainability supplier audit, Metso agrees on corrective action plans together with the supplier to improve suppliers' sustainability performance. Suppliers are also required to provide Metso with evidence of the corrective actions that have been implemented and are subjected to a re-audit, where necessary. (Metso 2018b)

Other supporting practices

Process integration: Metso has integrated sustainability aspects into its procurement processes, considering sustainability aspects in supplier evaluations to minimize the risks and develop the opportunities related to social and environmental aspects. (Metso 2018b)

Sustainability training: The sustainability training initiated for Metso´s procurement and supplier quality assurance team in 2016 aims to increase the sustainability knowledge of Metso´s procurement function in order to perform internal audits and to control the audits´ corrective actions comprehensively. This training also helps to move forward with the integration of processes. (Metso 2018b)

Reported topics and indicators

GRI disclosure table – RQ1

Table 13. Metso GRI disclosure.

G4	GRI Standard				GRI	
G4 Disclosure	GRI Standard Number	GRI Standard Title	Disclosure Number	Disclosure Title	*Metso*	Assessment according to Skoloudis et al.
G4-12	**GRI 102**	**General Disclosures**	**102-9**	Supply chain	AR p. 12-13, 16-17 Supply chain management, p. 22	4
G4-EC9	**GRI 204**	**Procurement Practices**	**204-1**	Proportion of spending on local suppliers	Key performance indicators, p. 27	4
G4-EN32	**GRI 308**	**Supplier Environmental Assessment**	**308-1**	New suppliers that were screened using environmental criteria		0
G4-EN33	**GRI 308**	**Supplier Environmental Assessment**	**308-2**	Negative environmental impacts in the supply chain and actions taken		0
G4-LA14	**GRI 414**	**Supplier Social Assessment**	**414-1**	New suppliers that were screened using social criteria		0
G4-LA15	**GRI 414**	**Supplier Social Assessment**	**414-2**	Negative social impacts in the supply chain and actions taken		0
G4-HR4	**GRI 407**	**Freedom of Association and Collective Bargaining**	**407-1**	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk		0
G4-HR5	**GRI 408**	**Child Labor**	**408-1**	Operations and suppliers at significant risk for incidents of child labor		0
G4-HR6	**GRI 409**	**Forced or Compulsory Labor**	**409-1**	Operations and suppliers at significant risk for incidents of forced or compulsory labor		0
G4-HR8	**GRI 411**	**Rights of Indigenous Peoples**	**411-1**	Incidents of violations involving rights of indigenous peoples		0
G4-HR10	**GRI 414**	**Supplier Social Assessment**	**414-1**	New suppliers that were screened using social criteria		0
G4-HR11	**GRI 414**	**Supplier Social Assessment**	**414-2**	Negative social impacts in the supply chain and actions taken		0
G4-SO9	**GRI 414**	**Supplier Social Assessment**	**414-1**	New suppliers that were screened using social criteria		0
G4-SO10	**GRI 414**	**Supplier Social Assessment**	**414-2**	Negative social impacts in the supply chain and actions taken		

GRI numeric indicator – RQ3

204-1 GRI 204: PROCUREMENT PRACTICES Proportion of spending on local suppliers (204-1)

GRI 204: PROCUREMENT PRACTICES

Proportion of spending on local suppliers (204-1)

	2016	2017
United States	60%	61%
Finland	57%	55%
Sweden	50%	50%
France	57%	59%
China	92%	92%
Brazil	90%	89%
India	82%	87%

Defintion of 'local supplier': sourced from the same country as the plant location
Definition 'significant location of operation': biggest countries for Metso procurement

Figure 16. Metso. Proportion of spending on local suppliers (Metso 2018b).

Other numeric indicators – RQ3

Sustainability supplier audits has jumped from 8 to 58 in just 2 years. In addition to the 15 third-party sustainability supplier audits, Metso also conducted 43 internal sustainability supplier audits in 2017. (Metso 2018b).

Metso indicator: Sustainability supplier audits

	2015	2016	2017
Number of sustainability audits in supply chain	8	15	58

In addition to third-party sustainability supplier audits (15), Metso also conducted 43 internal sustainability supplier audits in 2017.

Figure 17. Metso. Sustainability supplier audits (Metso 2018b).

Report quality, quantity and structure – RQ1

Metso´s Sustainability Supplement offers a holistic view to company´s Responsible Supply Chain. Materiality matrix helps to value the importance of sustainable development for company and stakeholder, with topics such as own Responsible Supply Chain and Sustainable technology. Therefore, sustainability is an integral part of Metso´s strategy, and Responsible Supply Chain is included and developed in Sustainability Agenda. Own company Code of Conduct sets the supply chain policy.

Metso provides systematic data, with clear figures for topic 204-1 - Proportion of spending on local suppliers. However, it is a tough task to find linkages among targets (100% new supplier screened) and other systematic indicators such supplier audits (58 supplier audits,15 third party and 43 internal). Sustainability targets and its progress in 2017 are nicely developed, but some of them are ambiguous (Procurement personnel trained on sustainability) and others lack of above mentioned easy-comparison feature.

Responsible Supply Chain reporting is well integrated in Annual Review and Sustainability Supplement, with a dedicated chapter and easy reachable KPI and GRI topics at the end of this last document.

Sustainability integration in procurement and sustainability training seems to be the greatest future challenges, and although no bad news disclosed, Metso knows that there is still room for improvement.

Although there is not a specific commitment from the top management to Responsible Supply Chain, topic materiality and the developed Sustainability Agenda seems to demonstrate focus and progress to the targets. Metso commissioned PricewaterhouseCoopers to conduct a limited assurance that include the accuracy and completeness of the information from original documents and systems, among other activities.

As a supporter of UNGC, Metso is committed to annually communicating on the UN Global Compact website any progress in the development of activities. It is remarkable how Metso links GRI report and UNGC ten principles and SDGs for every GRI disclosure.

Best practices ecosystem – RQ2

Inspired in UNCTAD 2012 document, the ecosystem for sustainability development in Metso´s supply chain can be divided in:

- Core operational practices: Risk mapping, audits, corrective action plans
- Support operational practices: Process integration, sustainability training
- Support documents: Code of Conduct, Supplier criteria, Supplier Handbook (see Metso 2018e), Sustainability Handbook (see Metso 2018f).

4.4 VAISALA

4.4.1 Company description

Vaisala is a company that develops, manufactures and markets products and services for environmental and industrial measurement, with a sales volume of 332.6 MEUR in 2017 in 30 countries and 1,600 Employees. (Vaisala 2018a)

Vaisala has two business areas, Weather and Environment that serves selected weather-dependent markets, and Industrial Measurements that provides to industrial customers in life science, power transmission, and targeted industrial applications. (Vaisala 2018a)

4.4.2 Sustainability strategy

There is not a clearly reported sustainability strategy for the company.

4.4.3 Supply chain description

The following figures shows clearly Vaisala´s supply chain and suppliers location.

Key figures of Vaisala's direct supply chain

392 suppliers in 30 countries

-54% reduction from the 856 suppliers in 2013, through strategic consolidation

87% of suppliers rated on ESG metrics (based on spend), target 90% in 2017 (80%, 2016)

89% of supplier (based on spend) have signed the Supplier Code of Conduct

7 new suppliers in 2017

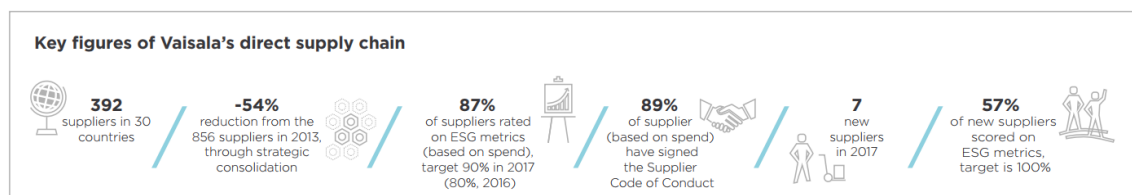**57%** of new suppliers scored on ESG metrics, target is 100%

Figure 18. Key figures of Vaisala´s direct supply chain (Vaisala 2018a).

With the aim of increasing collaboration with existing suppliers, Vaisala has consolidated its supply chain to only 392 direct suppliers. Vaisala´s 2017 target was that at least 90% of total euros spent on direct suppliers would be covered by ESG (Environmental, Social and corporate Governance) analysis, and the target was almost met at 87%. There were seven new suppliers in 2017, four of them had an SAQ (Self-Assessment Questionnaire) score before the end of the reporting period, and six had signed the Supplier Code of Conduct. (Vaisala 2018a)

VAISALA'S DIRECT SUPPLIERS BY REGION

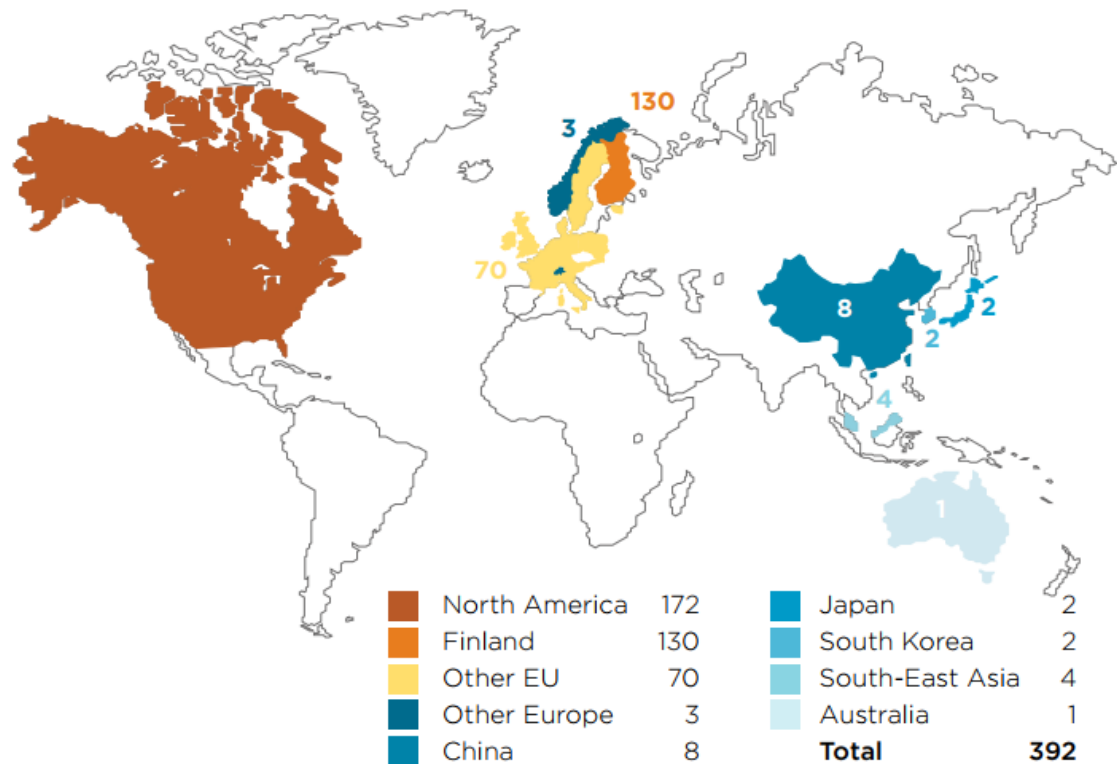|					
North America	172		Japan		2
Finland	130		South Korea		2
Other EU	70		South-East Asia		4
Other Europe	3		Australia		1
China	8		**Total**		**392**

Figure 19. Vaisala´s direct supplier location (Vaisala 2018a).

Vaisala through Responsible business practices and use of local suppliers create indirect benefits to local communities. (Vaisala 2018a)

4.4.4 Sustainable supply chain

Vaisala has concentrated the information about its Sustainable Supply Chain in the chapter "Responsible Supply Chains" of its Annual report 2017 – Observations for a Better World (Vaisala 2018a).

Goals

In order to be the winner in the high-mix – low volume supply chain, Vaisala aims to create competitive advantage and innovations through close cooperation with its consolidated sustainable supply chain in order to fulfil its stakeholders´ demands and expectations. (Vaisala 2018a)

Policies

All Vaisala´s suppliers are required to meet a set of criteria gathered in the Supplier requirements document (see Vaisala 2018c). (Vaisala 2018a)

Moreover, suppliers are required to comply with Vaisala's Supplier Code of Conduct (see Vaisala 2018b) as part of their contract. The Supplier Code of Conduct reflects Vaisala's values and Code of Conduct, and it is based on principles created by the United Nations Global Compact initiative, the International Labour Organization (ILO), and the Responsible Business Alliance (formerly EICC). (Vaisala 2018a)

Operational practices

Supplier classification: Vaisala classifies its suppliers into four categories: potential, approved, preferred, and strategic suppliers. The classification defines the relationship between Vaisala and the supplier and outlines the management model for each category. (Vaisala 2018a)

Risk assessment: To evaluate ESG risks in the supply chain, Vaisala applies a Supplier Sustainability Self-assessment Questionnaire (SAQ) as part of the supplier scoring for all supplier categories. The SAQ forms a part of the supplier assessment and exposes risks in labour and human rights as well as environmental issues in the supply chain. Internal supply chain risk assessments suggest that risks for adverse impacts of human rights are most likely to be found beyond the third tier of suppliers. Typical issues are the same as in other electronic manufacturing supply chains, including but not limited to unpaid or excessive overtime, dangerous working conditions, and low wages. Risks in Vaisala's supply chain are mitigated by carefully choosing preferred suppliers and working closely with first tier suppliers, insisting on policies that go beyond what would be required by local legislation. (Vaisala 2018a)

Corrective Action Plan (CAP): If a supplier's scores are in the lowest category, a corrective action plan must be put in place at once and business relations with the supplier may cease. New suppliers will not be approved, if they score below expectations. The SAQ scoring is discussed bi-annually or when needed with each supplier. (Vaisala 2018a)

Early Supplier Involvement (ESI): Vaisala involves its suppliers in product development and design early on. Manufacturability, consistent quality, total cost of ownership, and performance can be improved through Early Supplier Involvement (ESI). ESI has proved

to be an efficient method to implement reliability and continuous improvement. (Vaisala 2018a)

Other supporting activities

There are other activities that support sustainability and company´s excellence, focused on deepen collaboration and knowledge sharing with suppliers.

Supplier Day event: With training sessions, workshops, and networking, the target is to deepen cooperation between Vaisala and its supply chain opening up Vaisala´s strategies and business models. The event concluded with Vaisala Supplier Awards ceremony that celebrated mutual success in five categories: Sustainable Business, Quality, Technology, Customer Service, and Delivery. (Vaisala 2018a)

Reported topics and indicators

<u>GRI disclosure table – RQ1</u>

Table 14. Vaisala GRI disclosure.

G4	GRI Standard				G4	
G4 Disclosure	GRI Standard Number	GRI Standard Title	Disclosure Number	Disclosure Title	<u>Vaisala</u>	<u>Accordingg to Skolodius et al.</u>
G4-12	**GRI 102**	**General Disclosures**	**102-9**	Supply chain	176	3
G4-EC9	**GRI 204**	**Procurement Practices**	**204-1**	Proportion of spending on local suppliers		0
G4-EN32	**GRI 308**	**Supplier Environmental Assessment**	**308-1**	New suppliers that were screened using environmental criteria	176-177	2
G4-EN33	**GRI 308**	**Supplier Environmental Assessment**	**308-2**	Negative environmental impacts in the supply chain and actions taken		0
G4-LA14	**GRI 414**	**Supplier Social Assessment**	**414-1**	New suppliers that were screened using social criteria		0
G4-LA15	**GRI 414**	**Supplier Social Assessment**	**414-2**	Negative social impacts in the supply chain and actions taken		0
G4-HR4	**GRI 407**	**Freedom of Association and Collective Bargaining**	**407-1**	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	176-177. Aspect is determined not to be material in Vaisala's own operations, only in specific areas of the supply chain. For details of supply chain risk mapping, the information is proprietary	3
G4-HR5	**GRI 408**	**Child Labor**	**408-1**	Operations and suppliers at significant risk for incidents of child labor	176-177. Aspect is determined not to be material in Vaisala's own operations, only in the supply chain.	3
G4-HR6	**GRI 409**	**Forced or Compulsory Labor**	**409-1**	Operations and suppliers at significant risk for incidents of forced or compulsory labor	176-177. Aspect is determined not to be material in Vaisala's own operations, only in the supply chain.	3
G4-HR10	**GRI 414**	**Supplier Social Assessment**	**414-1**	New suppliers that were screened using social criteria	176-177	2
G4-HR11	**GRI 414**	**Supplier Social Assessment**	**414-2**	Negative social impacts in the supply chain and actions taken		0
G4-SO9	**GRI 414**	**Supplier Social Assessment**	**414-1**	New suppliers that were screened using social criteria	176-177	2
G4-SO10	**GRI 414**	**Supplier Social Assessment**	**414-2**	Negative social impacts in the supply chain and actions taken		0

<u>GRI numeric indicator – RQ3</u>

G4-EN32 / G4 HR10 / G4 SO9:57% of new suppliers scored on ESG metrics. Target 100%. (Vaisala 2018a)

G4-EC9: Although Vaisala states a strong commitment to local suppliers and consolidation strategy in a high-mix, low-volume supply chain, there is no data about local spend.

<u>Other numeric indicators – RQ3</u>

ESG metrics: 87% of suppliers rated on ESG metrics (based on spend), target 90% in 2017 (80%, 2016). (Vaisala 2018a)

SCoC metrics: 89% of supplier (based on spend) have signed the Supplier Code of Conduct. (Vaisala 2018a)

New suppliers: 7 new suppliers in 2017. (Vaisala 2018a)

<u>Other GRI disclosures</u>

G4-HR4 / HR5 / HR6: There were no confirmed complaints or sanctions by authorities during 2017. Specifically, no incidents of corruption, anti-competitive behaviour, anti-trust or monopoly practices or any other breach of legislation or regulations were confirmed during 2017. Furthermore, there were no reported concerns or breaches of human rights, labour rights, or environmental legislation in the adjacent supply chain. (Vaisala 2018a)

Report quality, quantity and structure – RQ1

Although there is not a clear statement about sustainability strategy at corporate level, Responsible Supply Chains section in Vaisala´s Annual report highlights that Vaisala's supply chain management aims to create sustainable competitive advantage and innovations through collaboration. At least it creates a minimum framework, but not a Sustainability Agenda or Roadmap with clear targets in a limited timeframe (3 or 4 years) or greatest challenges. Only one GRI sustainability aspect has objectives and can be evaluated, (G4-EN32 - 57% of new suppliers scored on ESG metrics) but it doesn´t meet the target (100%). This figure is not hidden showing reporting transparency. Other figures are time comparable and show implementation progress.

The Supplier Code of Conduct fixes the terms of collaboration with suppliers, and although operational and support practices are listed briefly, more detailed information is found along the report out of Responsible Supply Chains section. Moreover, the liaison among SSCM activities should be added for better and further comprehension.

Clear GRI cross-reference at the end of annual report joining G4 aspects, with pages were to find information, comments, assurance level and UNGC principles applied. Its sustainability principles clearly based on UNGC, with clear relations.

Not a clear commitment from top level management to Sustainable Supply Chain, or Agenda but interesting supporting activities as Early Supplier Involvement, Supplier Day Event, Supplier Award, or analysis of reporting complaints and sanctions by authorities in deep supply chain (3rd tier) (G4-HR4 / HR5 / HR6).

Limited report assurance by Deloitte, reviewing internal and external documentation to verify to what extent data supports the information included and assessing that the information has been prepared in accordance with the Sustainability Reporting Guidelines (G4).

Best practices ecosystem – RQ2

Although there is not much information about operational practices linkages, the ecosystem for sustainability development in Vaisala´s supply chain might be divided in:

- Core operational practices: Supplier classification, Risk assessment (SAQ), Corrective Action Plan.
- Support operational practices: Early Supplier Involvement, Supplier Day Event, Supplier Awards.
- Support documents: Code of Conduct, Supplier requirements.

4.5 Valmet

4.5.1 Company description

Valmet is a global developer and supplier of technologies, automation and services for the pulp, paper and energy industries. The company has over 200 years of industrial history. Valmet has 12,000 professionals around the world and net sales in 2017 of EUR 3.1 billion. Valmet's head office is in located Espoo. (Valmet 2018e)

4.5.2 Sustainability strategy

Valmet's Sustainability360° agenda supports the company's strategy and is at the core of strategy implementation. This agenda has been defined in accordance with the key megatrends identified and focuses on five core areas, among them sustainable supply chain. The sustainability agenda has been approved by Valmet's Executive Team and it is reviewed annually. This agenda and the connected action plans are also aligned with the United Nations Sustainable Development Goals (SDG). The current sustainability action plan is on-going for 2016-2018. (Valmet 2018a)

4.5.3 Supply chain description

Valmet has an extensive supply chain. Its total spend in direct purchases is between EUR 1-2 billion annually, sourced from 10000 active suppliers in over 50 countries. Although the share of sourcing from the emerging markets is increasing, over half of Valmet´s purchases, by supplier spend, come from Finland and Sweden. (Valmet 2018f)

4.5.4 Sustainable supply chain

Valmet has a global supply chain that includes procurement from countries with different risk levels. Global megatrends, such as resource efficiency, growing customer awareness and digitalization are increasing the need for a transparent and sustainable supply chain. (Valmet 2018a)

Valmet divides its information about sustainability in its supply chain between the Annual Review (see Valmet 2018a, pages 28-30 –Supply chain- and page 30 –Auditing suppliers for sustainability) and the GRI supplement (see Valmet 2018b, page 14 – Sustainable Supply Chain).

Goals

Valmet's sustainability agenda was initially launched in 2014 and renewed in 2016, when Valmet defined new action plans for 2016–2018. The action plans include detailed actions, targets and KPIs for each sustainability focus area. Ensuring a sustainable supply chain is one of Valmet's five sustainability agenda focus area. (Valmet 2018a)

This area has 2 targets in the 2016-2018 action plan:

- To develop sustainable procurement practices globally-
    - 100% of new direct suppliers gone through supplier approval process
    - 50 supplier sustainability audits per year
- To support selected key suppliers to meet the level of sustainability expected by Valmet
    - Engage 100% of selected suppliers to supplier sustainability engagement program (Valmet 2018a)

The tables below introduce the status of the main targets and achievements at the end of 2017, as well as the key actions for 2018.

Figure 20. Progress on Sustainability 360° Agenda (Valmet 2018a)

Policies

Sustainability is fully integrated into Valmet's way to operate in its supply chain. Valmet expects that all its suppliers comply with the sustainability requirements in its Sustainable Supply Chain Policy, and it has zero tolerance towards the use of forced or child labour (Valmet 2018a)

Valmet also fosters the develop of more sustainable supply chain practices globally besides ensuring procurement savings. (Valmet 2018f)

Operational practices

Valmet has a comprehensive approach to sustainable supply chain management that aims to enhance risk management and ensure compliance with the Supply Chain Policy. This method includes the own sustainable Supply Chain Policy, risk assessments, supplier self-assessments, and supplier sustainability audits executed with a third party. The so-called Sustainability Gates are an integrated and automated part of this framework that ensures that all suppliers are assessed in relation to their potential sustainability risk, sign the Sustainable Supply Chain Policy, and complete a sustainability self-assessment. if this is required based on the risk assessment. (Valmet 2018a)

Sustainability risk assessment: Valmet has a systematic method for risk assessment that evaluate suppliers by country of origin and by purchasing category. The method assesses the potential negative indirect impacts and risks related to human rights, practices, ethical business practices, environmental performance, and health and safety. (Valmet 2018b)

Supplier self-assessment: Based on the supplier sustainability risk assessment, Valmet may request that its suppliers self-assess their sustainability performance and management, the self-assessment may lead to a supplier audit conducted by an independent third party and Valmet. The online self-assessment is available in nine languages. (Valmet 2018b)

Audits: Valmet conducts supplier sustainability audits using Valmet's global sustainability audit protocol together with a third-party auditor. The protocol ensures the process is consistent and enables comparability between suppliers. In 2017, Valmet continued to

develop global templates and guidelines for sustainability audits and follow-ups to ensure uniform processes. (Valmet 2018a)

At the Annual Review Valmet shows an illustrative chart for Sustainable Supply Chain management

A global supplier sustainability management process

Required from all suppliers

Sustainable Supply Chain Policy

All suppliers are required to sign Valmet's Sustainable Supply Chain Policy.

Sustainability risk assessment

All suppliers are evaluated through a five-level sustainability risk assessment.

Required based on supplier risk assessment

Supplier self-assessments

A low result in the risk assessment leads to a supplier sustainability self-assessment.

Sustainability audits

A low result in the self-assessment leads to an audit.

Figure 21. Supplier sustainablity management proces (Valmet 2018a).

Corrective action plan (CAP): Valmet follows up all findings from sustainability audits through a systematic process that includes a corrective action plan. Valmet supports, monitors and verifies actions that the supplier carries out. In case the supplier refuses to proceed, Valmet reserves the right to terminate the contract with the supplier. (Valmet 2018a)

The Supplier Relationship Management (SRM) program aims to lead Valmet's suppliers towards more sustainable operation. The program includes targets, KPIs and follow-up mechanisms for selected suppliers. Valmet also integrates a supplier sustainability engagement concept in the current SRM program. (Valmet 2018a)

Other operational supporting practices

Valmet has established an open channel for reporting violations to Valmet´s Code of Conduct (see Valmet 2018c), Supply Chain Policy (see Valmet 2018d) or others related

to fraud, abuse or misconduct. The channel enables to make a report via telephone or the Internet 24/7. (Valmet 2018b)

Valmet further integrates sustainability into its procurement activities and therefore sustainability is part of procurement's main KPIs and targets. (Valmet 2018a)

Valmet also continues its sustainability training programs and e-learning courses for global procurement. Valmet also holds internal training to share best practices about sustainability auditing across areas and audit teams. (Valmet 2018a)

Reported topics and indicators

GRI disclosure table – RQ1

Table 15. Valmet GRI disclosure.

G4	GRI Standard				GRI	
G4 Disclosure	GRI Standard Number	GRI Standard Title	Disclosure Number	Disclosure Title	Vaisala	According to Skolodius et al.
G4-12	GRI 102	General Disclosures	102-9	Supply chain	AR28-30, GR14	4
G4-EC9	GRI 204	Procurement Practices	204-1	Proportion of spending on local suppliers		0
G4-EN32	GRI 308	Supplier Environmental Assessment	308-1	New suppliers that were screened using environmental criteria		0
G4-EN33	GRI 308	Supplier Environmental Assessment	308-2	Negative environmental impacts in the supply chain and actions taken		0
G4-LA14	GRI 414	Supplier Social Assessment	414-1	New suppliers that were screened using social criteria	AR30,GR31	4
G4-LA15	GRI 414	Supplier Social Assessment	414-2	Negative social impacts in the supply chain and actions taken		0
G4-HR4	GRI 407	Freedom of Association and Collective Bargaining	407-1	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk		0
G4-HR5	GRI 408	Child Labor	408-1	Operations and suppliers at significant risk for incidents of child labor		0
G4-HR6	GRI 409	Forced or Compulsory Labor	409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labor	GR31, AR 28-30	3
G4-HR10	GRI 414	Supplier Social Assessment	414-1	New suppliers that were screened using social criteria		0
G4-HR11	GRI 414	Supplier Social Assessment	414-2	Negative social impacts in the supply chain and actions taken		0
G4-SO9	GRI 414	Supplier Social Assessment	414-1	New suppliers that were screened using social criteria		0
G4-SO10	GRI 414	Supplier Social Assessment	414-2	Negative social impacts in the supply chain and actions taken		0

GRI numeric indicator – RQ3

GRI 414-1 New suppliers that were screened using social criteria: In 2017, 73 percent of all new direct suppliers were automatically screened on sustainability. The remaining

suppliers have been manually assessed in regard to potential sustainability risk. The screening covers business ethics. compliance, human and labor rights, health, safety and environmental management, as well as product safety topics. (Valmet 2018b)

Other numeric indicators – RQ3

Purchases
(10 largest countries)

EUR MILLION	2017	2016
Finland	751	758
Sweden	265	211
China	157	114
USA	116	130
Germany	78	75
Brazil	68	24
Poland	62	65
Estonia	40	30
Italy	34	40
Spain	25	7

Figure 22. Purchases by ten largest countries (Valmet 2018a).

Audits: In 2017, Valmet conducted a total of 56 supplier sustainability audits in 14 countries (Valmet 2018a)

Audit findings: Sustainability audit findings are based on non-conformities with Valmet's Sustainable Supply Chain Policy, or with local or international law. Most findings (58 percent of all findings) were related to human and labour rights. as well as health and safety. (Valmet 2018a)

Corrective actions: Of all the suggested corrective actions in 2015—2017, around 67% were completed and verified by the end of 2017. (Valmet 2018a)

Other GRI disclosures

GRI 409-1 Forced or compulsory labour.: Child labour and forced labour are part of the indicators assessed to identify risk countries in terms of human rights impacts. (Valmet 2018b)

Report quality, quantity and structure – RQ1

With a clear mission, *"to convert renewable resources into sustainable results"*, Valmet outlines in both report a detailed roadmap to sustainability in a holistic view. Valmet's business environment is impacted by megatrends that create both opportunities and risks and design the corporate strategy for sustainability at focus areas. That strategy, called Sustainability 360° Agenda, is broken down into action plans, with limited development time (3 years), that include targets, actions and KPIs. Both reports provide details to policies and practices in a transparent way. Data reporting is systematic but comparable data to previous years is missing and it makes difficult to see progress.

Current practices are nicely reported and future goals as well, but some action description (*Continue to increase traceability in supply chain*) are too ambiguous.

Reporting tone is quite neutral, with no emphasis on good or bad news. Interview to auditors breaks this impersonal tone to bring fresh air and, at same time, inform of positive impact to supplier and greatest challenges "there´s still room for improvement regarding safety issues". The information about Sustainable Supply chain is well integrated with other company´s aspects, but probably that try to further integration leads towards information sharing in different documents and section. For a stakeholder it can take a good time to join those pieces and create a general picture.

A strong commitment to sustainability from management level results in the development of strategies and action plan to focus areas such as supply chain.

At this point, and according to above information, Valmet has a leader role in sustainability development and its reporting. Because of that, Valmet promotes reporting transparency and standardization, for example with a GRI supplement. As a weakness, the scarce number of GRI topics reported related to supply chain.

Valmet commissioned DNV to conduct a limited assurance engagement over selected information such as GRI 414-1 New suppliers that were screened using social criteria or GRI 409-1 Forced or compulsory labour.

Valmet is a signatory of the UNGC and the action plans are also aligned with the UN SDGs.

In the end, a transparent company with good reporting practices but surprisingly no many GRI topics about supply chain.

Best practices ecosystem – RQ2

The most extend practices ecosystem so far includes:

- Core operational practices: Risk assessment, Supplier Self-Asssement (SAQ), Audits, Corrective Action Plan (CAP)
- Support operational practices: Open report channel, Supplier Relationship Management (SRM) + sustainability engagement, Sustainability Integration, Training + best practices sharing.
- Support documents: Code of Conduct, Sustainable Supply Chain Policy

4.6 Wärtsilä

4.6.1 Company description

Wärtsilä is a developer of smart technologies and complete lifecycle solutions for the marine and energy markets. Wärtsilä maximises the performance of vessels and power through sustainable innovation. In 2017, Wärtsilä's net sales totalled EUR 4.9 billion with approximately 18,000 employees. The company has operations in over 200 locations in more than 80 countries around the world. Wärtsilä is listed on Nasdaq Helsinki. (Wärtsilä 2018d)

Wärtsilä consists of three businesses; Marine Solutions, Energy Solutions and Services. Wärtsilä Marine Solutions provides innovative products to enhances marine and oil & gas industry. Wärtsilä Energy Solutions is a global energy system integrator whose offering includes internal combustion engine based power plants, solar power plants, energy storage & integration solutions, as well as LNG terminals and distribution systems. And Wärtsilä Services provides high-quality lifecycle services that range from spare parts and basic support to ensuring the maximised lifetime. (Wärtsilä 2018d)

4.6.2 Sustainability strategy

Wärtsilä commitment to sustainability is based on its mission - enabling sustainable societies with smart technology- and strategy. Wärtsilä's strategy is based on three key

areas, energy efficient solutions, lifecycle optimisation, and innovative solutions. (Wärtsilä 2018b)

Technology plays a central role in Wärtsilä´s sustainability development. Wärtsilä Energy Solutions and Marine Solutions businesses focus on developing and providing sustainable solutions, whereas Wärtsilä Services has a key role in supporting those solutions and providing the latest technologies for existing installations through modernisation packages. (Wärtsilä 2018b)

Wärtsilä identifies and assesses its sustainability risks on an annual basis. Based on the current assessment, the sustainability risks are at a moderate level. Generally speaking sustainability can be seen as an opportunity for Wärtsilä. (Wärtsilä 2018b)

Figure 23. Wärtsilä's sustainability approach (Wärtsilä 2018b).

4.6.3 Supply chain description

Wärtsilä has an extensive supply base with more than 25,000 active suppliers, most of whom are located in Europe, where Wärtsilä have main production units. (Wärtsilä 2018b)

4.6.4 Sustainable supply chain

Goals

Wärtsilä aims to stimulate knowledge sharing, create an environment of innovation, and integrate more strongly strategic suppliers into Wärtsilä's value chain. (Wärtsilä 2018b)

Policies

Wärtsilä has clear requirements towards its suppliers in terms of quality, product-specific requirements, environmental management, occupational health and safety, social responsibility, and legal compliance, and strives to ensure that these expectations are met. (Wärtsilä 2018b)
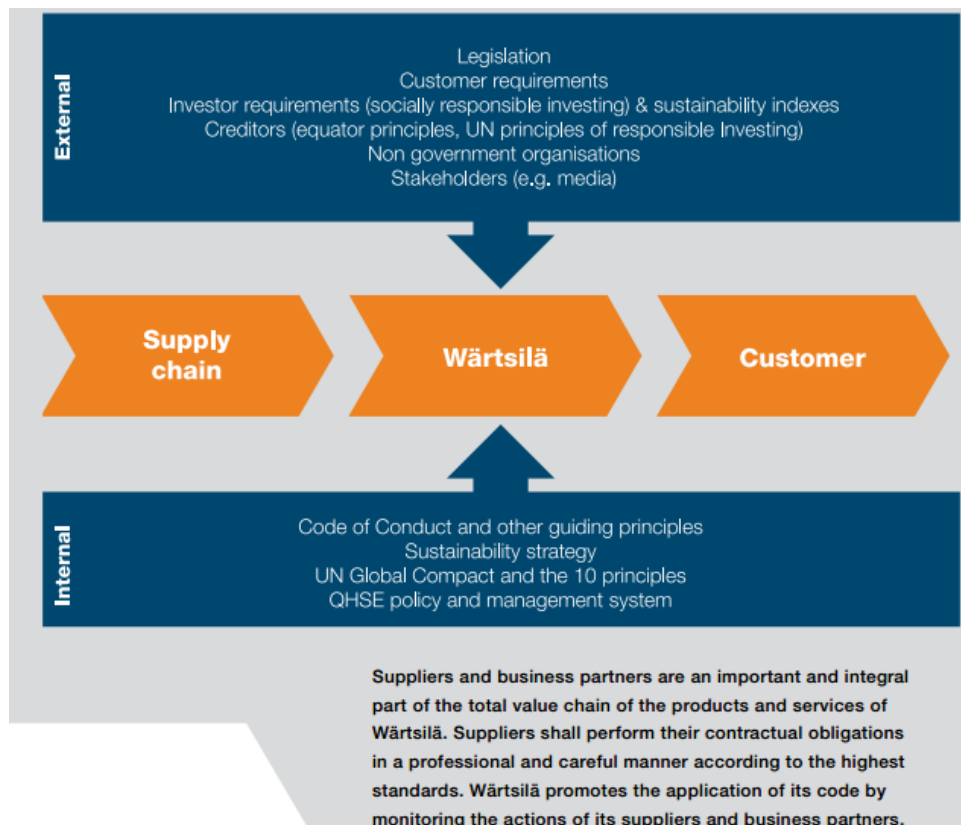

Figure 24. Wärtsilä commitment to sustainability (Wärtsilä 2018c).

Operational practices

Supplier evaluations: Wärtsilä monitors that key suppliers comply with these requirements through its Supplier Management System. Wärtsilä regularly conducts supplier evaluations, which are divided into three categories: pre-assessment, auditing, and performance review.

1. In the pre-assessment phase, Wärtsilä assesses potential new suppliers before the supplier relationship begins.
2. Audits are conducted for new suppliers of critical components and for suppliers whose performance does not meet Wärtsilä's requirements.
3. Performance reviews are carried out to identify and solve deviations from the requirements. (Wärtsilä 2018b)

Supplier rating: As part of the supplier evaluation, Wärtsilä conducts a rating based upon Wärtsilä's supplier requirements. This rating is a result of an assessment of various information sources, such as pre-qualification questionnaires, dialogue with suppliers, and/or conducted audits. Based on this rating, the suppliers can be approved, approved with remarks, or banned. This rating is part of the quarterly supplier reviews conducted by Wärtsilä Supply Management. The rating is reviewed regularly, as are the results of conducted audits. (Wärtsilä 2018b)

Risk assessment: In 2018, Wärtsilä will be launching a risk-based supplier assessment and management system for new suppliers, which will be applied by 2019 also to existing suppliers. (Wärtsilä 2018b)

Wärtsilä general framework for the Supplier Management System is the Supplier Handbook, whose purpose is to provide a general overview of what Wärtsilä expects from its suppliers (as a Supplier Code of Conduct) but it also adds interesting methodologies for supply management like:

- Supplier assessment and selection
- Part quality assurance plan (PQAP)
- Supplier material traceability and record retention
- Commitment to securing processes
- Process change and design change management
- Handling of non-conforming products and services
- Continuous supplier performance evaluation

-   Continual improvement. (Wärtsilä 2018b)

Reported topics and indicators

GRI disclosure table – RQ1

Table 16. Valmet GRI disclosure.

G4	GRI Standard				GRI	
G4 Disclosure	GRI Standard Number	GRI Standard Title	Disclosure Number	Disclosure Title	Wärtsilä	Accordingg to Skolodius et al.
G4-12	**GRI 102**	**General Disclosures**	**102-9**	Supply chain	Supply chain management	2
G4-EC9	**GRI 204**	**Procurement Practices**	**204-1**	Proportion of spending on local suppliers		0
G4-EN32	**GRI 308**	**Supplier Environmental Assessment**	**308-1**	New suppliers that were screened using environmental criteria		0
G4-EN33	**GRI 308**	**Supplier Environmental Assessment**	**308-2**	Negative environmental impacts in the supply chain and actions taken		0
G4-LA14	**GRI 414**	**Supplier Social Assessment**	**414-1**	New suppliers that were screened using social criteria		0
G4-LA15	**GRI 414**	**Supplier Social Assessment**	**414-2**	Negative social impacts in the supply chain and actions taken		0
G4-HR4	**GRI 407**	**Freedom of Association and Collective Bargaining**	**407-1**	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk		0
G4-HR5	**GRI 408**	**Child Labor**	**408-1**	Operations and suppliers at significant risk for incidents of child labor		0
G4-HR6	**GRI 409**	**Forced or Compulsory Labor**	**409-1**	Operations and suppliers at significant risk for incidents of forced or compulsory labor		0
G4-HR10	**GRI 414**	**Supplier Social Assessment**	**414-1**	New suppliers that were screened using social criteria		0
G4-HR11	**GRI 414**	**Supplier Social Assessment**	**414-2**	Negative social impacts in the supply chain and actions taken		0
G4-SO9	**GRI 414**	**Supplier Social Assessment**	**414-1**	New suppliers that were screened using social criteria		0
G4-SO10	**GRI 414**	**Supplier Social Assessment**	**414-2**	Negative social impacts in the supply chain and actions taken		0

<u>GRI numeric indicator – RQ3</u>

No GRI numeric indicator disclosed.

<u>Other numeric indicators – RQ3</u>

Supplier Rating values: During 2017, 137 suppliers with no valid assessment were rated, and 167 suppliers received a renewal of their rating (valid for 3 years). By the end of 2017, Wärtsilä rated 687 out of 1,120 key suppliers, which covers 93% of key supplier spend, and 2,968 suppliers in total with a spend coverage of 70%. (Wärtsilä 2018b).

Suppliers banned: In 2017, 13 suppliers were banned because of non-compliance with Wärtsilä's requirements, including five for sustainability reasons. (Wärtsilä 2018b)

<u>Other GRI disclosures</u>

No other GRI disclosures found.

Report quality, quantity and structure – RQ1

Same information is disclosed in the Wärtsilä Annual report and in the Annual report – Sustainability document.

In spite of apparent Wärtsilä´s commitment to sustainability, supply chain disclosure is closer to a report of traditional supply chain practices, with a risk-assessment program to implement in 2018, as the only highlighted sustainability practice. There is no numeric GRI indicators and those disclosed refer only to 2017, so there is no way to get a progress assessment. There is not a clear strategy, action plan or target to which compare these few indicators to, although "Suppliers banned" indicator offer a bad new (or not). There are not greatest challenges to sustainability implementation and the integration of supply chain information is poorly done in just one page in the Sustainability document of the Annual report. The Supplier Handbook seems to take the role of Supplier Code of Conduct.

PricewaterhouseCoopers has performed a limited assurance engagement on selected sustainability disclosures. The scope of the assurance has not covered the only GRI topic disclosed under this research.

Wärtsilä signed the United Nations Global Compact initiative in 2009 and supports its ten principles with respect to human rights, labour, the environment, and anti-corruption. The general disclosure GRI 102-9 – Supply chain is according to this initiative.

Best practices ecosystem – RQ2

Although the Supplier Handbook disclose more information, according to the Sustainability report (the goal of this research), Wärtsilä practices are:

- Core operational practices: Supplier evaluation, Rating, Risk assessment (in 2018)
- Support operational practices:
- Support documents: Supplier Handbook

4.7 Benchmarking and analysis

A new look to the research framework defined in chapter 3 (see Figure 12) is needed to understand the structure and objectives of next sub-chapters that aim to provide a benchmarking of 5 Finnish companies in reporting, management practices and indicators.

In order to respond to the first research question RQ1 - *How do Finnish leaders in industrial sector report about sustainability in their supply chain*?. I will use the methodologies provided by Skoloudis and Boston Group. UNTCAD and Leppelt provides a specific framework for RQ2 - *How do Finnish leaders in industrial sector implement sustainability in their supply chains?.* And finally, Schöggl can help to define a set of indicators that reply RQ3 - *What indicators do Finnish leaders in industrial sector use to assess sustainability in their supply chains?*

4.7.1 Sustainability reports

In order to reply to first research question *How do Finnish leaders in industrial sector report about sustainability in their supply chain*? individual evaluations of each company have been collected into one table.

Table 17. Numeric evaluation of GRI disclosures accoding to Skoloudis et. al method.

G4 Disclosure	GRI Standard Title	Disclosure Number	Disclosure Title	G4 Cargotec	GRI Metso	G4 Vaisala	GRI Valmet	GRI Wärtsilä	Avg if<>0	Points	Score% (Max 20)
G4-12	General Disclosures	102-9	Supply chain	2	4	3	4	2	3,0	15,0	75 %
G4-EC9	Procurement Practices	204-1	Proportion of spending on local suppliers	0	4	0	0	0	4,0	4,0	20 %
G4-EN32	Supplier Environmental Assessment	308-1	New suppliers that were screened using environmental criteria	4	0	2	0	0	3,0	6,0	30 %
G4-EN33	Supplier Environmental Assessment	308-2	Negative environmental impacts in the supply chain and actions taken	1	0	0	0	0	1,0	1,0	5 %
G4-HR4	Freedom of Association and Collective Bargaining	407-1	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	4	0	3	0	0	3,5	7,0	35 %
G4-HR5	Child Labor	408-1	Operations and suppliers at significant risk for incidents of child labor	4	0	3	0	0	3,5	7,0	35 %
G4-HR6	Forced or Compulsory Labor	409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labor	4	0	3	3	0	3,3	10,0	50 %
G4-LA14	Supplier Social Assessment	414-1	New suppliers that were screened using social criteria	3	0	0	4	0	3,5	7,0	35 %
G4-HR10	Supplier Social Assessment	414-1	New suppliers that were screened using social criteria	3	0	2	0	0	2,5	5,0	25 %
G4-SO9	Supplier Social Assessment	414-1	New suppliers that were screened using social criteria	3	0	2	0	0	2,5	5,0	25 %
G4-LA15	Supplier Social Assessment	414-2	Negative social impacts in the supply chain and actions taken	0	0	0	0	0	0	0,0	0 %
G4-HR11	Supplier Social Assessment	414-2	Negative social impacts in the supply chain and actions taken	0	0	0	0	0	0	0,0	0 %
G4-SO10	Supplier Social Assessment	414-2	Negative social impacts in the supply chain and actions taken	0	0	0	0	0	0	0,0	0 %
			Avg if <>0	3,1	4,0	2,6	3,7	2,0			
			Points	28	8	18	11	2			
			Score % (Max52)	54%	15 %	35 %	21 %	4 %			

Every topic can rank from 0 to 4 points, and according to Skoloudis et al. criteria the topic evaluation is calculated by comparing the potential maximum value to evaluated one (Points). It is represented by a percentage in Score % (Max) values and can give an outlook of reporting performance because it joins disclosed topics and its content completeness.

As no many topics have been disclosed, it is worth evaluating the average quality of released information. For that reason, I add new evaluation result named as Average, and represented in table as Avg if <>0.
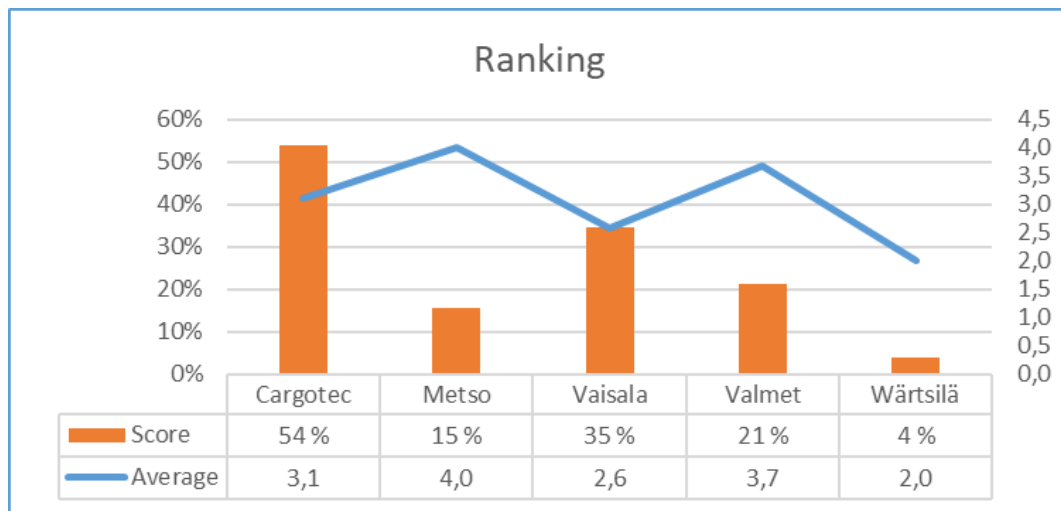
Figure 25. Ranking by suppliers according to Skolodius et. al.

If results are ranked by supplier, Cargotec is the company with the best score (54%). It is also worth checking that Metso offered the most complete information (4,0) but as not many topics were disclosed, its overall score is poor (15%)
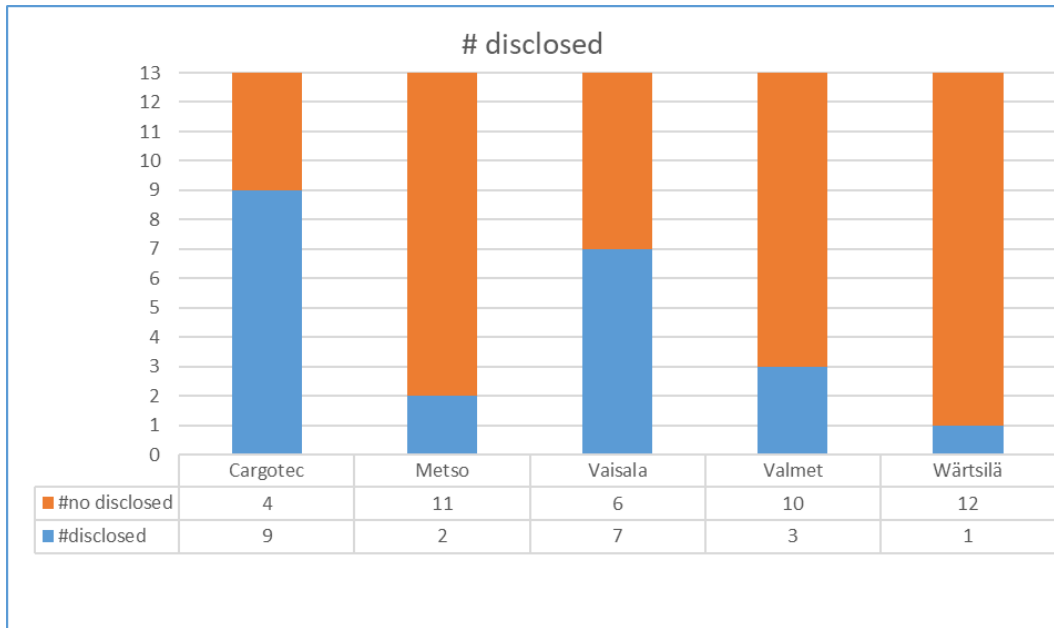
Figure 26. Disclosed topics by supplier.

In the figure above, Cargotec is also the company with more GRI topics disclosed. Wärtsila just released the compulsory GRI G4-12 / GRI 102-9: Supply chain that belongs to General Disclosures.
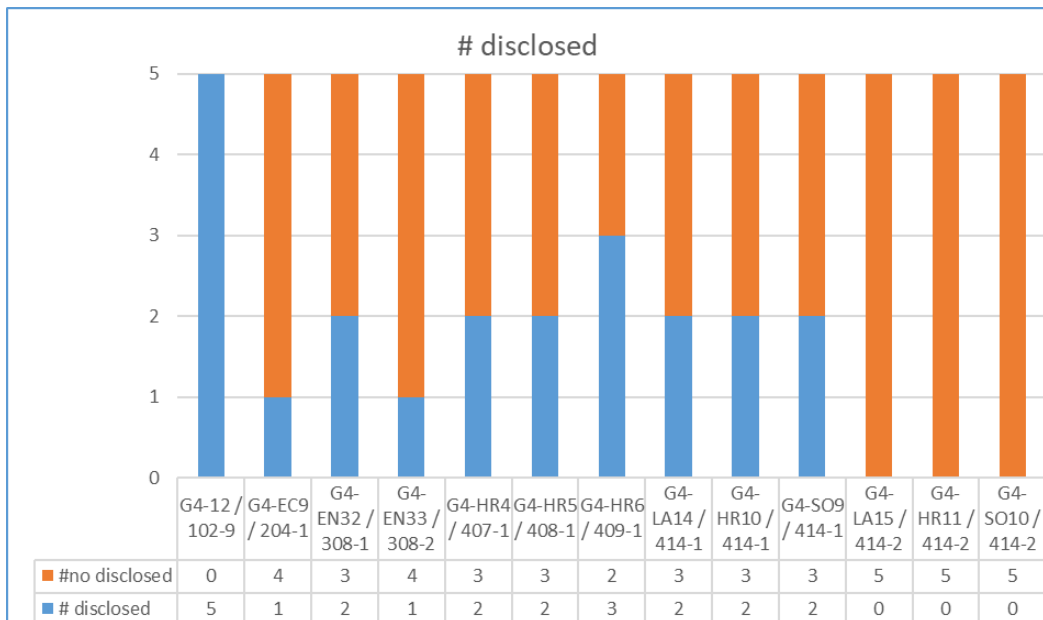

Figure 27. # disclosed information by GRI topics.

If the analysis to companies is extended to GRI disclosures, all companies reported G4-12 / GRI 102-9: Supply chain, because of its compulsion, as a Core GRI topic (General Disclosure).

Three companies decided to report about Operations and suppliers at significant risk for incidents of forced or compulsory labour (G4-HR6 / GRI 409-1: Forced of compulsory labour). Two reports included references to screening practices using environmental or social criteria, same as risk about child labour or right to freedom of association. Only one reference to spending on local suppliers or negative environmental impacts and actions taken.
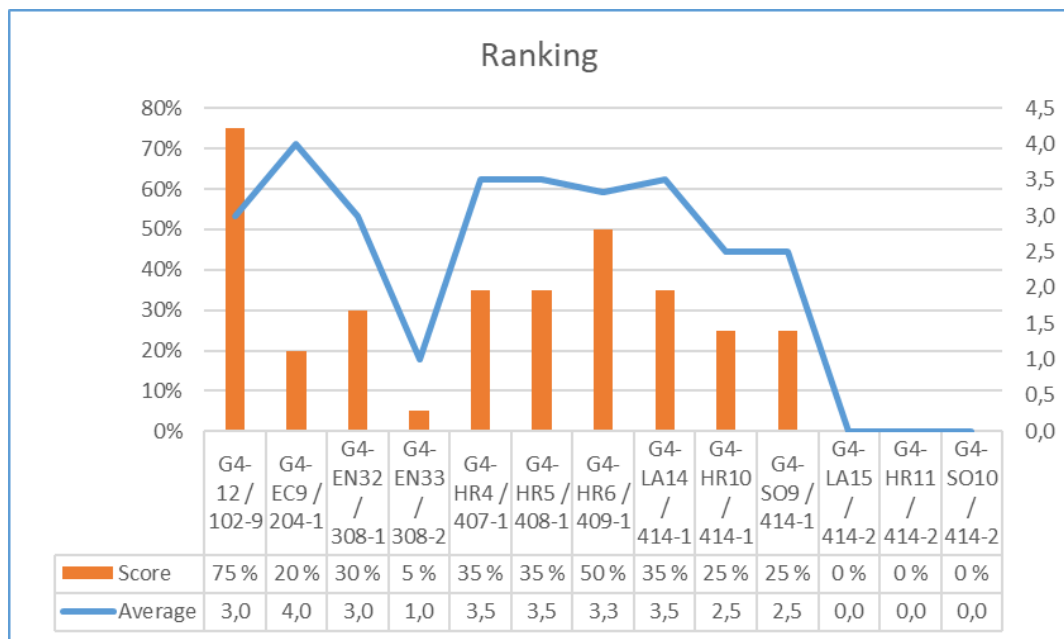
Figure 28. Ranking by GRI topics according to Skoloudis et. al.

As the content completeness (Average) have similar values for most of the topics, the ranking chart (Score) follows the shape of previous figure (# disclosed information by GRI topics). It seems to indicate that when companies report a topic, they disclose transparently.

About quality, content and structure of reporting according to Boston College methodology, comments were done in previous chapter. I merely wish to emphasize how well Valmet reported and the need of improvement for the others.

It is interesting to realize that Skoloudis et. al method focuses on assessing GRI aspects completeness in an empirical and numerical way and Boston College aims to assess

quality reporting in a subjective way just keeping some questions as guideline. Therefore, both methodologies reach different but complementary results to get an overall sustainability reporting assessment.

4.7.2 Sustainability management practices

The table below summarize the findings about operational practices to implement sustainability in supply chains that respond the research question *How do Finnish leaders in industrial sector implement sustainability in their supply chains?*

The UNCTAD 2012 information has been taken as the base to find common points among suppliers. The use of secondary data (reports) where companies disclose with different grades of transparency and where they focus information on those practices more relevant to some stakeholders (not all), together with the lack of common language, makes difficult to get a general picture, but the model proposed by UNCTAD is perfectly valid if we add the preliminary risk assessment phase.
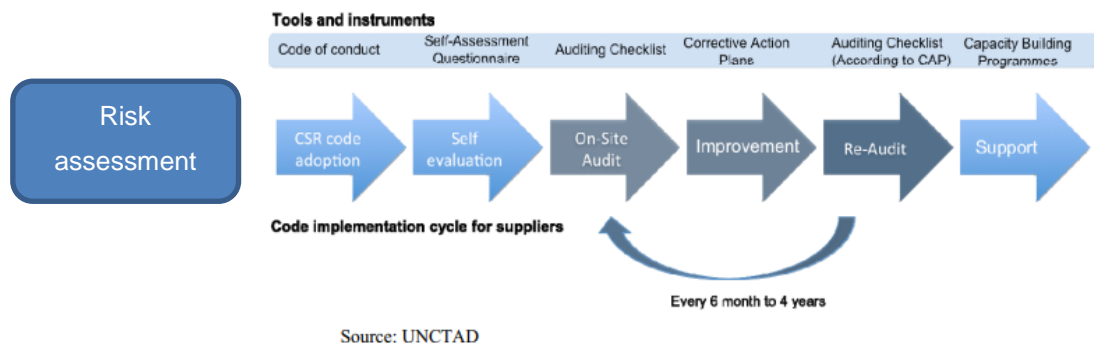

Figure 29. Adapted overview of typical code implementation process.

This research also got a good bunch of supporting activities and documents to study more deeply and apply in future supply chain development.

Some supplier, just disclose its practices without a liaison among activities, whether timeline (B after A) or condition (If A then B), what avoid a full understanding of its supply chain management processes. But those blanks can be guessed with enough

stakeholder expertise or with access to primary data, e.g. an interview to professionals involved in supply chain management.

The lack of common language can also make tough to evaluate how to categorize or group some practices, for example. Cargotec´s. Supplier Assessment might include audits. Once again, standardization, better reporting practices and transparency will avoid all these concerns.

Table 18. Sustainable supply chain management practices summary.

Ecosystem		Cargotec	Metso	Vaisala	Valmet	Wärtsilä
Activity	Tool / Documemt	-	-	-	-	-
<u>Core activities</u>						
Supplier classification				Potential, approved, preferred, and strategic		
Risk assessment / mapping		By location	By product, volume and location		By country of origin and by purchasing category.	Risk assessment (2018 new suppliers)
CSR code adoption	Code of Conduct				Supply Chain Policy adoption	
Self evaluation	Self-Assessment (SAQ)	Self assessment tool		Supplier Sustainability Self-assessment Questionnaire (SAQ)	Supplier self-assessment	Pre-assessment
Supplier assessment		Sustainability Assessment (20%)				
On Site Audit	Auditing checlist		Third-party or internal (Procurement&Quality)		Together with a third-party auditor	Audits
Improvement	Corrective Action Plan (CAP)		Corrective action plan	Corrective Action Plan (CAP)	Corrective Action Plan (CAP)	
Re-audits	Auditing checlist (accordig to CAP)		If necessary			Performance reviews
Support	Capacity Building Programmes	Supplier support and integration		Early Supplier Involvement (ESI)	Suppler Relationship Management (SRM)	
Ratings						Approved, approved with remarks, or banned
<u>Support activities</u>						
Open report channel					Via phone or internet 24/7	
Sustainability integration (procurement)			Process integration into Procurement		Sustainability integration (procurement)	
Training			Sustainability training		Sustainability training programs and e-learning courses, best practices sharing.	
Supplier Day event				Supplier Day event		
Supplier Awards				Supplier Awards		
<u>Support documents</u>						
Code of Conduct			Code of Conduct	Code of Conduct	Code of Conduct	
Supplier Code of Conduct		Supplier Code of Conduct			Supply Chain Policy	
Supplier Requirements		Supplier Requirement	Supplier Criteria	Supplier Requirements		
Supplier Quality Manual		Supplier Quality Manual	Supplier + Sustainability Handbooks			Supplier Handbook

4.7.3 Sustainability indicators

 I hoped to find common points between this research and previous literature that lead me to respond the third research question, *What indicators do Finnish leaders in industrial sector use to assess sustainability in their supply chains*?. But surprisingly the indicators that companies have disclosed in their reports are far from those that Schöggl et al. summarized in their researches. Only the Schöggl´s "*Compliance with social regulations*" is close to Vaisala´s *G4-HR4, G4-HR5, G4-HR6 - Operations and suppliers at significant risk for association, child or compulsory labour*. Reasons behind these differences might be that I applied partially the model proposed by Schöggl and interviews are needed to get a more complete and transparent information.

None of the GRI numeric indicators collected in report analysis leads to a performance comparison among companies. Fortunately two of the categorized as Other numeric indicator", Sustainability *Supplier audits* and *Supplier rated on ESG* let compare how well some supplier performed. About these Other numeric indicators, it is interesting to check that even for same topics, and as they are not regulated by standards, companies can play with measurement units and offer the information most favourable to its interest. For example, Supplier rated on ESG can be reported by *suppliers* or by *% based on purchasing spending.*

Table 19. Indicators comparison.

			Cargotec	Metso	Vaisala	Valmet	Wärtsilä
Activity			**G4**	**GRI**	**G4**	**GRI**	**GRI**
<u>GRI numeric indicator – RQ3</u>	**Description**	**Units**					
G4-EN32, G4-LA14 and G4-HR10	New suppliers that were screened using environmental social criteria	%	79 %				
G4-EN32, G4-HR10 and G4-SO9	New suppliers that were screened using environmental social criteria (ESG)	%				57 %	
GRI 414-1 = G4-LA14, G4-HR10, G4-SO9	New suppliers that were screened using social criteria (but say environmental management)	%				73% (automatic)+ 27% manually	
G4-EC9 / GRI 204-1	Proportion of spending on local suppliers	%		% spending sourced from the same country as the plan location			
<u>Other GRI disclosures</u>	-	-					
G4-HR4, G4-HR5, G4-HR6	Operations and suppliers at significant risk for association, child or compulsory labor				There were no confirmed complaints or sanctions during 2017		
GRI 409-1 = G4-HR6	Operations and suppliers at significant risk for compulsory labor					Child labour and forced labour are part of the indicators assessed	
<u>Other numeric indicators – RQ3</u>	-	-					
Sustainability supplier audits	Sustainability supplier audits (by third-party & internal) (in X countries)	Audits		58 %		56 %	
Audit findings category	Most findings were related to					58% human and labour right	
Corrective actions	Corrective action completed and verified						
Supplier rated on ESG	Suppliers rated on ESG metrics	% (based on spend)			87 %	67 %	
Supplier Code of Conduct	Suppliers have signed the Supplier Code of Conduct	% (based on spend)			89 %		
Purchases by ten largest countries	Top ten countries by spending	MEUR				MEUR	
Supplier ratings	Information about supplier ratings	Description in Metso analysis					Descriptio in Metso analysis
Suppliers banned	Suppliers banned						

4.7.4 Maturity levels of compared companies

Different reporting performance, operational practices and indicators abovementioned lead to wonder about maturity levels of analysed companies (see chapter 2.4 Sustainable supply chain development).

Table 20. Maturity level according to UNGC model.

Basic	Improving	Established	Mature	Leading
	Wärtsilä	Cargotec	Metso	Valmet
			Vaisala	

According to this research results that were based on reported topics, I venture to say that just Valmet is a leading company that is operationalizing sustainability in its supply chain by establishing a shared commitment with suppliers. Metso has reached maturity in its process, and Vaisala is evolving from established to mature operations. Wärtsila has a basic or improving maturity level (but maybe not much information disclosed to evaluate properly) and Cargotec has a good established practices and better projection.

5 CONCLUSIONS AND NEXT STEPS

The purpose of this thesis was to know how to develop sustainability in supply chains through the study of different sustainable supply chain practices disclosed in Corporate Social Responsibility reports.

Actually, the objectives were to gather general knowledge of sustainability in supply chains via literature review, and specifically about the best practices for reporting, management and assessment of sustainability in the supply chain via sustainability reports review.

My findings were that sustainability development is a continuous process that need the commitment from top management level. This commitment is needed to push development strategies and actions plans based on the materiality of megatrends applied to the corporation business environment. I also learnt that Sustainable or Responsible Supply Chain development and maturity can be low unless this topic is evaluated as relevant to stakeholder and business development. And I found that those companies with better maturity level in Sustainable Supply Chain are those that consider its supplier as extended part of the company and engage them, acting as leader and mentors in sustainability, with transparent reporting practices. An interesting finding is to observe that innovation in sustainability don´t go always hand-in-hand with company size, and medium companies can have creative proposals while big corporations can apply just well-known recipes in supply chain management.

About operational practices, the main findings show that risk assessment and the Code of Conduct are the very first stage of any Sustainable Supply Chain. Clear supplier requirements, their communication to suppliers and their acceptance should always be done with every new supplier. Risk assessment based on different parameters and datasets should lead companies to extra activities such as audits. Self-assessment tools should help supplier to know its weaknesses and become receptive to any improvement proposal. Corrective actions plan and capacity building programmes, in other words collaboration with suppliers, are the key to succeed. Internally, companies struggle to integrate sustainability ecosystem (target, actions and KPIs) in "old procurement" activities, with training and knowledge sharing.

This research has been also used to compile relevant background documents, such as Supplier Code of Conduct or Supplier Handbooks, supporting tools, e.g. Open report channel) or rewarding activities to apply, e.g. Supplier Day event and Awards.

Sustainable supply chain indicators have not been fully developed yet in any of the selected companies. I considered that the analysis of GRI reports of credible companies in sustainability could shed light on the matter, but the number of GRI topics referred to supply chain is limited and most of them are out of the General disclosures. Therefore, companies can report about "core" activities, one of them Supply chain description, and just leave in background the environmental and social aspect applied to supply chains. For example, none of the companies in this research disclosed its negative social impacts in the supply chain, an only one reported the absence of environmental impacts.

In the five reports analysed, companies report about many different indicators probably the most favourable in their public relations efforts, not in sustainability, lacking a standardized sustainability context and indicators, or even units (% spending, number of suppliers).

Without the reporting principle known as *sustainability context in GRI (that involves discussing the performance of the organisation in the context of the limits and demands placed on environmental or social resources at the sector, local, regional, or global level*) (The Guardian 2018), there cannot be bona fide sustainability reporting at all. There simply cannot be any true, authentic, or empirical disclosure of sustainability performance unless such context is included, and although the selection of reports was limited by sector and geographical location, probably this context was wider than needed to find some specific and comparable results.

Other point to highlight is the report structure. Those companies that decided to place disclosures following GRI structure helped to find and compare information to GRI literates. Those companies that used a more traditional reporting structure based in process description required extra work to get comparable information with peers, and moreover they needed supporting table to fulfil with GRI standards. Therefore same information was in different locations, overlengthening corporate annual review and even forcing to create new GRI supplements.

For all above reasons, although I must recognize that GRI guidelines are a basic framework, I join to the criticism to GRI guidelines.

The number of indicators and its typology has been completely different to expected by other researchers´ studies as Schöggl. My guess is that different research sources, questions and methods conducted to different results.

As a further research for this part, I will continue exploring the possibility to get one or two interviews in the analysed companies that let me know about real know-how and experience of a supplier manager tackling sustainable supply chain monitoring, assessment and development. As I said the information contained in the sustainability report need a context (at the sector, local, regional, or global level) and as public information, highlights success and strong points, and reduce weaknesses, bad news and development needs.

Other research suggestions would be to check information contained in sustainability indices and how information hubs work (SustanHUB, SEDEX) to share information among partners.

Some poor results reported make me think that companies will tackle sustainability in supply chains in the next few years once sustainability is fully implemented in their core activities, and sustainability leader push their suppliers to follow sustainable practices.

The overall objective of the data analysis "**Learning from sustainability leaders about how to develop, monitor and report sustainability in supply chains**" has been fulfilled, but I will continue researching some points with clear development potential.

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