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Managing Sustainability Integration in Innovation Projects

A study of strategy implementation for product development companies

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International Project Management

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Abstract

This research investigates how product development companies set and define their strategies for sustainable development. The purpose of the study is to provide an understanding of if and how product development companies relate their sustainability efforts to a wider sustainability or cooperative strategy. This in turn aims to provide insights in barriers and opportunities for facilitating the successful achievement of sustainable innovation projects. The theory covers the areas of sustainable strategic management, change management, risk management and sustainable project management. The theory further provides insights in current challenges related to sustainability integration in organisations. The chosen methodology is based on a qualitative and deductive approach. The study includes semi-structured interviews with managers of development projects, sustainability consultants and a researcher. The findings of the study show that most of the participating companies do not have a defined and integrated strategy for sustainability. However, all companies have ongoing projects and processes based on sustainable values. Identified barriers includes an ambiguity within the definition of sustainability and sustainable strategies, difficulties in collaboration with suppliers, lack of customer demands and lack of resources for implementation. There are a wide range of challenges related to the implementation of sustainable innovation projects and how to connect strategies for sustainability to business goals and models. Further focused research is necessary in order to get a deeper understanding of how to facilitate the transition to more sustainable ways of developing products.

Key words: Sustainability strategies, Sustainable innovation projects, Sustainability integration

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Preface

This thesis is done as the final part of the study program M.Sc. International Project Management. The program is set up as a collaboration between the two universities Chalmers University of Technology in Gothenburg, Sweden and Northumbria University in Newcastle Upon Tyne, United Kingdom. The research is conducted by author, Elif Özpekmezci, who has a background of studying Mechanical Engineering – Industrial Design and Innovation. The research was primarily conducted in the city of Gothenburg, but also included data collection from other cities and countries. The thesis covers the topic of strategic sustainability management at product development companies and aims to contribute to the area of strategic sustainability management by identifying potential barriers and opportunities for the integration of sustainability strategies and frameworks at product development companies. The study was motivated by an observed ambiguity of the author, in how to implement and integrate sustainability strategies at organisations. The concept is widely discussed and promoted in both academia and businesses but the implementation in practice is not always clear. The research topic chosen correlate with the Programme Handbook presented by Northumbria University (2015) by addressing issues of project sustainability, including conflicting approaches and implications for project management. Furthermore, the process and completion of the dissertation involve the presentation of research skills and methods of ethical enquiry. The research further aligns with the APM BoK (2012) section of sustainability where it is stated that "The term sustainable development was defined by the Brundtland Commission in the 1980s and is a simple concept that can often be difficult to put into practice. [...] The need for sustainable development stems from the recognition that using natural and human resources indiscriminately to achieve growth and 'single' bottom line financial profit, without regard to the environmental or social cost, is no longer tenable." The study takes a qualitative approach in order to capture thicker descriptions and views of employees and includes semi-structured interviews with six different companies. Furthermore, the study also includes interviews with two consultants and one researcher in order to provide a wider view of the challenges involved in formulation and integration of sustainability strategies. The theoretical fields covered are challenges of sustainability integration in organisations, strategy formation, risk management and sustainable project management. The study takes a deductive approach within a qualitative study and theory is therefore used as a base of knowledge that are to be investigated through the case studies and collected data.

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1. Introduction

This research aims to investigate how product development companies defines and set strategies to incorporate sustainability values in product development projects. The study further aims to contribute to the area of strategic sustainability management by identifying potential barriers and opportunities for the integration of sustainability strategies and frameworks at product development companies. The literature review includes theories in the subjects of sustainable strategic management, sustainable change management, sustainable risk management, sustainable project management and challenges involved in the setting and implementation of sustainability strategies.

The study takes a qualitative approach in order to capture thick descriptions and views of employees and include nine semi-structured interviews. Six of these are with product development companies from different industries. The study also includes interviews with two sustainability consultants and one researcher in order to provide a wider view of the challenges involved in the formulation and integration of sustainability strategies.

1.1. Background and rationale

During the course of time and under the influence of sociological research, the economic view of how innovation adds value has become more and more challenged and differentiated. There is a shift in focus from this one-sided view, to one capturing a wider perspective of overall improvement in the performance of organisations. Within this view, an innovation would not only be to create shorter waiting lists at hospitals but at the same time making the new solution more sustainable by decreasing work pressure on staff (Jorna, 2006).
Sustainable innovation goes beyond eco-innovation and eco-design by encompassing social objectives and being clearly linked to the holistic process of achieving both short- and long-term sustainability objectives (Boons et al., 2012). The term can be defined as "…a process where sustainability considerations (environmental, social, and financial) are integrated into company systems from idea generation through research and development (R&D) and commercialization. This applies to products, services and technologies, as well as to new business and organizational models" as quoted by Boons et al., (2012, p. 3) from Charter and Clark (2007).

Many scientists agree that our current society is on a long-term unsustainable course and product development and manufacturing industries have an important role in changing the direction of the society towards sustainability (Gaziulusoy, et al., 2012). Organisations that recognize this, and have a strategic approach to systematically diminishing their contribution to an unsustainable course will increase their chances to avoid sudden cost increase, their chance of identifying new market

opportunities in time, improve productivity and as an extra bonus improve their brand value (Hallstedt, et al., 2010).

Drexhage & Murphy (2010) states that even though most organisations today recognise and accept sustainable development as a guiding principle, the concept has still proven to be difficult to implement. Further, according to Labuschagne & Brent (2005), in order for sustainability to be truly integrated and manifest within a company, change is required on strategic, process and operational levels of organisations which currently is not the case.
Both Nidumolu et al. (2009) and Silvius & Tharp (2013) bring up the issue of many executives treating sustainability concerns as only a matter of corporate social responsibility without integrating it into business objectives. Nidumolu et al. (2009) state that this is due to that many still believe that sustainable development will add to costs and not deliver immediate financial benefits but also that there are difficulties in finding suppliers that can provide green inputs or show transparency and that the demand for eco-friendly products from the customer side is not high enough.
Nidumolu et al. (2009) continue to argue that treating sustainability as a goal and business objective rather than a corporate responsibility will give early movers a competitive advantage that rivals will be hard-pressed to match. They further state that the key to success in crises is seen as innovation, and just as some internet companies survived the bust in 2000 so will sustainable corporations emerge from recessions and upset the status quos today.

The size of green markets is increasing and is likely to get bigger in the future. There is a rapid change in the markets in terms of increasing societal and environmental expectations from several stakeholders and marketers are facing challenges in how to attract and retain customers by addressing sustainability issues (Dangelico & Pujari, 2010). Boons et al., (2012) points out that there is a substantial amount of knowledge about the driving factors behind sustainable innovation but less knowledge in how it can be realised in win-win business solutions and Dangelico & Pujari (2010) state that there still is little knowledge in how companies integrate both societal and environmental sustainability into their practices, and that it therefore is an important area for researchers to investigate.

1.2. Research aim

According to Drexhage & Murphy (2010) most organisations today have recognised and accepted sustainable development as a guiding principle but the concept has still proven to be difficult to implement (Dangelico & Pujari, 2010; Labuschagne & Brent, 2005 ; Silvius & Tharp, 2013). Aras (2015) describes the concept of sustainability as somewhat problematic and subject to many different definitions even though it is one of the most used words related to corporate activity. Furthermore, it is stated by Dangelico & Pujari (2010) that the size of green markets are increasing and is likely to get bigger in the future. Therefore, the aim with this research is to identify potential barriers and opportunities for facilitating the integration of sustainability goals in companies with product development projects.

The main research question follows:

How can organisations define, form and implement sustainability strategies throughout the organisation in order to achieve successful sustainable innovation projects?

The research question is to be answered through the following sub-questions;

1. How do product development companies define and set sustainability strategies throughout their organisation?
2. In which way are these sustainability strategies implemented from the strategic visions level to the operational level of projects for innovation?
3. What are the main barriers and opportunities for the implementation of sustainability strategies?

1.3. Scope and Limitations

The scope of this research is to analyse if and how product development companies define and set sustainable innovation strategies and how these strategies are implemented through the organisation and in innovation projects. The scope further covers the identification of barriers and opportunities for integration. The chosen research strategy and approach is qualitative in order to capture thicker descriptions through and views of employees. The study includes semi-structured interviews with six different managers working with product development at different industries but also includes two interviews with sustainability consultants from different companies as well as a researcher within the subject in order to provide a wider understanding of challenges.

The analysis of sustainability integration in this report includes the definition of sustainable development as a balance between the three pillars of economic, environmental, and social sustainability, that was defined at the World Summit on Sustainable Development in Johannesburg 2002 (UNESCO, 2010). The theoretical framework in this report is structured to illustrate the process of strategy formation and execution, from the setting of strategic definitions and visions to the delivering of projects. It also sets the base and context for the performed research. The research will not cover extensive general strategic management or project management aspects but study their intersection point in relation to the sustainability integration of firms. Furthermore, some theoretical fields in relation to the subject will be mentioned but not covered as extensively, such as stakeholder management and models and concepts for integration.

As mentioned, the performed interviews bring up the perspectives of a researcher, consultants and managers in innovation projects. This adds a wider view of challenges, however, the scope is still limited to only illuminate the views of these managers at the studied companies and does not bring in the views from people with other roles in the organisation or in innovation projects. Furthermore, the companies are all working with product development and innovation but are in different sizes and in different industries in order to capture a holistic view of the challenges,

however this might also lead to difficulties when comparing processes as well as affect the qualitative orientation of the study that most often entails specific or similar cases. The study is also limited to investigating only six companies, two consultancy firms and one researcher. This gives a limited result in regards to the different views of each group and is therefore a limitation of the study's ability to be generalised into other similar situations and organisations. The limitations of the methodology and methods used to perform the study will be further presented in the Research Methodology chapter as well as discussed in the chapter of Discussion.

2.Theoretical framework

This chapter presents previous research done in the subject area. The first section describes the current sustainability related challenges of organisations as well as benefits and motives for developing sustainability strategies. The section of sustainable strategic management covers theory regarding how strategies can be defined and formed as well as strategic aspects of sustainability integration. The sustainable project management section is focused on challenges related to sustainable innovation projects. The chapter is concluded with a summary of integration challenges.

2.1. The Sustainability Challenge

The term sustainable development was popularised in the Our Common Future report, also known as the Brundtland report (Drexhage & Murphy, 2010). The report was published by the World Commission on Environment and Development in 1987 and included the following definition of the term: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). The term got political salience when it was accepted by the United Nations General Assembly and the foundations for global institutionalisation of the term was set through 27 guiding sustainable development principles that were defined at the United Nations Conference on Environment and Development in Rio de Janeiro, Brazil, 1992 (Drexhage & Murphy, 2010).

Over the past decades there has been an acceleration in the demand of natural resources which has led to a point where it is now considered to be a serious threat for the future functioning of economies and societies. The continuing use of today's predominant technologies in industrialised countries will lead to overconsumption exceeding every ecologically, economically and socially responsible level (Severengiz, et al., 2011). This means that the development of products and manufacturing, as well as incentives at a societal level is a critical intervention point in the transformation towards a sustainable society (Hallstedt, et al., 2013).

Sustainable development constitutes of the three pillars (also called the triple bottom line) of economic development, social equity and environmental protection. The three pillars were defined at the World Summit on Sustainable Development in Johannesburg in 2002 (UNESCO, 2010). The economic pillar represents sensitivity to the limits and potentials of economic growth as well as an understanding for its impact on society and the environment. Social sustainability stands for an understanding of social institutions and their role in change and development, the democratic and participatory systems and the resolution of differences. The environmental pillar represents an awareness of how human activity and decisions affect resources and the physical environment, with a commitment to factoring environmental concerns into social and economic development (UNESCO, 2010). For organisations these pillars include the issues of profit, reduce of costs and investment in research and development. The social aspect includes availability of jobs and equal opportunities for all and the environmental cover issues like use of natural resources, prevention of pollution and the maintaining of biodiversity. The

interactions of the pillars also include business ethics and fair trade, energy efficiency and development of green technologies (Fedkin, 2014).

During the the last decades, most businesses, governments and the civil society in general have accepted sustainable development as a guiding principle and made progress on metrics for it. However, the concept still remains elusive and the implementation has proven to be difficult (Drexhage & Murphy, 2010). Even though sustainability is one of the most used words related to corporate activity, the concept is somewhat problematic and subject to many varying definitions. It could be argued that the term is being overused and thereby loses its effective meaning. The term is widespread among organisations but its exact definition is not always defined (Aras, 2015).

Corporations often manages sustainable development related issues and strategies as an activity separated from core business processes (Silvius & Tharp, 2013). According to Silvius & Tharp (2013) many organisations do not know how to integrate these aspects into core business operations and they also lack clear strategies for sustainable development to do so. They further describe how sustainable development often are managed as a "side-lined" activity, separate from core strategies and processes.

Driven by the stock market, firms have tended to overemphasize short-term goals by focusing more on quarterly results than on the foundation of long-term success that is the spirit of sustainability (Dyllick & Hockerts, 2002). Figge et al. (2002) point out that there is rather little literature on the subject of the relation between environmental and social factors and the long-term economical success of firms. Maintaining financial capital basis is commonly accepted to be a precondition for successful and responsible management, however, in order to achieve sustainable long-term success, it is necessary to also manage natural and social capital. A company will cease to exist when all economic capital is lost, however it will become unsustainable long before (Dyllick & Hockerts, 2002).

Without a global governing body in society today, that can take a definite decision to move society towards sustainability, it is up to different groups of people, such as, organisations, national governments, local municipalities, and businesses to do so. Following these arguments, changes in the environment will occur one way or another, and it is up to organisations and businesses to choose whether to be part of the problem or solution (Robèrt, et al., 2012).

Nidumolu et al. (2009) argue that sustainability always will be an integral part of development and that companies improving their sustainability processes therefore will have great competitive advantage. Setting a sustainable strategy now will save companies time in the future. Some of the main benefits that can be achieved trough the integration of environmental sustainability in product development and business operations are development of new markets, increased sales, return on investment, efficiency in resource usage, improved corporate image, product differentiation and enhanced competitive advantage (Dangelico & Pujari, 2010).

The integration of environmental sustainability principles into business strategies are becoming more of a strategic opportunity for companies and as a result the number of organisations adapting the concept is increasing. Even so, the reasons for embracing these values and concepts can be different (Dangelico & Pujari, 2010).

Some of the motivations identified in a study performed by Dangelico & Pujari (2010) were compliance with regulations, competitive advantage, firm reputation and image, ecological responsibility and personal commitment of top management. The compliance with regulations were identified as constraints to green innovation but also as opportunities to avoid future risks of money losses, damage of company image and opportunities for new product ideas and business creations. The study further showed that some companies were primarily motivated by compliance and competitiveness while others had competitiveness and environmental responsibility as main drivers. Dangelico & Pujari (2010) also stresses that having different motivations for sustainability integration is never enough, firms do have to set policies and targets in order to move forward on green product innovation.

2.2. Sustainable Strategic Management

According to Robèrt et al. (2012), the sustainability challenge requires a focused, strategic transition towards a sustainable society. In order for organisations to be able to work towards sustainability it is therefore extremely important to create, implement, and continually improve a strategic plan for sustainability. This plan can then be the basis for real, measurable change. Further, according to Boons et al., (2012) competitiveness in the future will no longer be defined as the struggle to remain competitive in current markets but as the struggle to create new markets through innovation.

Even though sustainable development and green product innovation is becoming more common within different industries, there is still confusion regarding the definition of a green product. One definition comprises the "… strive to protect or enhance the natural environment by conserving energy and/or resources and reducing or eliminating use of toxic agents, pollution and waste" (Ottman, et al., 2006, p. 24). In this definition the strive is enough, recognising the fact that no or very few consumer products have zero impact on the environment. Overcoming and addressing sustainability challenges throughout a product's life cycle, such as choice of materials, use of energy, or the prevention of pollution, requires, apart from an enhanced level of corporate environmental responsibility, a sustained level of implementation of the organisation's environmental policies, in order to move from ideas of green products into actual practice (Dangelico & Pujari, 2010).

2.2.1. Strategy formation

There are many different ideas of how a strategy should be defined and formed. One wide definition that encompass many others follows "strategy is a course of action

for achieving an organisation's purpose" (De Wit & Meyer, 2014, p. 169). The intended strategy of an organisation is what it formulates prior to action, while the realised strategy refers to the strategic behaviour shown in practice. Actions that are not aligned with fulfilling the purpose of the organisation are not considered to be strategic (De Wit & Meyer, 2014). The process of creating an intended strategy is called strategy formulation while strategy formation describes the process of how a realised strategy takes form. These differ when the intended end up not being implemented as first planned. Managers need to see the whole process of strategy formulation and implementation together in order to increase the level of strategically aligned actions to be performed (De Wit & Meyer, 2014).

The paradox of wanting to intentionally design the future while at the same time needing to gradually explore it, depending on different circumstances and uncontrollable events and actions can be described as the paradox of deliberateness and emergence. It is suggested that few strategies are implemented exactly as intended and therefore called deliberate strategies while few also are completely emergent and in the absence of intentions. Most strategies are executed as a mix between the two where managers need to consider the conflicting demands of both planning and adapting. The process of constantly enacting strategic changes to stay in harmony with external conditions is called strategic alignment (De Wit & Meyer, 2014).

One planning tool that are used by organisations to set strategies is forecasting. Forecasting is based on trying to predict the future by analysing current trends and situations and can be a valuable tool when planning reactions to future events. However, when planning for a sustainable society there is a risk in using only forecasting as it can lead to the continuing of current unsustainable trends and thereby the degradation of the socio-ecological system (Robèrt, et al., 2012).

Another way of managing and planning future actions is to plan for the desirable future, instead of the most likely future. One way of doing so is to take on backcasting as a strategic planning technique (Robèrt, et al., 2012). The technique starts with building a shared vision for success in the future. The vision should be defined in a way that allows both flexibility and strategically sound planning. Creating future scenarios is one way to create and communicate visions. This can be with the help of designers, storytellers or computer modellers. Having set the visions, you find what is needed to be done today in order to achieve this vision. Using this technique, tools and techniques that are existent or realistic today only determines the pace of the transition and not its direction. When visions and methods are set, works start with improving the likelihood that planned strategies and actions actually lead to an overall success of the vision. However, since these scenarios are to be based on shared visions, (in order to increase and encourage participation) there will be challenges when larger groups are to agree on detailed descriptions of a successful sustainable outcome (Robèrt, et al., 2012).

Robèrt, et al. (2012) suggests that the two techniques of forecasting and backcasting can successfully be combined together. With the backcasting as a basis, forecasting techniques can help to clarify what is possible and most likely in the nearest future so

that actions taken in order to achieve the visions will be more reliable. This is supported by Gaziulusoy (2012), who states that strategies should be developed with reference to both the expected and desired systemic changes in society. Since sustainability challenges and barriers are contextual and company specific there are no generic strategies that can be successfully applied to all companies (Gaziulusoy, et al., 2012). Strategies needs to be developed in a systematic way with the understanding of the companies' roles and impact in the society, and with products, services and business models aligned to long-term sustainability visions (Gaziulusoy, et al., 2012).

The long-term visionary planning can be broken down to short-term operational planning and strategic medium-term planning (Gaziulusoy, et al., 2012). Figure 2-1 shows a model describing societal visions as a vantage point for organisational innovations and organisational innovations as a vantage point for product and service innovations. The short-term, operational goals in this model covers a maximum of ten years.

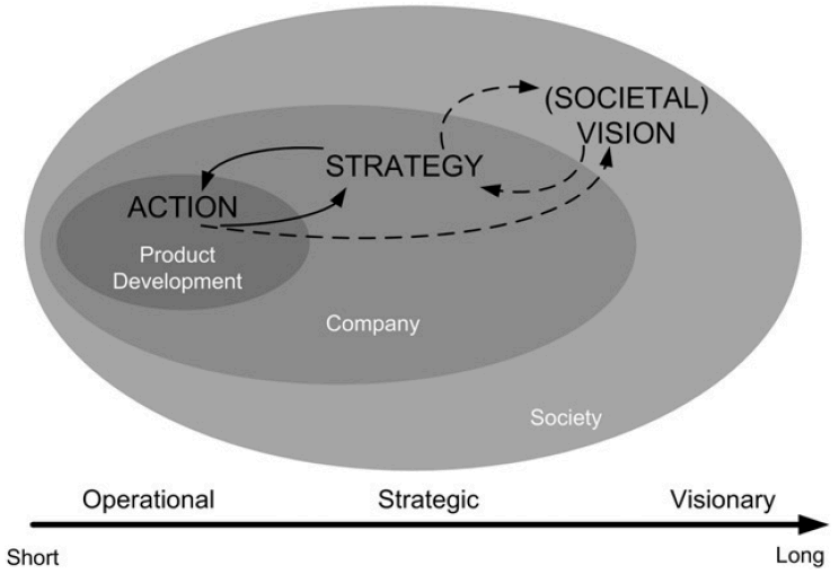

Figure 2-1 A model for the company and product development function (Gaziulusoy et al., 2012).

A business goal can be described as a condition that must be achieved within a set timeframe. Clear goals are essential for the delegation and monitoring of all business activity. The shorter-term goals must be based on the long-term visions by working backwards through strategic goals, as described in backcasting. With goals developed in this manner decision-makers can keep control of the visions and thereby reduce risks of setting goals that are not strategically aligned and therefore might not benefit the organisations in the long-term. Setting responsibility for

different sections of action plans, defining activities, creating schedules, calculating budgets and resources as well as defining indicators for the measurement of progress are all necessary parts of strategic action plans (Robèrt, et al., 2012).

2.2.2. Sustainable Change Management

Gaziulusoy, et al., (2012) argue that sustainability requires both societal and technological transformation. The societal transformation includes institutional, cultural and organisational change. The transition from one socio-technological system to another is defined as system innovation and occurs when the societal system functions differently and requires a fundamental structural change. The transition from horse-and-carriage to automobiles and from piston engine aircrafts to jetliners are examples of historical system innovations. System innovations transforms the wider societal context and therefore not only covers product and process innovations but also changes in markets, regulations, infrastructure, lifestyle and management of firms (Gaziulusoy, et al., 2012).

Companies can be categorised in: rejection, non-responsiveness, compliance, efficiency, strategic proactivity and the sustaining corporation, depending on their characteristic way of responding to sustainability issues and managing their natural and human resources (Dunphy, et al., 2014).

The characteristics of the group of rejection is described to be organisations that have a highly instrumental perspective on employees and the environment, that hold a culture of exploitation and opposition to governments and green activists.
The non-responsive organisations have a primary technical and financial focus, are more ignorant than oppositional and seeks business as usual. The organisations falling under the compliance category focus on reducing risks for failing to meet minimum legal and community standards and follow route of compliance to maintain good citizen image. The efficiency group takes it one step further where environmental management is seen as a source of avoidable cost for the organisation and HR systems as means to higher productivity. The group of strategic proactivity focus on innovation, seeks stakeholder engagement and advocates good citizenship to maximise profits and increase employee attraction. Lastly, the sustaining corporation is described as the one that reinterprets the nature of the corporation to an integral element of the whole society. Of the companies that are responding, a majority falls under compliance and efficiency categories. This means that even though businesses are changing it has not yet reached to the point of a systemic transformation towards sustainability (Gaziulusoy, et al., 2012).

The implementation of new strategies and ways of working in organisations is inevitably linked to change. The change can be of different amount or size but often needs to be managed closely. One of the reasons for many change efforts to fail is the resistance to change within employees (Eriksson-Zetterquist, et al., 2011). This can be identified through factors such as fear of change, complacency of workers, reliance on current skills and a need to maintain current norms. Some of the reasons for resistance have been observed to be self-interest, misunderstanding and lack of

trust, different assessments and low tolerance. Self-interest is linked to believing that something of value for the employees will be lost. The misunderstanding is described as employees not understanding the implications, sometimes due to lack of trust. The different assessment is describing the fact that people assess situations in different ways and therefore employees may see more costs than benefits compared to managers. Low tolerance refers to the fact that some might resist change because of the challenge to adapt when the change is too much or too quick (Eriksson-Zetterquist, et al., 2011).

There are several different ways to manage and respond to resistance. Some of the identified are the broadening of staff interests, using understandable terms, having a new look at resistance and new job definitions. By involving staff in more areas than their own, interest and value recognition outside of their own field can be encouraged. Using understandable terms can help in avoiding misunderstandings, as people express and interpret things differently. Furthermore, viewing resistance as a warning signal rather than something to overcome can make it easier to identify the root causes for the resistance. Finally, managers may need to change their perception of their own role and understand that successful change is dependent on the contributions of others (Eriksson-Zetterquist, et al., 2011).

Strategies for green products and portfolios also requires the ability to communicate value for customers and other market players (Ottman, et al., 2006). In other words, change is required and need to be managed not only internally but also externally, as mentioned by Gaziuluoy, et al. (2012). Ottman, et al. (2006) describe how the change of strategies towards green products and portfolios also require changes in markets. Costumers will ask what these products can provide for them except from being environmental friendly. In practice, products will not likely attract the mainstream consumers unless they also provide benefits such as cost-savings and/or improved performance. In order to take advantage of economic opportunities to steer global commerce towards sustainability, green products must attract consumers outside of the traditional green position. According to Ottman, et al. (2006) the ability to decrease environmental impacts of significant orders requires both good engineering and good economics but also an ability to change consumer preferences. Research further indicates that green products fail not only when marketers focus on the products “greeness” over the broader expectations of consumers but also when other market players, such as regulators and activist are not considered.

2.2.3. Models and Concepts for Integration

The increasing interest and importance of sustainability on the international agenda has brought several tools for sustainability integration. Some of these are Life Cycle Assessment, Ecological Footprint and environmental management systems like ISO 14001 (Robèrt, et al., 2012). A part from the benefits it brings to be able to choose between different ways of integrating sustainability aspects in business, the great number of tools can also bring a conceptual challenge. Most organisations have limited time and money to explore tools, train people to use them and implement them in the complex context of their organisation. It is also common that an organisation has started to work with sustainability related issues before defining or planning a sustainability strategy (Robèrt, et al., 2012). In order to align this

processes with long-term strategies and significantly improve an organisations movement towards sustainability it is necessary to investigate how tools and processes can be chosen or modified to optimise the time, money and training spent on them (Robèrt, et al., 2012).

One way of managing corporate sustainability related work is to set policies for Corporate Social Responsibility (CSR). CSR refers to the responsibility companies take to their social, environmental and economical impact on society. The European Commission points out the importance of CSR for the EU economy, innovation, competitiveness and sustainability as well as the benefits it brings to cost savings, customer relationships, risk management and human resource management (European Comission, 2016). The guidelines provided by European Commission are based on international agreements and standards such as United Nations Global Compact, United Nations Guiding Principles On Business and Human Rights, ISO 26000, and OECD Guidelines for Multinational Enterprises (European Comission, 2016). According to Hallstedt et al., (2013) CSR focus mainly on sustaining a corporation and sustaining a corporation is described to be much different from sustaining a society. Therefore, the two can not be put on the same operational level.

The concept of The Natural Step Framework is developed to clarify the needs for achieving socially and environmentally sustainable organisations and societies. The difference from this concept, CSR, and the triple bottom line is that it focuses on the need for change in systems and not only within organisations (Hallstedt, et al., 2013). The framework is based on a five level planning process including the systems level, the success level, the strategic level, the actions level and the tools level. The systems level entails the understanding of how the society and the organisations within that society affects the biosphere, the global socio-ecological system (Robèrt, et al., 2012). The concept is based on backcasting.

Popular management frameworks like the balanced scorecard and value management are ways to identify and measure the drivers of performance and to clarify causal relationships and linkages within organisations and the action that managers can implement in order to improve both customer and corporate profitability (Epstein & Roy, 2003). The balanced score card (BSC) is a strategic tool first developed in the early 1900s. The tool was developed to capture and measure soft factors such as intellectual capital and excellent customer orientation and is based on the assumption that efficient use of only investment capital is not the only determinant for competitive advantage (Figge, et al., 2002). This report will not cover or describe the method in detail but a more thorough description on the integration of sustainability goals in a balanced score card are described by Figge, et al. (2002).

Some of the critics against viewing sustainability from the three pillars perspective suggest that the balancing of these pillars as a management goal and in their equal achievement is impossible. Therefore, they are also critical of the ability to successfully and equally integrate economic, environmental and social objectives through values and strategies in a balanced score card. This is further described by Milne & Gray (2013), but will not be covered in this report.

Environmental management systems

Environmental management systems (EMS) are designed to help organisations implement and run the environmental parts of its sustainability agenda. ISO 14001 is the most commonly used environmental management system and is developed with motivation from regulations and governments but was also designed with the business community (Robèrt, et al., 2012).

International Organization for Standardization (ISO) is a non-governmental, independent organisation with 161 member countries. The standards provided are quality marks and specifications for products, services and systems in order to ensure quality and safety (ISO, 2016). The main standards for sustainable development are the ones for environmental management ISO 14001 and the guidelines for social responsibility ISO 26000.

The EU has developed its own EMS, the Eco-management and Audit Scheme (EMAS). The primary difference is that EMAS requires organisations to make their results public. Other than that the standards are quite similar and have the same kind of requirements for adoption (Robèrt, et al., 2012). To be certified, it is required that an organisation complies with all applicable environmental laws, makes its objectives clear in policies and guiding documents, adapts a process of continuous improvement to revise objectives and aligns procurements with the objectives of the organisation (Robèrt, et al., 2012). ISO 14001:2015 contains requirements for organisations to follow to enhance their environmental performance by supporting its environmental management system. These systems include, enhancement of environmental performance, fulfilment of compliance obligations and achievement of environmental objectives. The standard is developed to be applicable to any organisation independent of size, type or nature (ISO, 2016).

The ISO 26000:2010 standard has the purpose of assisting organisations in their sustainable development by providing guidelines to manage the social responsibility. The standard can not be certified against since it does not contain specific requirements. The tool is meant to be used as complement to other initiatives for social responsibility (ISO, 2016).

Robèrt, et al. (2012) points out that the ISO 14001 standard does not provide guidance for full socio-ecological sustainability and only highlights what is considered by the organisation itself to be the important aspects and impacts. The standard further tends to exclude the social dimension of sustainability which then has to be addressed in a separate agenda. Therefore, Robert et al. (2012) argue that these type of management systems does not influence businesses to a large degree but mainly lead to incremental improvements to current problems without having an overall goal in mind. Furthermore, Figge, et al. (2002) argue that management systems are rarely integrated into the general management of firms, and thereby not linked to the economic success of them.

Reporting initiatives

The most widely used frameworks for sustainability reporting, is the GRI standards. The Global Reporting Initiative (GRI) is an independent organisation that clarifies the impact of businesses on critical sustainability issues to governments, businesses and other organisations. The critical issues include climate change, human rights, corruption and many more (GRI, 2016).

GRI (2016) have defined several benefits for an organisation that use their standards to report in their sustainability performance. Some of these are, increased understanding of risks and opportunities, emphasizing links between financial and non-financial performance and influencing long term management strategy, as well enabling external stakeholders to understand the organisations true value in tangible and intangible assets. In regards to what is presented as the benefits there are critics of the popular reporting system. Milne & Gray (2013) argue that there is a clear difference between what companies report and what they actually perform. They argue that the concept of sustainability as it is presented in the reports often can leave out important issues such as footprints and social justice.

Life Cycle Assessment

When developing green products, the reduction of environmental impact is crucial. However, the scientific assessments and measurements of their impacts are often difficult and complex (Dangelico & Pujari, 2010). Tools like carbon management or life-cycle assessment can be particularly useful to capture environment related in- and outputs of entire value-chains from raw-materials supply to product use and returns (Labuschagne & Brent, 2005).

Life Cycle Assessment (LCA) is an approach to study and identify the environmental impacts throughout a product's life cycle with a cradle to grave perspective. This includes, raw material acquisition, production, use and disposal and is often analysed through general categories such as resource use, human health and ecological consequences (Klöpffer & Grahl, 2014).

Goedkoop, et al. (2015) describes the LCA as a bottom-up approach as it starts at the product level. The method can help to pinpoint important suppliers in relation to e.g. material selection and identify the impacts of each stage of the products life. However, Goedkoop, et al. (2015) also identify the struggle to link hotspots and improvement opportunities to the Key Performance Indicators (KPI) of a company, since they are most often formulated in a different language. In order to overcome this, it is suggested to add the top-down route to make changes meaningful and specific for the company and management.

Today, the responsibilities of setting the direction of product development, assuring that right methods and tools are used, allocation of resources and the assurance of clear communication throughout an organisation are often all on senior management (Hallstedt, et al., 2013). In order for management to truly support sustainable development it is important to do the following (Hallstedt, et al., 2013):

- Define a common view on sustainability
- Coordinate and integrate tools and methods for sustainable product development in the overall decision-making process
- Combine widely used methods (like LCA and CSR)
- Emphasize the importance of effective communication

In order to be able to effectively incorporate sustainable ways of working it is essential to have a common view on what sustainability means for the company, to ensure that the whole concept of both social and ecological aspects are integrated and used to guide innovation processes rather than single aspects of sustainability. Another way of avoiding the single aspect view is to combine different methods and guidelines for integration rather than just focus on e.g. eco-design that mainly strives to improve environmental impacts of an organisation (Hallstedt, et al., 2013).

2.2.4. Sustainable Risk Management

The sustainability risks are counted among the new mega risks of the century. These risks are of great significance for businesses. Risk assessments are widely used among companies and with the help of scenario methods, a risk approach can be adopted to evaluate sustainability related issues. With the awareness of sustainability risks and their implications companies will have incentives to mitigate them, through the identification of new technological and organisational innovation opportunities (Gaziulusoy, et al., 2012).

Strategic decisions in principle deals with long-term goals and objectives that are set to secure the future success of a firm. However, the achievement of short-term goals and objectives are crucial in order to keep the business going. This raises the issue of finding the ultimate balance between the long-term and short-term objectives of a firm. Executives may hesitate to invest in sustainability driven innovation projects due to their primarily long-term orientation (Brook & Pagnanelli, 2014). The will and consent of executives to invest in more radical sustainability projects are often related to the risk propensity of the firm (Brook & Pagnanelli, 2014). The risk tendencies are thereby reflected in the choice of innovation strategies.

Brook and Pagnelli (2014) presents four different innovation archetypes that originally where identified by Miles et al. (1978). The archetypes, Prospector, Analyser, Defender and Reactor describe the strategic innovation direction of an organisation, and its relation and reaction to the market. The Prospectors are described as the risk-takers, the organisations focusing on finding and exploiting new markets and product opportunities. These type of organisations prioritise their brand and reputation of being innovators just as high, if not higher than their profitability.

The Defenders are organisations focusing on maintaining stability. They usually focus on a narrow segment of the market and differentiate themselves by for example selling at competitive prices or developing products of higher quality. They further ignore market trends outside of their segment and usually perform limited product development. Instead they focus on engineering problems such as developing the efficiency of goods and services distribution. The Analysers are positioned between the two extremes Prospectors and Defenders. The Analysers attempt to minimise risk while maximising opportunities for profit. This strategic approach brings the challenge of constantly adapting to the changing markets while achieving a balance between investing in both radical and incremental innovation.

When selecting and evaluating innovation projects, with the aim to achieve a balance of the innovation portfolios in regards to the incorporation of ecological, social and economic dimensions, there are some key issues to address. In the decision-making process it is important to (Brook & Pagnanelli, 2014):

- Understand the innovation archetypes of the firm that reflect the competitive approach to the marketplace as well as the risk propensity

- Develop new business models that addresses the three sustainability issues by translating global trends into innovation themes that goes beyond new technologies and manufacturing

- Constantly aim for balancing innovation investments between short- , medium- , and long-term business objectives, by splitting up financial resources between the three categories that reflect levels of radical and incremental innovation through breakthrough, platform and derivative projects. The balance should be connected to the strategy archetype of the firm.

2.3. Sustainable Project Management

“Sustainability has become a component of business success, and project management is one of the ways to get there” (Project Management Institute, 2011, p. 1).

In order for sustainability to be integrated within an organisation it is important for change to occur on three levels, the strategic, process and operational level. However, this is currently not the case. According to Labuschagne & Brent (2005), the sustainability principles are usually better integrated at a strategic and operational level than at the process level by companies. At a strategic level, organisations have started to define what sustainable development means for them and many are incorporating the principles in their vision and mission statements. Furthermore, organisations implementing environmental management systems and sustainable reporting are aiming for integration at the operational level. However, the second level of change, the process level, that is needed for the overall integration, largely ignores environmental and social sustainability goals. Project management methodologies, which are a core business process to many companies are also included in this group. Traditional business management systems are solely aiming

for financial performance and thereby exclude environmental and social aspects. A study from 2002, that conducted interviews with 1000 participating companies showed that 72 % of the respondents did not include risk and opportunities management of sustainability in their project or investment processes (Labuschagne & Brent, 2005).

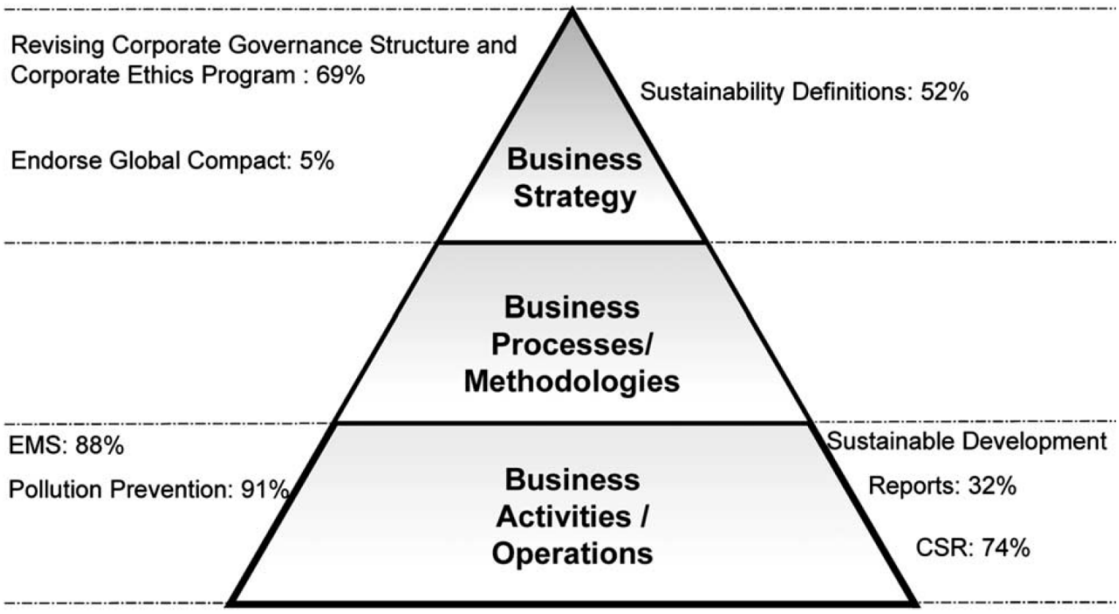

Figure 2-2 Sustainability integration at different levels of an organisation (Labuschagne & Brent, 2005).

The direct economical benefits brought by implementing sustainability practices are most effectively realised by integrating sustainability into organisational goals from the top layers of management, through portfolio and program management and down to the management of individual projects. This means that in order to make sustainability a part of the way a company operates it is necessary to integrate it into the way that projects are managed (Project Management Institute, 2011).

Sanchez & Schneider (2014) note that research connecting project management and strategy has been a popular subject in the last years. It is observed that the project management community has strengthened its focus on the strategic aspects of project management and its relation to project portfolio management. Silvius & Tharp (2013) point out that the efforts and interest of integrating sustainable development in projects is growing but still limited and the balancing of financial interests for organisations with larger societal concerns for economic, social and environmental development in short, medium and long-term perspectives is yet to be standard practice in projects (Silvius & Tharp, 2013).

Further, in order to achieve management of sustainability goals it is necessary for project management executives and their teams to define environmental and societal targets just as traditional cost, time and quality targets are set and measured. In this way, goals can be controlled and monitored through project processes such as material procurement, risk identification and milestone reviews through set criteria

against which decisions are made and measured (Project Management Institute, 2011). According to Labuschagne (2005), the current project management frameworks requires revision and there is a need to develop indicators that can be used in decision-making processes to ensure that projects are executed to contribute to sustainable development (Labuschagne & Brent, 2005). Most businesses to date have not successfully achieved this strategic focus of sustainable projects which also seems to be the missing link and strategic connection between integrated corporate and project sustainable development (Silvius & Tharp, 2013).

2.3.1. Innovation projects

Hallstedt, et al., (2013) describe the innovation and design of products together with incentives at a societal level as a critical intervention point in the transformation towards a sustainable society. This is also supported by (Gaziulusoy, et al., 2012). In order to create a system innovation, it is crucial to address the product development level of organisations due to, among others, the following statements (Gaziulusoy, et al., 2012):

- Product or service development is the key business function of companies to generate financial and societal value
- It is the operational and strategic level where the required business transformation will show itself over time
- The development phase is where new markets and user profiles are first envisioned

The paradigm of product development to increase value by increasing benefits and reducing costs is unlikely to change, however the integration of sustainability aspects in development process can change to support both increase of benefits and reduction of costs (Hallstedt, et al., 2013). The product innovation process includes both product development and realisation (Hallstedt, et al., 2013). The majority of the impact made on the environment and society of a product happen during the realisation while the best possibility to influence the future impact is during the early development phases (Hallstedt, et al., 2013; Ullman, 2010). Therefore, sustainability aspects need to be integrated into the development process with the help of practical methods (Hallstedt, et al., 2013).

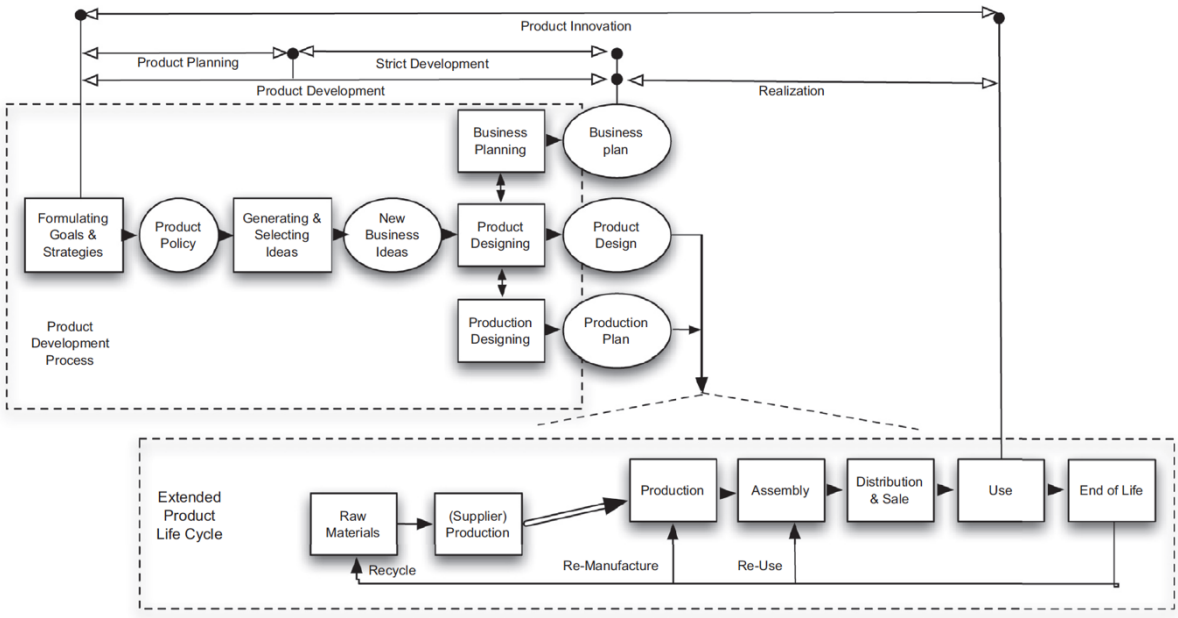

Figure 2-3 The product innovation process (Hallstedt, et al. 2013).

According to Labuschagne & Brent (2005) a benchmarking study concludes that companies successful in project management mainly use company-specific and simple frameworks that define a staged approach for all projects. Major activities, deliverables and guideline questions are specified for every phase, and end of phase or gates in the framework and trough them a level of management control is established.

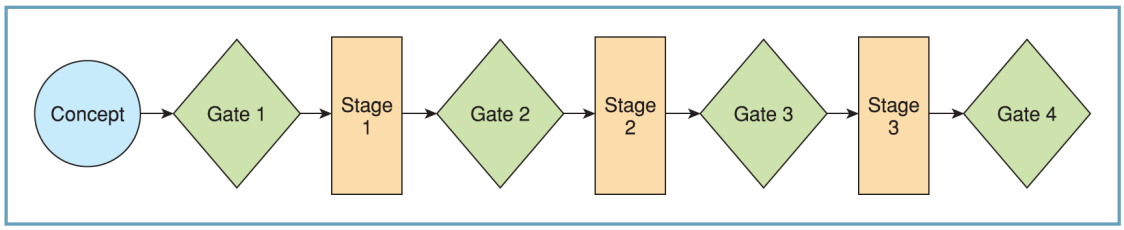

Figure 2-4 Stage-gate model of project (Maylor, 2010).

Part of the project manager's or project planner's role is to determine the objectives of each stage of a project. Gates function as check-points, where progress can be reviewed. This ensures that potential problems can be identified before project budget or time expires. Criteria for passing a gate into the follow stage must be defined in advance (Maylor, 2010). Labuschagne & Brent (2005) point out the need to develop indicators that can be used in decision-making processes of projects to ensure that decisions and practises are aligned with sustainable development strategies.

2.3.2. Radical and Incremental innovation

Radical green innovations are usually developed through new technologies, or by replacing a critical component with a new one that reduces the overall environmental impact of the product. Incremental green innovations often increase or improves the use of already existing green technology such as trough improving fuel efficiency in vehicles or substitutes the use of conventional materials with others that have less impact on the environment. For example, trough exchanging virgin materials with recycled ones or design for assembly to facilitate recycling of the new product (Dangelico & Pujari, 2010).

With the significant changes that comes with radical product innovation, such as the creations of new markets and the transforming of existing ones, there are great opportunities for achieving environmental sustainability objectives. However, successful implementation requires systematic changes in the behaviours of both infrastructure and consumers, as mentioned in section 2.2.2. The lack of integration between the environmental attributes of a product and desired consumer value may lead to product failures (Dangelico & Pujari, 2010; Ottman, et al., 2006).

Both radical and more systematic innovations encounter several barriers for sustainability integration (Boons, et al., 2012). When bringing in the concept of sustainability, they engage the larger system of the organisation rather than just a production process or product component. One way of managing the gap between different kinds of innovations and the organisational strategies can be to define sustainable business models that includes economical performance at several levels (Boons, et al., 2012). There are however few studies providing useful insights about how to transition traditional business models into more sustainable ones through the integration of sustainability policies (Hall J & Wagner, 2011).

2.4. Challenges of Sustainability Integration

Even though companies that are working with sustainable development seem to face several challenges, there are few empirical studies reporting on the subject (Dangelico & Pujari, 2010). Epstein & Roy (2003) argue that making the business case for social and environmental performance is the only way to enable managers to truly integrate social and environment aspects into their business strategies. However, they continue to illuminate that most companies have not focused on making the business case but instead followed through processes in order to act in a way they have considered as socially responsible. Epstein & Roy (2003) argue that programmes initiated solely for this reason are vulnerable due to their reliance on public priorities, changes in senior management and financial cycles.

In another study it was found that a key challenge in green product innovation is related to the balance between environmental and conventional product characteristics. There is a challenge in trying to avoid a trade-off between product quality and green attributes. These can be related to achieving the same level of quality in aesthetics, performance and/or credibility (Dangelico & Pujari, 2010).

Another challenge in developing sustainable products is to be able to sell at a competitive price. In the sectors of automotive, fuels, ink, paper and more, there are solutions and alternatives but their price makes them uninteresting for industrial and final consumers. In these cases, it is not lack of technologies that hinder sustainable innovation, but high development and manufacturing costs. In some industries without clear regulations from the law, companies struggle to compete with others that have not invested in sustainable products or technologies (Dangelico & Pujari, 2010).

Common concerns among CEO's for investing in sustainable development are related to finding suppliers that can provide green inputs and transparency and the market demand for eco-friendly products (Nidumolu, et al., 2009). The awareness of customers is a key component when striving to realise the benefits from sustainable development. If customers do not understand and perceive the value and advantages of eco-design the products will not be attractive on the market, therefore there is in some cases a challenge in making the environmental variable a source of competitive advantage (Dangelico & Pujari, 2010).

Furthermore, compliance to regulations connected to environmental and societal aspects are complicated since regulations can vary between countries, states and regions and even though it can be easier to comply to the lowest environmental standards set by regulations, Nidumolu et al., (2009) suggest to comply with the most stringent rules before they are enforced in order to gain first-mover advantages in fostering innovation. A part from saving time, money can be saved by setting a single norm at all processes worldwide, instead of adapting to different regulations in different countries, and thereby benefit from economies of scale and optimisation of supply chains.

Table 2-1 Summarised challenges based on the literature review.

Internal challenges	External challenges
Understanding the value of integration	Compliance to regulations
Balancing long- and short-term goals	Customers' awareness
Resistance to change	Balancing product characteristics
Choice of methods and tools	
Balancing product characteristics	
Finding "green" suppliers	
High development costs	
Balancing the three pillars	

The challenges identified in the studied literature are summarised in **Error! Reference source not found.** and categorised as internal and external challenges. These challenges, together with the earlier described theories regarding sustainable strategic management as well as sustainable project management shaped the research question in this report that was first presented in the Introduction.

The main research question follows:
How can organisations define, form and implement sustainability strategies throughout the organisation in order to achieve successful sustainable innovation projects?

The research question is to be answered through the following sub-questions;

1. How do product development organisations define and set sustainability strategies throughout the organisation?

2. In which way are these sustainability strategies implemented from the strategic visions level to the operational level of projects for innovation?

3. What are the main barriers and opportunities for the implementation of sustainability strategies?

The following chapter of Research Methodology describes how the research question is aimed to be answered.

3. Research Methodology

This chapter describes the adopted research methodology of the study. Included in the description is the chosen research strategy, research design, data collection and data analysis. The chapter further includes reflections regarding chosen methodology as well as comments on which limitations it brings. The chapter ends with reflections regarding the reliability and validity of the study.

3.1. Research strategy

This study employed a qualitative research strategy approach, being concerned with words of people rather than numbers and statistics that are studied when using a quantitative research strategy (Bryman, 2012). The data collection within qualitative studies are structured in a more open way to encourage the views and opinions of participants, while the quantitative data collection methods are structured to not depart from a prepared standardised scheme in order to be able to compare many answers (Bryman, 2012). The qualitative strategy was chosen based on that it was considered to answer the aim of the research in the best way. The aim to identify barriers and opportunities for sustainability integration were considered to best be answered through the words and descriptions of people. Since the area of sustainability and the definition and meaning of the term for organisations still is subject to varying definitions (Aras, 2015; Drexhage & Murphy, 2010), interviews including open-ended questions, and discussions were considered to be most rewarding for the research aim in order to get a deeper understanding of the participants views on the subject.

Some of the more common critiques against qualitative research are that they can be too subjective, difficult to replicate, lack transparency and can bring issues following generalization (Bryman, 2012). In this study, these factors were taken into consideration and the researcher aimed to stay as objective as possible when collecting data and making an analysis in order to prevent being too subjective. Further, when drawing conclusions from the research the author has kept in mind how the methodology and results can have been affected by the choices made by her, and therefore also affect the study's ability to be replicated. The lack of transparency has been worked against by providing descriptions of the methodology in this chapter and descriptions of the participating companies in Chapter 0, Case Descriptions. Finally, the problems of generalisation, related to only involve a small number of organisations are discussed in the chapter of Discussion and taken into account when conclusions have been made.

Within social research the most common reasoning approach is the deductive one. This comprises the creation of a hypothesis that are to be empirically scrutinized during the research through data collection and findings and is finally either confirmed or rejected. The deductive approach describes a process where findings are reached and created through theory. Inductive reasoning approach, comprises the creation of theory through the collection of data and findings. It involves the process

of drawing generalizable conclusions out of the made observations. The deductive approach is usually taken within the quantitative research strategy (Bryman, 2012), however, in this study the deductive approach has been taken within a qualitative study. The presented theory has been summarised into a number of challenges facing product development companies that are to integrate sustainable values. The collection of data in this study will be used to investigate and compare findings with those theories.

3.1.1. Epistemological view and Ontological position

The interpretivist position describes the epistemological view of the research and is defined by studying a reality through the social world and examinations of the interactions between its participants. The position has developed from the view that the social sciences, that are people and their institutions, are fundamentally different from natural sciences and therefore requires a separate study model and procedure of research logic than the scientific one. The interpretivist position includes the intellectual tradition and philosophy of phenomenology, that is concerned with questions regarding how people make sense of the context and world around them (Bryman, 2012). The contrasting position is the one of positivism that advocates the application of the methods within natural sciences to studies of social realities and beyond. Positivism furthermore entails the principles of only seeing phenomena that are confirmed by the senses as real knowledge (Bryman, 2012).

The interpretivist position taken in this research is a result from studying the issue through the eyes of the participants and using their observations and views of the research question as the findings of this research. The findings describe the participant's views of barriers and opportunities of sustainability integration in product development.

The constructionist position is defining the study's ontological view and implies that the social reality is created trough the perceptions and interaction of its participants. This position challenges the position of objectivism that implies that social phenomena confronts us as external facts beyond our control or influence. For example, within constructionism, culture is seen as an emergent reality in a continuous state of construction while it is seen as something external that acts on and constrains people within objectivism (Bryman, 2012).

This study takes the constructionist approach by considering that the social reality in which organisations and projects take place are created through the interaction of its participants, meaning that the interviewees are considered to have the answers to what they consider as barriers instead of seeing it as a fact beyond their control or independent of their perceptions.

3.2. Research design

The research design describes the framework for the collection and analysis of data in the study (Bryman, 2012). This study is based on a comparative design within the frames of a qualitative study. Comparative designs are usually taken within the

quantitative studies and are in those cases studies that entails at least two cases that are based on data collection methods similar to those in cross-sectional design. This includes, questionnaires, structured interviews, structured observation and content analysis (Bryman, 2012). When the comparative design is taken within a qualitative study, as in this study, it is in form of a multiple-case study. This method has become a common research design within organisation studies. The approach can improve theory building, by placing the researcher in a better position to confirm or reject a theory when comparing two or more cases (Bryman, 2012). In this study the cases chosen are typical or exemplifying cases, meaning that they are chosen to capture conditions of an ordinary situation and therefore can exemplify a broader category of cases. The method is chosen to identify barriers for sustainability organisation at a commonplace organisation.

3.3. Data Collection Method

The conducted research is based on interviews performed with practitioners. The participants are sustainability consultants, researchers and project managers within product development. The interviews were performed with a semi-structured outline that will be described in the following section. The research was shaped by ethical considerations in both data collection and analysis in order to contribute to the trustworthiness of the study which is further described in section 3.5, Reliability and validity.

3.3.1. Interviews

The interviews performed in this study had a qualitative semi-structured form. Qualitative interviewing tends to be structured a lot differently from the quantitative interviews. It entails an emphasis on the point of view of the interviewee and the focus of the discussion can therefore depart significantly from prepared interview schedules or guides. The aim or goal with a qualitative interview is to get rich and detailed answers whereas, the goal in the structured form, used in quantitative research, is to acquire answers that can be categorised, coded and processed easily (Bryman, 2012).

The questions in this interview, were prepared beforehand but the interviewees were free in their way of replying and therefore also could bring in new subjects not necessarily mentioned on the interview sheet. Bryman (2012) describes the semi-structured interview as a process where the researcher prepares a list of questions of fairly specific topics to be covered but gives the interviewees great freedom in how to reply. The researcher may pick up new topics from the interviewees' answers but in general without leaving any prepared topics undiscussed. In this study additional questions were also asked as a result of the interviewees' answers. However, all the prepared questions were asked, and in a similar way between all interviewees. The main topics of all interviews were the same but some questions differed between the interviews with the researcher, the consultants and the managers, in order to capture the different perspectives of their roles. The interview guides, with prepared questions can be found in Appendix.

Interviews were done with one person from nine different organisations and companies. Six companies working with innovation and product development were interviewed to gain empirical data regarding if and how sustainability processes are performed and integrated at different companies. All the participants have managerial roles within product development or sustainability projects. The companies were chosen to reflect different industries and sizes in order to give a generic view and to capture a holistic view of possible challenges. The companies will be presented in Chapter 0. Two interviews were done with sustainability consultants from two different consultancy firms in order to identify general barriers that they face when working with and consulting different innovation projects and companies. Finally, one interview was done with a researcher within the subject of sustainability integration in innovation projects. This interview aimed to contribute with deeper knowledge and understandings regarding the sustainability challenges for innovations but also for the society as a whole, in order to be able to understand the issues facing the companies in a wider context.

Table 3-1 List of participating interviewees.

Interviewee	Company	Role	Type of interview
Consultant 1	A	Sustainability Consultant	Face-to-face
Consultant 2	B	Sustainability Consultant	Face-to-face
Researcher	C	Sustainability Researcher	Video conference
Manager 1	D	Quality Manager	Telephone
Manager 2	E	Regulatory affairs manager	Face-to-face
Manager 3	F	Product Developer	Telephone
Manager 4	G	Sustainability Manager	Telephone
Manager 5	H	Product Development Manager	Telephone
Manager 6	I	Chief Technical Officer	Telephone

Due to far distances and limited time some interviews where performed with the help of video conferencing and telephones. According to Bryman (2012), this reduces interviewer effect to some extent by excluding non-verbal cues, however the lack of them might also be considered as a less satisfying situation for the interviewee.

3.3.2. Ethical Considerations

When performing any kind of social study involving the actions or opinions of humans it is important to consider some key points regarding the ethical position of the study. As suggested by Hart (2005), the following issues are recommended to be considered:

- Confidentiality of subjects (people involved in the research and protection of their identities and places of work)
- Maintaining independence as a research topic owner (in order to prevent possible attempts by interested parties/bodies to bias results)
- Ensuring security of data during and after the completion of the research

This study employed the following steps to address the mentioned issues:

1. The use of universities formal procedures including sending standard agreements and letters of consent on confidentiality to all participants before interviews
2. The insurance of non-disclosure of subjects by using numbers in place of names, and of their respective organisations by using letters instead of names
3. Making sure only myself and my dissertation supervisors will have access to the information used in the research
4. Sending copies of the research report for consent before the publishing in order to ensure that confidentiality is secured and avoid any possible misinterpretations done by the researcher.

When performing interviews, it is, a part from the earlier mentioned, also important to remember that the human interaction between interviewer and interviewee will affect the collected data, and how it is later analysed. Ethical issues are inherent throughout the whole process of an interview investigation and are needed to be considered from the very beginning of a research until the final report (Brinkmann & Kvale, 2015). When designing an interview, the purpose should, a part from the scientific value it can bring, be considered with regards to improvement of the human situation investigated. Further, during the transcription of interviews, there is an ethical issue in staying loyal to the interviewee's oral statements (Brinkmann & Kvale, 2015).

3.4. Data analysis

The interviews performed in this study were audio recorded and later transcribed. Brinkmann & Kvale (2015) describes the transcription process as an analytical process itself and as mentioned in previous section of Ethical Considerations it entails ethical issues in staying loyal to the statements but also to protect the confidentiality of the interviewed person.

When analysing the transcribed interviews in this study, the process of open coding was used. Coding entails viewing transcripts and labelling parts of the data in different concepts based on theoretical significance or of particular significance for the social world studied (Bryman, 2012). It entails breaking down, examining, and

comparing data that results in categories of them. In comparison to coding within quantitative studies, the qualitative coding tends to be in a constant state of revision where the data is treated as potential indicators of concepts and constantly compared to get an understanding of in which concept it best fits in.

3.5. Reliability and validity

The reliability of a study is concerned with whether the study is repeatable or not while validity is concerned with the integrity of the drawn conclusions of the study (Bryman, 2012). Validity further concerns whether a method is investigating what it is intended to investigate and thereby answering the aim of the research (Brinkmann & Kvale, 2015). These measures and criteria varies in their application to quantitative and qualitative research. Some researchers suggest that the issues of reliability and validity are mainly geared towards quantitative research but that they also can be used when evaluating qualitative research as long as they are slightly modified in their application (Bryman, 2012).

Others argue that qualitative studies should be assessed based on different criteria than those used in quantitative research. Lincoln & Guba suggests trustworthiness as a criterion to measure the quality of a study (Bryman, 2012). The criterion includes the aspects of credibility, transferability, dependability and conformability, each of them responding to an aspect within the quantitative criteria. The main critique from Lincoln & Guba towards the application of reliability and validity to qualitative research is that the criteria presuppose a single and absolute account of the social reality. Lincoln & Guba argue that there can be more than one (Bryman, 2012).

Credibility

The credibility aspect is linked to the view of a social world including multiple accounts of reality. The founding of the credibility of studies involves ensuring that research is performed in good practice and that findings are submitted to research participants for confirmation of the interpreted results of the researcher. The latter technique is also called respondent or member validation.

Transferability

The aspect of transferability encourages qualitative researchers to produce thick descriptions of the studied reality and context. This is important since qualitative studies usually tend to be done in unique contexts, with a small group of participants, and findings may or may not hold in other contexts or even in similar contexts at other times. The thick description can therefore provide others with valuable information that can enable judgements regarding the transferability of findings to other social environments.

Dependability

The dependability of a study is concerned with whether, and to what extent a research is performed with proper procedures. To ensure this Lincoln & Guba suggest the adoption of an auditing approach that entails the assurance that records are kept of the entire research process, including problem formulation, interview transcripts and data analysis decisions. This allows peers to act as auditors, possibly during and certainly at the end of a study, to evaluate to what extent proper procedures have been followed.

Conformability

Conformability concerns the level of objectivity in social research. While recognising that complete objectivity is impossible, the researcher can be shown to have acted in good faith. This entails that it should be clear that personal values have not been overtly allowed to influence the conduct of the research or the findings deriving from it. Lincoln & Guba suggest that conformability should be established by auditors.

This study will aim to ensure reliability and validity by following the recommendations from Lincoln & Guba and their alternative way of assessing research through trustworthiness. The report will be sent out to all participants before the publishing to ensure that no information provided by them have been interpreted or used in a wrong way. Furthermore, case descriptions will be done in chapter 0, in order to provide information to enable judgements regarding possible transferability. All documents and transcripts related to the processes of the research have been saved and continuously scrutinised by peers both during and at the end of the study to ensure dependability. The issue of conformability is to be established by auditors, however, in this study, the researcher has tried to remain as objective as possible when analysing data and drawing conclusions by maintaining independence as a researcher, as suggested by Hart (2005) in section 3.3.2.

4.Case Descriptions

This chapter gives an overview of the companies and organisations that are represented by the interviewees in this study. The chapter starts with a table summarising some basic facts about the participating product development companies that are used as cases and follows with a description of each of those as well as the consultancy organisations and the researcher that have participated to broaden the study with different angles.

The participating product development companies are presented in Table 4-1. The consultancy firms as well as the organisation of the researcher are not included in this table since they are not seen as cases to be compared in this study. However, they provide useful knowledge and insight in strategy development and barriers related to sustainability from a consultant's as well as a researcher's perspective. They are further described in section 4.1-4.3.

Table 4-1 Categorisation of companies D-J represented by interviewee 4-9.

Company	Size	Industry	Location	Strategy
D	26	Foot wear	Gothenburg	No defined sustainability strategy but some projects based on a strategy in development.
E	16	Medical	Gothenburg	No defined sustainability strategy but extensive Quality Management.
F	300	Paper	Gothenburg	No defined sustainability strategy but goals in business plan. Using EMS.
G	2000	Chemicals	Gothenburg	Defined strategy. Integrated business model. Using EMS.
H	20	Work wear	Varberg	No defined strategy. Focus on Quality Management. Using EMS.
I	150	Electronics	Mölndal	No defined sustainability strategy. Set policies. Using EMS. Focus on long-term relations with customers.

4.1. Company A

Consultant 1 works at a sustainability consultancy firm with six employees in Gothenburg, Sweden. The consultants usually take the roles as process or project managers. As process leaders they join projects in different parts of the life cycle, but

are usually responsible from project start to end. As process leaders they contribute with knowledge expertise within different areas, such as purchase. A part from the roles as process leaders, in some projects they contribute as investigators, moderators or educators when lecturing within the subject of sustainability at different organisations. Their clients are both within private and public sector and also within different industries such as textile, chemistry and energy. Furthermore, most of their clients are based in Gothenburg and other cities in Sweden. The perspectives of consultants were brought up in order to increase the level of understanding of the issues brought up by managers.

4.2. Company B

Company B is a consultancy firm based in Utrecht, Netherlands, with 22 employees. Six of the employees are consultants, other roles are within marketing, sales, financial and HR. The company have defined three key areas of operation. These are pioneering, delivery and integration. Pioneering are developing new metrics for sustainability, delivery is focusing on LCA studies, databases and training while integration are looking at how to apply LCA studies and life cycle management in companies. The clients are within a large variety of industries and sectors and most of them are based in Europe and the US, but some are also based in India, Thailand, China and Philippines.

4.3. Company C

The interviewed researcher is based in Blekinge, Sweden and are aiming to improve the ability to integrate sustainability in the early phases of product development. The method is to look at the strategic level of companies and how you can build a business case to integrate it into product development. The studied elements include tools, formal processes and road-maps. The researcher mostly collaborates with companies within the manufacturing industry that also have a product development department. The perspective of the researcher contributes with a deeper understanding of the challenges and how they are interlinked with the rest of the society.

4.4. Company D

Company D have 26 employees and are based in Gothenburg, Sweden with headquarters and product development, but also have sales organisations in Norway, Germany and USA. The products are within the footwear category and are developed in Gothenburg but manufactured in Asia. They are currently in the process of developing sustainability strategies but already have projects that are based on that strategy. Furthermore, their aim is to develop high quality products with a long life span. The interviewee from this company has the title of Quality Manager.

4.5. Company E

The fifth interviewee is a manager representing Company E. The company operates within the industry of medical technology, has 16 employees, are based in Gothenburg, and have global customers but mainly operate through distributors. The interviewee is responsible for regulatory affairs and controls regulations and quality systems. The interviewee has also started the sustainability work at the company in collaboration with one of the product specialists and with support from the CEO. The work has started within the last year with their interest as the main driver.

4.6. Company F

The third company manufactures and develops paper for graphic use and is part of a bigger corporate group. The head office is mainly based in Poland but also has stations in Gothenburg, Sweden. The company has around 300 employees with main markets in Europe and around five percent outside of Europe. The interviewee is a product developer that develops new products and improves current product portfolios. The company has no defined sustainability strategy but has goals included in the business plans and are also certified with ISO 14001 and EMAS.

4.7. Company G

Manager 4 is a sustainability manager and represents a department based in Gothenburg, Sweden, with 2000 employees specialized in pulp and performance chemicals with customers in 35 countries. The department is part of a company employing 46000 people that operates in more than 80 countries around the world with headquarters in Amsterdam, Netherlands. The company have a well-defined strategy were performance are linked to monetary values and the aim is to create more value with fewer resources. The company is certified with ISO 14001 and applies LCA.

4.8. Company H

Company H develops and sells work wear for the use of military, mountain and coast guards and others. The company consists of 20 employees and are based in Varberg, Sweden. The main market is Sweden but the company also have an increasing amount of exports within Scandinavia and Europe. The interviewee is manager of the product development operations. Their sustainability related work has been developed in recent years and the strategy is based on making quality products that last long, the company is also certified with ISO14001.

4.9. Company I

The last interviewed company is a sub-contractor mainly producing electronic products and solutions for general, automotive and textile industry but has in more recent times also went in the direction of mechatronics by producing finished products such as engines. The company is based in Mölndal, Sweden, with both

development and production, has 150 employees and are also part of a global corporate group with owners in Belgium. The company has international collaborations within their group. The majority of their customers are Swedish companies that export their products so most of the end-users of Company I is based abroad. The company also have some direct international customers. The interviewee has the role of being Chief Technical Officer.

5.Findings and Analysis

This chapter presents the results of the performed interviews in relation to the research aim and research questions. The chapter is structured to answer the research questions, by starting with findings regarding strategy formation and current practices at organisations and ending with findings regarding barriers and opportunities for sustainability integration. The results and quotes stated in this chapter are all based on the discussions and dialogues that took place with the interviewees based on the interview guides presented in appendix.

5.1. Strategy formulation

Based on the empirical findings in this study there are many different reasons, drivers and motivators for organisations to formulate sustainability strategies. In addition, there are different ways in doing so. Even though some of the motivators are the same for different organisations their ways of answering them is different. All companies described different levels of integration and two of the companies were just in the beginning of defining strategies for sustainability.

5.1.1. Drivers and motivators for sustainability

Some of the mentioned motivators for incorporating sustainability principles in their product development were the opportunities for creating new value and identifying new markets, as well as improve efficiency of resources and to comply with regulations.

"I think looking in the traditional way at innovation or partnership is basically at the end of the possibilities. Because we have made everything much more efficient from an economic point of view, we have identified all the economic partners but there are other impacts that also have a lot of value for people and companies that have not been addressed that well and I think that is where sustainability comes in."

(Consultant 2)

Several of the interviewees mentioned that they had identified new ways to create value and gain new customers. Bringing in sustainability into their organisation and product development in some cases worked as a marketing strategy that were used to stand out from the rest and give competitive advantage while for some companies it was considered to be a must in order to survive on their market. These companies had identified sustainability integration as a clear customer requirement.

Manager 4 mentioned how their sustainability strategy was related to risk management and could be used to gain new customers and identify new markets.

"For example, if we identify a risk of decreasing biodiversity in an area, we notify the risk but also identify opportunities to gain customers by offering or creating products that can decrease this risk. So where we see trends and risks, we can develop a solution pro-actively, before everyone else in order to gain customers." (Manager 4)

Consultant 2 described one view of how different companies from his experiences were motivated to incorporate sustainability work in their innovation processes.

"So, the front-runners, they are intrinsically motivated, they see it as a way to create value and to innovate. And they are quite successful in it. Like Unilever, they apply this on a product level. Some companies really try to approach it from an efficiency perspective as a way to lowers costs. And I think the biggest junk is still driven by compliance. This can be either compliance because of regulation or because of customers asking for it. But then probably, those customers are the front-runners. So this is kind of snowball effect." (Consultant 2)

Among the participants in this study there were companies responding in all three categories mentioned by Consultant 2. Manager 2 described how some of their sustainability strategies was formed as part of their marketing strategy.

"What we see is that even if our industry does not request it directly, when you are doing it, it is visible and makes people interested. Of course, it is a way for us to be seen since we are quite small. We are a very little actor among bigger ones. The bigger companies are visible just because they are known to many but we have to find ways to be seen. So it is a part of the strategy to ask ourselves how we can use our sustainability driven efforts to get bigger?" (Manager 2)

Customer demands

Four out of the six interviewed managers described the demand and pressure from customers to be one of the main motivators to set strategies for sustainability. However, one of the interviewees described it as something they believed would be bigger in the future. When asked about the motivators behind their sustainability related efforts Manager 5 described an internal willingness to contribute as well as a demand from the customer. However, the same participant also described that the efforts taken were primarily based on analysis of future demands.

"We are a bit surprised that the requirements from the customer side is not bigger. We have even asked our customers how important the environmental aspect is for

them and they replied that it was not so important, they wanted good quality products. So for us, the customer demand is not our major motivator but we believe that the requirements will be bigger in the future and therefore we see it as an important future aspect." (Manager 5)

Furthermore, Manager 6 described how the need to work with environmental and social issues was integrated in their way of operating and long-term thinking.

"Our whole business has a long-term focus. We have had most of our customers for a very long time and we want to continue having them. It is not only our relations that have to be sustainable but also our products. We want to keep the relations with our suppliers and therefore they also have to remain in the future." (Manager 6)

Legal compliance

Some of the respondents saw upcoming laws and regulations as a reason to develop their sustainability work. It was, just as how manager 5 described the customer demands, in many cases considered as a proactive solution to future challenges in adapting to regulations.

"We are discussing this a lot and we want to be a good company first and foremost but we also see that new regulations and laws are coming, and we believe that it will come even more in the future. So we have no doubts in that the arguments for environmental sustainability are strong and coming." (Manager 5)

"There can be wishes from some customers of products that are environmentally friendly in a certain way. When you are quick to see these wishes you are able to fix them before it is a requirement for the customer. It is the same with laws from authorities. If you constantly have a dialogue you are able to be up front. If you isolate and only try to do what is necessary, it is a great risk that you will fall behind when the reality changes." (Manager 3)

Manager 2 described the compliance to environmental regulations as something that pushed the sustainability development further in that area. However, the lack of regulations regarding economic and social sustainability was mentioned as something that could slow down the process of integration in those areas.

5.1.2. Governance and frameworks

The setting of sustainability strategies for companies are based on different motives as previously presented. Furthermore, the formulation and formation of strategy is also different. One of the consultants as well as the researcher interviewed described their view of the strategy formulation of companies as in many cases, vague and unclear.

"It can be very different. In some cases, companies have 50 goals and we come in and tell them that they have to prioritise. In most cases 50 goals are too many to manage, or the goals can be too vaguely formulated and not tangible within a set timeframe with a connected action plan. In those cases, we help to try to prioritise and analyse visions and policies that are already there and set action plans for them." (Consultant 1)

Furthermore, from the consultants' and the researcher's perspective, strategies of companies were considered to often not connect wider visions to actions plans and processes which also was considered by the researcher to be one of the keys to success.

"I many times see that strategies are not clearly formulated but rather unclear, too general and do not connect to a more operational level. I also think that if you have a vision and a strategy it is important to have activities that are connected to it." (Researcher)

When asked about if they had a defined sustainability strategy at the six different companies the managers' answers differed but most of them did not have a clear set and integrated strategy although many of them described that they were aware of the concept and had some integrated processes, while a few were just in the beginning of developing processes. Several of the interviewed managers expressed a will to develop a more comprehensive and defined strategy to improve their sustainability work.

"We probably do not have anything that we call sustainability strategy even though I am well aware of the term. We do make a business plan each year and within it we have some things that are related to sustainability." (Manager 3)

"The strategy is what we are building in our current project. … So it is not ready yet. It is pretty far done and it will be a living document that will be updated all the time. But we already have some projects that is based on the strategy." (Manager 1)

"…I have together with one of the product specialists started our sustainability work. In fact, we started just this year, but we do not have anyone specifically responsible for that. We are working withs this just because of interest, we also have the CEO with us that also is the operational manager." (Manager 2)

One of the interviewees, Manager 4, described a well-defined strategy with action plans that were connected to visions.

Table 5-1 Summary of findings related to strategy formulation.

Motivations and integration of strategies	**Number of managers**	**Description**
Drivers and motivators for integration		
Customer demands	4	Pressure and demands from customers were described by most of the managers as a main reason for the development of strategies. This was by some described to relate to forecasts of greater future demands and for some to maintain long-term customer relations
Legal compliance	3	Upcoming laws and regulations were described as a driver to develop sustainable strategies. One of the managers mentioned that the focus on environmental laws also could lead to a focus on the development of environmentally related strategies, excluding other pillars.
Quality	3	Three of the companies had business models focusing on making high qualitative products. For them, the high demands were described to incorporate sustainable values.

Strategy formulation

Defined and integrated strategy	1	Manager 4 from Company G described a defined strategy integrated in their business model and business cases of projects and portfolios
Strategies in process and projects	6	All companies had some processes were sustainability were considered in decision-making, this could be related to either choice of raw materials or suppliers as well as in the setting of policies for working conditions
Currently developing strategies	2	Two of the companies were in the very beginning of developing their sustainability work. One of these companies already had some projects based on those strategies

5.2. Breaking down the strategy

The interviewed consultants and the researcher all mentioned the need of a strategic plan for sustainability on several different levels of the organisation. Further the need of defined actions plans and activities incorporating efforts towards sustainability were described as necessary in order to execute goals stated in visions.

"For example, if you are developing a new product, in the first meeting, when brainstorming is done, these issues need to be brought into the ordinary meetings and forums. It is very important to always, when developing a product to bring in sustainability from the very beginning." (Consultant 1)

Most of the interviewees were working in projects based on a stage-gate model. In each ending of a phase, project requirements and goals are followed up and controlled in order to ensure that the stated values and benefits that are to be collected from each development project is still within the line of the project frameworks. Further also that activities are performed as planned and are aligned with the strategy set for the project and for the company as a whole. Many of the participants described that they did not have integrated sustainability goals within their product development, however, this was planned to be developed in the near future. Several of the participants mentioned that environmental considerations were done when choosing raw materials, materials and suppliers for products. Activities primarily in the beginning of a development project.

"... we are working in projects especially when it comes to product development but we have not really brought in the sustainability aspect there yet. Or.. It is not clear how, but it is surely considered when working with it." (Manager 2)

When asked if sustainability related issues were evaluated through each project gate, Manager 1 and 6 answered the following:

"Not yet. That is. But previously no. There are really nice green wishes. But now they are actually real, and we are finally getting somewhere and the fall/winter 17 is the first that we really work on this idea." (Manager 1)

" Yes, every requirement. But it depends on what kind of requirements that exists. It is different depending on the type of project. We make very customised products and work very close with our customers and the development departments of our bigger customers so we have to adapt our way of working to make them feel more at home." (Manager 6)

5.2.1. Models and concepts for integration

The results showed that most of the companies used some kind of quality certification on their products. The certifications were specifically for showing environmental qualities while others were to ensure a certain quality level of for example performance or safety and in that since incorporated sustainability related values. Furthermore, different models like the LCA were used to measure, evaluate and develop current processes of product development, while one of the participants mentioned the use of a balanced score card to set strategies and link them to projects and processes. Four out of six companies were certified with environmental management system ISO 14001 and three out of six described how their sustainability work were integrated in their risk management processes in different ways, however all managers described motivations for sustainability integration that were all directly or indirectly connected to decrease risks of e.g. losing customer, losing markets, or not complying to regulations.

According to the consultants and the researcher, one of the keys to success in order to truly integrate sustainability efforts is to integrate and link processes of sustainability requirements in already existing routines and meetings.

" It is the forums and meetings that happen anyway that we need to capture. Are there any documents already used by the project managers then put the sustainability aspects there as well instead of making a new document that people will not have the time to look at." (Consultant 1)

Consultant 2 described the benefits of using LCA to identify where in the value chain the major environmental impacts are.

"I think it is important to look at the entire life cycle because then you can identify okay, where are those hotspots that I need to address. Sometimes they are in what we call the use phase, of using the products, sometimes they are in the extraction of raw materials, sometimes they are in the production phase, sometimes it is the transport but that is often not that much of an impact but then you know where to focus your attention." (Consultant 2)

Manager 2 described that they have very high quality standards on their products and therefore have to manage quality aspects in relation to risks in every small step of a processes. Those analyses were described as based on sustainable values.

One of the managers described how their company studied costs of their business in the society. Both environmentally and socially. This was for example done trough the evaluation of what they offer employees in terms of education and career possibilities, but also including community programs and taxes that they pay that contribute to libraries, schools and such. The manager described how this information was used internally within the organisation.

"…we use it as an internal tool to improve ourselves. By putting numbers on some things we can identify hotspots that we have and thereby bring those issues to our management team so that decisions can be taken faster, since they are used to speak in monetary terms" (Manager 4).

5.2.2. Radical and incremental innovation

Another question discussed with the interviewees was if and how sustainability integration varied between radical and incremental innovations. The researcher described how the integration could be easier within radical innovation since it could be seen as a support in finding new solutions.

"I think the difference is that we can integrate sustainability easier in the radical solutions since it can work as a support to find completely new solutions. Incremental innovations can be to look at what you have to see if you can do it better, but you may get stuck in your existing solutions." (Researcher)

This was also the view of three of the interviewed companies. Manager 4 and 6 described how this could be interlinked with the relations to customers and stakeholder requirements. Manager 4 described that permission was needed in every step of a change since it could affect the quality of a product and Manager 6 described the linkage to the pricing of a product.

"In some cases, we can be hindered to change existing products. To change them is more difficult since we need permissions from our customers." (Manager 4)

"Those kind of problems can be more difficult when working with incremental innovation since you already have a standard and an established price level. So if you try to improve a product slightly the change in price must stand in relation to something comparable. In a radical innovation, you may break new ground, and will not have to do benchmarking in the same way. That may make it easier to integrate from the beginning and establish a slightly higher pricing… In that since I think that radical innovation may have a bigger change to get support or to be accepted for these changes." (Manager 6)

The three other companies had different views on the differences between radical and incremental innovation in relation to sustainability. One of the interviewees had the view of sustainability integration being more difficult in radical innovation since it required a bigger amount of change while one of the interviewees mentioned that they did not work with radical innovation. Lastly, manager 5 described that the processes were similar and no particular differences were seen.

5.2.3. Collaboration and stakeholders

Stakeholder management is described as a key component when working with sustainability by all interviewees. As described earlier, customer requirements and regulations are some of the most important drivers behind the sustainability efforts at the companies. Furthermore, the collaboration with both suppliers and customers is seen as necessary in order to be able to fully implement sustainability within your own organisation.

"But what I think is really important is to look at the entire life cycle because on average between 15-20 % of your environmental impact is within your own company the rest is outside of your company so if you want to change something you will always have to collaborate with other people." (Consultant 2)

In the previous section, 5.2.2, it was described how some of the companies collaborated with customers when making incremental changes. Three of the managers also expressed some kind of collaboration with suppliers to improve environmental aspects of products. The improvements were mostly connected to choice of raw materials and the finding and development of new materials that brought less environmental impacts.

"...we are working a lot with our suppliers and identify with the help of a life cycle analysis. If it is a raw material that contributes a lot to carbon dioxide emissions, we discuss our data with our suppliers to confirm that it is true and if they can do something about it." (Manager 4)

Two of the managers described how they tried to improve working conditions not only within their own organisations but also at suppliers.

"Since we are producing in Asia where sometimes working conditions can be whatever we want to make good choices there as well and really improve the quality of life in those factories as well and then again if entering a new factory, we are going to evaluate if they are playing along." (Manager 1)

Table 5-2 Summary of findings related to strategy implementation.

Ways of strategy implementation	**Number of managers**	**Description**
Use of tools for integration		
EMS	4	Four out of six managers described that they were certified with management system ISO 14001, while one of the managers described that they also were certified with EMAS.
Balanced Score Card	1	Manager 4 described the use of a balanced score card to follow up performance and goals towards the set sustainability strategies
Risk management	3	Three of the managers described how their sustainability work was somehow integrated in their risk assessments. One of the managers described that it was related to the high quality requirements on their products, another described the

		relationship between the risk assessment and sustainability values to be in the identification and documentation of risks within the working environment, and the third manager described this to be related both to internal risks of working environments and external risks that could be turned into opportunities through the introducing of new products and solutions in risk prone markets. Furthermore, it is important to state that even though every manager did not mention risk assessment technics, the motivation for integrating sustainability strategies were related to avoid future risks of being unsustainable in all companies.
Life Cycle Analysis	1	One of the managers described how they use life cycle analysis to identify hotspots and important suppliers or customers to collaborate with to decrease environmental impacts. However, all interviewees were not specifically asked if they worked with LCA, this was an answer to how strategies could be implemented. Also, four managers described the use of ISO14001, which recommends the use of LCA but does not require a detailed life cycle assessment.
Radical and incremental innovation		
Easier to integrate sustainable values in radical innovations	3	Three out of six managers described how sustainable values often could be easier to integrate in radical innovations. Due to their newness it was described as easier to motivate higher prices and product changes.

Stakeholder management		
Collaboration with suppliers to improve environmental and social aspects of products and organisations	4	Four out of six companies were collaborating with suppliers to improve either materials or working conditions at the suppliers' organisations.

5.3. Barriers and Opportunities

The mentioned barriers for integration were many and diverse. However, the interviewees had many of the mentioned difficulties in common. It is clear that, according to the participants in this study, neither the setting of sustainability strategies or the integration of the strategic goals in projects is easy. One of the interviewees described a well-defined strategy that connected integrated strategies and projects, however the company still witness several difficulties in integration.

5.3.1. Governance management

One of the challenges related to governance that were described by the researcher was that even though it was identified to be a necessity, many companies do not have a person that owns the responsibility to work as advisor to suggest tools for implementation. However, the consultants described another issue in relation to this. One of the interviewed consultants described that their biggest challenge was to bridge the gap between LCA experts, that got a lot of relevant information, and the people that like sustainability but do not see how it can be beneficial for their businesses or how it can help their business grow.

"…a lot of our clients are LCA experts. And they often find it very difficult to show the relevance of what they are doing to their internal or external stakeholder. Because it can be very complicated, what they do. So that is really hard for them to get their message across, and a lot of discussions are also very technical, so you can get lost in this technical details and discussions." (Consultant 2)

This challenge was also described by Consultant 1 that mentioned that they often gave advice to one person responsible for the sustainability work that found it quite though to send the information on, internally. This specific challenge was not mentioned by any of the interviewed managers, however one of them described challenges related to the culture and engagement of employees.

"We have come a long way, but something I think can be improved internally is that many still believe that sustainability is a cost and we are working a lot to show that sustainability is helping to reduce costs and improving productivity. We are working a lot with this because in times like this everyone wants to save money and have a short-term view on investments." (Manager 4)

Two of the managers also mentioned that commitment from top management was a key component in setting the culture and motivation for sustainability.

The researcher further described the difficulty of translating softer sustainability goals into more quantitative goals. This was also mentioned as a challenge by one of the managers.

"…for this softer things within social sustainability, it is difficult to set quantified goals, at least externally, internally we have it for example by following up accidents at the workplace, but other than that it is rather sparse with measurable goals…" (Manager 6)

On the question regarding if social criterions were valued in the processes Manager 2 answered as follows:

"We have it in our minds, but we have not really started. But of course, I mean, in our contracts that we write, or I think that it says that bribery and other things are not allowed. But it is difficult for us to control it, especially in those countries where it occurs, but it is also where we might need to check." (Manager 2)

5.3.2. Resource management

Resource management were among the most mentioned barriers for developing and implementing sustainability projects and processes at organisations. The resources mentioned were human and financial capital as well as time management. The consultants and the researcher described that it was not always prioritised and that one challenge was to link sustainability hotspots to other issues to show its relevance in a wider perspective.

"There are many organisations that have shown that they believe that it is necessary to prioritise sustainability related issues in the future. However, many of them have not dared to fully take the step and invest in it." (Researcher)

Manager 6 described the difficulty in controlling that policies were followed due to resource limitations.

" We see nice documentation both down-stream and up-stream and how everyone commits to these issues, however what happens in reality is difficult to determine. We do not have the money or manpower to walk the whole chain and visit every sub-supplier, we have to trust that the messages are received." (Manager 6)

Another perspective brought up by interviewed managers were the balancing of product quality, cost and environmental and social qualities of products. This could also be a difficulty following new regulations on materials or substances or when making incremental changes in existing products that already had set quality and price standards, as described in section 5.2.2.

"I am interested in new technology when it comes to environmental friendly products but that is a balance you have to find. I can not only think of environmental friendliness, if the material is recycled or contains hazardous chemicals. I also have to look at the production." (Manager 5)

Two of the interviewed managers described a challenge in choosing environmental certifications for their products. They described it as being too many and too expensive and difficult to comply to all. Both the consultants and the researcher described the difficulty in balancing short- and long-term goals and benefits. Projects that could not show short-term payback and economic benefits were described as being difficult to motivate. This was only mentioned by one of the interviewed managers.

"In these times everyone wants to save money and have a short-term view of investments and so on. Investments with a payback time of more than two years have previously not been done. However, now it is better and the investments are done anyway when they are clearly linked to sustainability. This is thanks to our sustainability committed management team." (Manager 4)

5.3.3. Stakeholder management

One of the main barriers identified in this study is the issue of getting suppliers and other stakeholders on the same page as your own organisation. In order to work in a sustainable manner organisations are interdependent on each other. This can make it really difficult even if you internally can have great motivation and engagement. Three out of six managers saw difficulties in finding suppliers with the same level of commitment. One out of six saw how legal compliance effected the quality of the products, while one mentioned the lack of laws for social sustainability as a barrier for the motivation to integrate it.

"Technology is going forward and finding new ways of becoming environmental friendly, but we also see that as soon as it comes a new law that we have to adapt to, the product quality decrease and takes a small step backwards." (Manager 5)

To overcome this barrier of finding the right suppliers, Manager 1 described how they visited their suppliers to inform and discuss how they could be more sustainable. They tried to show what value it could bring, in terms of, for example, new customers. However, these suppliers in turn are working with other companies that may not request the same level of commitment.

Manager 6, that represent Company I, a subcontractor to general, automotive and textile industry, described that some changes that could be done in products to improve features, could be beneficial for the end-user but may not entail economic benefits to their customers. This could for example be a raise in price of a solution that would make the end-user save money by consuming less electricity but not benefit their first-tier customer. Another mentioned difficulty was geographical distances when working with global customers and/or suppliers. One of the interviews described that transportation could be difficult.

"…the mind-set is not adopted in all countries, so it can be difficult to find. Even if we transport goods through flights we could transport in other ways once in the country. However, it is not really there yet." (Manager 2)

It was also described by Manager 6 that visiting suppliers in other countries could be more difficult due to that the same amount of space usually were not open for investigation. Language and culture differences were further described as barriers of collaboration in an international arena.

Four of six interviewed managers described that they believed that in order to achieve win-win-win situations, between organisations, customers and society, a close dialogue and communication with stakeholders was necessary. Two out of six described the need for education of the receivers of sustainability related

information, such as customers, in order for them to understand why prices are higher and what value it actually brings.

Table 5-3 Summary of findings related to barriers and opportunities.

Barriers and opportunities	Number of managers	Description
Governance		
Culture and engagement	1	Both of the consultants mentioned how organisational inertia could be a challenge when they collaborated with one person from an organisation that later were to send information on internally. However, engagement of employees were only mentioned as a challenge by one of the managers
Commitment from top management	2	Two of the managers mentioned how commitment from top management was considered to be a key factor in motivation for integration
Managing social factors	2	Two of the managers mentioned challenges in measuring and managing social factors
Resources		
Time	4	Three managers mentioned how it was difficult to prioritise sustainability work or projects when their was limited time, one of the managers also mentioned how lack of time made it difficult to visit and control suppliers
Quality	3	The issue of balancing product performance and sustainable attributes of a product were mentioned by three of the managers. These issues were related to finding the right suppliers that could provide raw materials that both were environmentally friendly and high performing
Cost	2	Only one of the managers described the challenge of motivating projects with a long pay-back time. However, costs were also mentioned by one manager in relation to choosing certifications and in

		relation to finding sustainable materials that were not considered expensive.

Stakeholders

Authorities	2	Challenges related to legal compliance was mentioned in relation to new laws affecting product quality and lack of laws as a barrier for motivation to integrate processes for social sustainability.
Supplier collaboration	3	Three of the managers described challenges related to collaboration with suppliers. These were connected to finding suppliers with same visions, finding suppliers with qualitative materials and challenges related to visiting suppliers placed in far distances.

6.Discussion

The discussion is structured to follow research questions 1 and 2, however since the answers and questions are interrelated many of the aspects are mentioned several times and from different perspectives. The third research question, regarding barriers and opportunities will be discussed throughout the discussion in both the sections 6.1 and 6.2. The discussion aims to compare and discuss how theory and findings are connected and/or differs. The discussion ends with reflections regarding the reliability and validity of the results.

6.1. Strategy formulation

The implementation of sustainability strategies in organisations requires as described by Gaziulusoy, et al. (2012) and Ottman, et al., (2006) a great amount of change, both internally within the organisation and externally in communication and collaborations with stakeholders. These changes from ordinary practises of business-as-usual brings several challenges for implementation. Eriksson-Zetterquist (2011) described that, internally, one of the reasons for many change efforts to fail is the resistance to change within employees. Some of the reasons for resistance have been observed to be self-interest, misunderstanding and lack of trust, different assessments and low tolerance (Eriksson-Zetterquist, et al., 2011).

Many of these reasons for resistance can be related to theories around sustainability. For example, Drexhage & Murphy (2010) described how the concept of sustainability remains elusive for organisations, which can be one reason behind misunderstanding as a reason for resistance. This was also mentioned by Aras (2015), who stated that the concept of sustainability can be problematic since it is subject to different definitions even though it is one of the most used words at companies. The misunderstanding as a reason for resistance could be linked to the challenge described by the consultants in section 5.3.1. of how experts at companies are having difficulties in motivating strategic sustainability integration at organisations. The difficulties were described to be the explaining of the need for and benefits of sustainability strategies as well as how these strategies and goals connects to other processes and parts of the organisation, such as risk and value management. The different assessment reason described by Eriksson-Zetterquist (2011) tells how employees assess situations differently, and may see more costs than benefits compared to managers. Figge et al (2002) and Boons et al., (2012) mentioned how their still is little knowledge in how sustainability factors are related to the long-term economical success of firms and how sustainable innovation can be realised in win-win business solutions and Nidumolu, et al., (2009) stated that many still believe that sustainable development add to costs and does not deliver immediate financial benefits. This is also a situation described in this study. Manager 4 described in section 5.3.1, how many within the organisation saw sustainability as a cost, and how focus still was on a short-term view of investments.

There are several different ways to manage and respond to resistance. Some of the identified are the broadening of staff interests, using understandable terms, having a new look at resistance and new job definitions (Eriksson-Zetterquist, et al., 2011).

There is, as identified, several reasons, motives and drivers behind the creation of strategies. This is confirmed by both theory and findings. De Wit & Meyer (2014, p. 169) defined a strategy as "…a course of direction for achieving an organisations purpose". This purposes can be very different among different organisations and results in different goals and motives. In this study, the primary motivations identified for aiming to achieve sustainability goals were the answering to stakeholder requirements such as customers and authorities, as can be read in **Error! eference source not found.**. All the identified motives in this study were earlier presented by Dangelico & Pujari (2010) who mentioned motivations such as compliance with regulations, competitive advantage, firm reputation and image, ecological responsibility and personal commitment of top management.

The personal commitment of top management were also identified in this study and presented in 5.3.1. The two managers that mentioned the engagement and communication from management described it as an important aspect to overcome internal opinions and scepticism of employees, and it could be argued that the improvement of commitment and communication of benefits from top management could be a possible opportunity to facilitate integration at organisations.

Gaziulusoy, et al., (2012) argued that even though businesses are changing they have not yet reached a point of systemic transformation of the society. This was based on earlier studies that concluded that a majority of companies responding to sustainability issues falls under compliance and efficiency categories. The other categories were, rejection, non-responsiveness, compliance, efficiency, strategic proactivity and the sustaining corporation (Dunphy, et al., 2014). Also in this study, a majority of the interviewed companies were analysed to fall under the compliance and efficiency categories based on the characteristics identified for each group, described in section 2.2.2. Many of them had also already started projects and initiatives of improving their sustainability works towards a more integrated state. Company G stood out from the group and described characteristics on the level of integration closer to the strategic pro-activity and sustaining corporation groups and had developed governance schemes on both strategic and project level related to social and environmental sustainability.

6.2. Ways of implementation

As mentioned in the previous section discussing strategic aspects of sustainability integration, companies' reasons and ways of implementing sustainability initiatives are different. According to both Robèrt et al. (2012) and the findings in this research they also have a different level of connecting to a defined strategy. Robèrt et al. (2012) described a focused, strategic transition towards a sustainable society as a requirement for success. However, they also described that many organisations often start to work with sustainability related issues before defining or planning a sustainability strategy.

One of the interviewed consultants as well as the researcher had similar experiences as Robèrt et al. (2012). Companies they had collaborated with often had ongoing

projects or processes for sustainability while their strategies were not developed in an integrated level neither down to operational level nor up to system level. The managers interviewed in this study also described similar situations where many of the respondents mentioned that they did not have a defined strategy for sustainability even if some of them had incorporated environmental management systems.

It was further also mentioned by Ottman, et al., (2006) how, even though, sustainable development and green product innovation is becoming more common in several industries there is still a confusion regarding the definition of a green product. One definition was "… strive to protect or enhance the natural environment by conserving energy and/or resources and reducing or eliminating use of toxic agents, pollution and waste" (Ottman, et al., 2006, p. 24). The strive here is enough, since no products have zero impact, however it could be discussed if the "strive" in this definition adds to the the ambiguity of the term and thereby how to reach that term. Hallstedt, et al. (2013) also argued that a common view on what sustainability means for the company is necessary to effectively incorporate sustainable ways of working including both social and ecological aspects into innovation processes.

Another way of categorising strategies for sustainability in innovation were described by Brook & Pagnanelli (2014), who stated that the will and consent of executives to invest in more radical sustainability projects is often related to the risk propensity of the firm which is reflected in the choice of innovation strategies. The four different groups, originally presented by Miles, et al. (1978), were the Prospector, Analyser, Defender and Reactor. The groups also reflected the organisations relations and reactions to the market and are described in section 2.2.4.

The managers in this study described balances between investments in radical and incremental innovation, that could be categorised under both the Defender and Analyser category, while the manager from Company G described investments that could be described as focusing and finding new markets and product opportunities that are characteristics of the Prospectors. The Analysers are positioned between the Prospectors and Defenders and are organisations that try to minimise risk while maximising opportunities for profit.

Dangelico & Pujari (2010) identified compliance with regulations as constraints to green innovation but also as opportunities to avoid future risks. This was also identified in this study. One of the managers mentioned how new laws many times affected the product quality to the worse, however the same managers saw regulations as a necessity in order to move markets towards sustainability. Manager 2 also described that the lack of regulations for social sustainability could be a hinder for the pace of development in that area. While this was the case in one company, it was presented in section 5.1.1 that another manager mentioned how costumer demands were not as high as expected and therefore strategies were mainly discussed and developed to avoid future risks of an increase in the demand. This raises the question of how to push organisation that do not have the same external demands in the direction of sustainability. Should it be trough education and change of markets or with the help of stricter regulations?

A part from the negative affect that organisations without external pressure will have less drivers to integrate sustainability which can lead to less organisations doing so, there are other dimensions to the problem. Manager 1 described how they tried to improve working conditions at one of their suppliers in order to improve the value chain of which they are apart. However, one of the difficulties in doing so was that the suppliers had other customers that did not request the same levels of commitment. This means that the issue of one organisation not seeing reasons to change will affect many other organisations and actors and their ability to be truly sustainable.

One of the consultants described how they often helped to prioritise among goals and developed tools, like checklists with requirements that could be brought to meetings with suppliers. These tools were adapted to one specific organisation in order to capture their specific challenges and opportunities. This can be described as a strategically successful move if following the arguments of Gaziulusoy, et al., (2012) who argue that there are no generic strategies that can be applied to all companies since challenges and barriers are contextual and they therefore have to be developed in a systematic way with an understanding of the companies' role and impact in the society. Furthermore, the consultant described that the focus should be on incorporating processes in already set structures and documents to avoid it not being connected to other processes and also avoid that it is not done when it is not prioritised.

6.2.1. Project integration

Labuschagne & Brent (2005) described how sustainability principles often lacked integration on the process level of organisations where project management methodologies are categorised. It was stated that many companies have started to define what sustainability means for them on a strategic level and that the implementation of environmental management systems led to integration on operation level. Furthermore, Silvius & Tharp (2013) also pointed out that efforts of integrating sustainable development in projects is growing but still limited. These tendencies can also be identified in this study. Most of the companies have not yet integrated sustainability efforts through each gates. However, all of them considered sustainability issues in the beginning of projects, specifically when choosing suppliers and raw materials. Labuschagne & Brent (2005) also suggested to develop indicators that could be used in decision-making processes of projects to assure alignment to sustainable development processes. Consultant 1 described the need to discuss sustainability requirements at the same stages as quality and time requirements are discussed in order to really make it happen. This was also described to be up to every project manager. These statements, once more tell the need to link sustainability strategies and sustainability related processes to both the rest of the organisations' goals in order to make benefits visible, and to other critical processes such as quality management in order to integrate it into ordinary meetings and forums.

Epstein & Roy (2003) argued that making a business case for social and environmental performance is the only way to enable managers to integrate these aspects into business strategies and also stated that most companies instead only acted as they considered to be socially responsible. Boons, et al. (2012) also

mentioned that one way of managing the gap between innovations and organisational strategies could be to define sustainable business models that includes economical performance at several levels. In this study, one of the companies were categorised as strategically more developed in integrating sustainability strategies, this company was also the one company that had developed both sustainable business cases and models. This could be seen as one way to facilitate the integration to other processes and organisational strategies as mentioned by Boons, et al. (2012). However, the identified strategic integration at company G in this study can also be due to many other factors.

When comparing findings in this research, that are summarised in **Error! Reference source not found.**, **Error! Reference source not found.** and **Error! Reference source not found.** with the summarised challenges from the literature review in **Error! Reference source not found.**, it can be seen that all identified challenges in this study are supported by previous literature in the subject. Thereby this study contributes to strengthen the arguments within those theories. Furthermore, this study contributes to the theory by identifying the additional challenges of internal and external communication related to sustainability. These challenges are in one way related to the "understanding the value of integration", that were described in different ways as a challenge in the literature. This was related to how financial benefits often were difficult to show and that the terms sustainability and sustainable development still had different definitions for both different organisations and individuals within organisations. However, described by the consultants, this study also identified a gap of knowledge between sustainability experts at organisations and other employees that can create organisational inertia to be a barrier for implementation of sustainability strategies.

6.3. Critical evaluation of result

There are several limitations in this study and its results. The theoretical framework is developed to provide a broad understanding of the context of the problems as well as the challenges. However, covering many areas may also lead to the loss of in-depth theory on for example challenges, and at the same time not being able to cover all aspects or theories in relation to those presented. The methodology has a qualitative approach in order to capture descriptions and views of employees however the limited number of participating companies makes it difficult to generalise and draw conclusions from the results. This further makes it difficult to draw conclusions or see patterns related to the characteristics of the companies, such as size, industry etc. The results in this study rather show a great diversity of issues related to the topic, that also can be of value to recognise. However, some issues, such as the ambiguity of the term, seems to face companies independent of size or industry. Since all companies are represented by one interviewee only, the description of the sustainability work at the company is limited to one person, this shows a further limitation for the results and its ability to be compared. The interviews were also carried out within one hour which further made it difficult to fully understand all processes and challenges for integration at the different companies. Furthermore, the time for the research to be performed is also limited. The analysis made by the author can be affected of perceptions and experiences of

her and thereby reflect in the presentation of data and choice of quotations, even though the author has aimed to stay as objective as possible. Lastly, the ambiguity in the term sustainability strategy may have lead to interviewees responding differently regarding if and how they had defined strategies.

7.Conclusions and future research

The companies participating in this study have different main motivations for the creation of sustainability strategies. This can be due to many aspects. The companies are all developing products but within different industries that entail different challenges and different types of customers, regulations and relationships to other stakeholders such as suppliers. Further, the companies are of different size and on different levels of their development of sustainability strategies. As presented in the results, some are just in the beginning of defining strategies, while others have started processes but not necessarily defined a strategy for them or connected them to the rest of the organisation. These facts both show the individual challenges of all organisations and how it is difficult to compare the processes of one organisation to another. However, the majority of the companies have implemented sustainability processes before setting and defining a strategy that is aligned with other processes and goals of the organisations. This supports the theories by Robèrt, et al (2012) who also stated that a focused, strategic transition towards a sustainable society is a requirement for success.

The companies also have different ways of implementing their processes or strategies on strategic, process and operation level. Some of the companies in this study are implementing sustainable operations through their quality management without a connection to a wider defined strategy while others are managing operations with the help of EMS's. One of the managers described processes integrated on all the levels, however, most of the companies seemed to lack integration on process level and in project management methodologies that also was the theory of Labuschagne & Brent (2005). In order to integrate sustainable values in project management, Labuschagne & Brent (2005) suggested to develop indicators that can be used in decision-making processes to ensure that projects are executed to contribute to sustainable development.

The different natures of the participating companies bring different barriers and opportunities for the implementation of sustainability strategies. One of the main barriers that both is a barrier for integration and a limitation to this study is the ambiguity inherent in both of the terms sustainability and sustainable development. As long as these are not clearly defined at organisations it will always be a barrier for the implementation of it. However, even if an organisation defines its own meaning for the term there will still be challenges when collaborating with other organisations and stakeholders that have their own definitions of the terms. Other common barriers that were identified in this study include lack of resources, such as time, human and financial, the quantification and measuring of softer social goals, organisational inertia, and stakeholder management. According to authors such as Boons, et al, (2012) and Epstein & Roy (2003), making sustainable business cases and models are great opportunities to facilitate integration which also seems to be a successful case at Company G in this study. Other successful factors mentioned by interviewees was committed top management, strict regulations, long-term relationships with suppliers, and informed customers.

The nature of the barriers and opportunities identified in this study are highly connected to communication. Therefore, the author suggests organisations to focus on improving both internal and external communication channels. The internal

communication includes the challenges of making sustainability benefits and goals clear to all employees. This includes both setting actions and plans for what and how to do but also making clear why this should be done and how it can benefit the company as a whole but also the individuals within it. This can be a way of overcoming both the ambiguity in what the concept entails in practice but also increase motivation when benefits are understood. External communication is equally important in order to show these benefits for suppliers but also making them clear to customers. An organisation being able to create sustainable business models will have easier in communicating this to others, and thereby ensure the success of it. Furthermore, making the benefits clear internally can be a way of overcoming limitations in resources. Executives might not hesitate to invest time, human and financial resources in long-term strategies if their benefits can be shown.

In the introductory part of this report it was stated that many scientists agree that our current society is on a long-term unsustainable course. It was also stated that product development and manufacturing industries have an important role in changing the direction of the society towards sustainability. Furthermore, it was described how most organisations recognise and accept sustainable development as a guiding principle but still has difficulties implementing the concept. This could also be seen among the organisations participating in this study. In order to change this direction and gather knowledge in how to successfully integrate strategies it is necessary for more extensive research to be done. Future studies could be done in both quantitative and qualitative ways in order to further understand challenges and opportunities. A quantitative study within a single industry could identify certain barriers specific for that industry and suggest more adapted solutions for improvements. Furthermore, in order to grasp the challenges on a more detailed level it is suggested that qualitative studies with narrower focuses are done. This could for example be to look at one aspect of sustainability, or to only focus on challenges specific for e.g. communicating with customers.

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Appendix A

Interview questions - Consultants

This interview guide is a part of the data collection in the dissertation ”Managing Sustainability Integration in Innovation Projects – A study of strategy implementation for product development organisations”. The research is done within the study program International Project Management at Chalmers University of Technology and Northumbria University. The aim is to identify potential barriers and opportunities for the implementation of sustainability strategies at product development companies.

The company

1. How many people are working at your company?
2. What are your different roles and jobs?
3. In which industry are most of your costumers?
4. How do you work geographically?

Missions

5. What are your tasks and duties?
6. How do you initiate the work with a customer?
7. What type of consultancy do they more often seek?
8. Do you more often consult in specific projects or business development?
9. In which phases of a project are you more or less involved?

Customers

10. How do your customers work with the integration of sustainability goals before your consultation?

11. What are the usual motives for organisations to contact you and for wanting to develop their social and environmental work?

12. What value and which benefits do your customers more often want to achieve by integrating sustainability measures within their work and organisations?

13. Do your customers experience any difficulties with the integration of sustainability goals? (social, ecological, economical) If so, what?

The Work

14. Do you experience any difficulties within your job? If so, what kind of difficulties?

15. Are you using any tools or models for the integration of ecological and social sustainability goals? If so, how do you choose them?

16. When consulting a customer, do you more often focus on improving the work with one of the three pillars or all at the same time?

17. How do you work with going from strategy to actual implementation of sustainability initiatives?

18. How do you work with the monitoring and following-up of sustainability goals?

19. How do you believe is the best way to achieve “win-win” situations when organisations decide to implement sustainability goals? (company-society)

Appendix B

Interview questions - Researcher

This interview guide is a part of the data collection in the dissertation ”Managing Sustainability Integration in Innovation Projects – A study of strategy implementation for product development organisations”. The research is done within the study program International Project Management at Chalmers University of Technology and Northumbria University. The aim is to identify potential barriers and opportunities for the implementation of sustainability strategies at product development companies.

Research

1. What is the goal with your current research?
2. Do you experience any difficulties in your research work? If so, what?
3. What progress within your research area do you consider to be the most important in recent time?
4. What do you see as the next step within research in this area?

Strategy

5. How does an effective sustainability strategy look on an organisational level, according to you?
6. How well do you experience that companies in general formulate their strategies and visions in order to facilitate integration on project and process level?
7. What do you think that companies can do on a strategic level in order to facilitate integration on project level?
8. What do you think is the best way to bridge strategic work with daily operations?

Integration

9. Are there any general difficulties for product development organisations that wants to integrate sustainability goals? If so, what?
10. Have you experienced that organisations that you have collaborated with have had specific difficulties in integration work? If so, what?
11. Do you experience any differences in integration in incremental and radical innovation?
12. Which tools or models for integration do you experience is more common among organisations?

Process/Project

13. How can implementation of sustainability goals take form during the different phases of a development project?
14. Which phase and/or which methods for integration do you think is most important?
15. How do you think you can integrate sustainability requirements in a project on the same level as requirements for cost, time and quality?
16. How do you think is the best way to achieve “win-win” situations in relation to sustainability goals between organisations and the society?

Appendix C

Interview questions - Managers

This interview guide is a part of the data collection in the dissertation ”Managing Sustainability Integration in Innovation Projects – A study of strategy implementation for product development organisations”. The research is done within the study program International Project Management at Chalmers University of Technology and Northumbria University. The aim is to identify potential barriers and opportunities for the implementation of sustainability strategies at product development companies.

The Company

1. Describe your company shortly, including history and development.
2. How many people work at your company?
3. How do you operate geographically?
4. What are your different roles and tasks?

Strategy

5. How is your sustainability strategy formed? Does it connect to a wider corporate strategy?
6. Is your sustainability strategy connected to business goals? If so, in what way?
7. How do you work with connecting strategies to processes on project level?
8. Do you work with portfolio or program management in relation to sustainability? If so, in what way?

Process and Integration

9. What does your product development process look like?
10. How do you work with sustainability in different parts of the project life cycle?
11. Why do you work like you do, and how did you develop these processes?
12. Do you use any specific models or concepts to integrate environmental and social sustainability goals? How did you choose those?
13. Do previously mentioned concepts work well? If not, how do you see that it could be developed?
14. Do you work with both radical and incremental innovation? If so, in what way do they differ in regards to integration of sustainability?

Barriers and Opportunities

15. Do you experience any difficulties when integrating sustainability goals? (social, environmental, economical) If so, in what way?
16. What motivates you to integrate sustainability goals in product development?
17. What values do you see in integrating sustainability goals in product development?
18. How do you think is the best way to achieve ”win-win-win” situations in relation to sustainability goals between organisations, the society and customers?