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Managing Foresight for Innovation in Large Firms

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MANAGING FORESIGHT FOR INNOVATION IN LARGE FIRMS

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Abstract: More and more companies are searching for strategic orientation and feel the need to support more future insights to win the innovation race. Corporate foresight is expected to do exactly that. On a social level we apply foresight every day by expanding our awareness of the future. Yet, in a corporate context this concept has been less explored. There is a lack of research covering how to organise for and manage foresight, particularly in an innovation context. The purpose of this study is therefore to examine how large companies can manage foresight for innovation. This was investigated in a qualitative study with the means of multiple case studies and expert consultation. Findings show that managing and organising for foresight for large firms can be done on the basis of two approaches, formal or informal. This is based on theory and has been extended and modified in this study. The formal approach builds on structure and processes whereas the informal approach is based on the corporate culture. Which approach is more suitable depends on the existing structures and culture in place, as well as the desired outcome of foresight.

Keywords: *foresight, strategy, innovation, strategic management, innovation management, corporate foresight, future studies*

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List of Abbreviations

ATR	Advanced Technology & Research
BU	Business Unit
CF	Corporate Foresight
CP	Corporate Process (function within Volvo)
F2F	Face-to-Face
FE	Front End
IT	Information Technology
NBD	New Business Development
NPD	New Product Development
PI	Planning & Innovation

1 INTRODUCTION

1.1 Background

Today's business environment is defined by rapidly changing technology, intense competition and shortening product-life cycles, where innovation[1] has become a critical factor for organisational success to sustain competitive advantage (von der Gracht et al., 2010). More and more companies are searching for strategic orientation and feel the need to support more future insights to win the innovation race (Rohrbeck, 2010). The view that innovation is vital for survival and growth has long been widely accepted (Schumpeter, 1939: Dosi, 1988; Dougherty & Hardy, 1996; Dodgson et al., 2008; von der Gracht et al., 2010), whether for business or society as a whole.

In order to cope with these issues, innovation management plays an important role in generating and developing new ideas and to manage the challenges of the future (von der Gracht et al., 2010). However, developing new ideas only does not necessarily result in innovation. An idea becomes innovation if value can be appropriated from it. To move ideas to market launch in an effective manner, an innovation process can be employed, which involves decision-making, coordination and communication mechanisms to transform inputs into outputs (Dodgson et al., 2008). Such an innovation process needs to be managed to improve efficiency (Cooper, 2001). However, firms need to be aware that a highly process-oriented focus can lead to failing to see broader changes that can disrupt their business, as they are unable to change routines swiftly enough to adapt (Dodgson et al., 2008).

Large companies[2] in particular face challenges when trying to cope with changes in the environment. One of these challenges is the already mentioned *high rate of change*, relating to shortening product life cycles and the increase in innovation speed and diffusion (Rohrbeck, 2010; von der Gracht et al., 2010). Secondly, *ignorance,* concerning the limited outside scanning scope of organisations, the short time frames of strategic planning, the overload of information top management has to deal with and that information does not reach the right decision rooms (Rohrbeck, 2010). And lastly, *inertia*, which exists due to the complexity of structures in large companies and their lack of willingness to cannibalise existing successful operations (Bessant & Francis, 2005; Dodgson et al., 2008; Rohrbeck, 2010). These three challenges reduce a company's ability to successfully identify changes and breakthrough developments. Companies need to break away from this path dependency to lower the barriers for implementing organisational change, and Corporate Foresight (CF) is expected to increase the chances of doing exactly that (Rohrbeck, 2010).

Corporate Foresight can be considered part of strategic management, as strategy making is in essence a future-oriented process (Constanzo & MacKay, 2009). Strategy is traditionally concerned with the long-term development of the organisation (Chandler, 1962; Porter, 1980; Barney, 1986) as industry-leading companies essentially compete for the future by identifying tomorrow's opportunities today and by developing capabilities to exploit those (Hamel & Prahalad, 1994). In that sense, foresight can be seen as

[1] An innovation is the implementation of a new or significantly improved product *(good or service)* or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations (OECD, 2005).
[2] A large company classifies as one with more than 250 employees or 50 million Euros turnover (European Commission, 2014).

a means to reach goals and objectives in the future. Moreover, it is a way for companies to cope with uncertainties and to gain insights for anticipating and preparing for the future. If practiced successfully, foresight could potentially be regarded as a vital ability to maintain and develop competitive advantage (Chia, 2004).

Von der Gracht et al. (2010) argue that a combination of well-developed corporate foresight and innovation management is a key success factor in the knowledge economy[3]. Von der Gracht et al. (2010) and Rohrbeck (2010) both argue for foresight as part of strategic innovation management, given it's overarching future orientation. This implies that foresight and innovation are closely interrelated concepts. In the context of innovation, foresight is typically referred to in front end activities to inspire or guide ideation (Herstatt & Verworn, 2001; Reid & Brentani, 2004; von der Gracht et al. 2010).

1.2 Empirical Setting

The Volvo Group (hereafter named 'Volvo') is an example of a large company that is facing the challenges mentioned previously. The global manufacturer of trucks, buses, construction equipment and marine engines has over 100,000 employees, sales in 190 markets, and production in 19 countries[4]. To lead the early phases of business innovation and to challenge traditional ways of working, the team Planning & Innovation (hereafter named 'PI') provides insights on what the future will bring, often technological or IT related, and uses this information for NBD to various internal and external customers. They are currently operating on a case-by-case basis and therefore seek a more mature and formalised way of working with foresight. As a result, the team is interested in understanding how other large companies in various industries manage and operationalise foresight, which in turn initiated the setup of this thesis project. Moreover, Volvo is currently reviewing their way of working, which is why foresight is of strategic importance for Volvo and deserves more attention.

1.3 Problem Setting

The objective of management is to improve efficiencies and enhance sustainable competitiveness. Innovation plays a major role in meeting these objectives, as competitive advantage is created through a company's ability of making and doing things more cheaply and better, or to make and do new things, which their competitors cannot provide (Dodgson et al. 2008). Therefore the setting of this thesis will be within the context of innovation management.

The importance of foresight has been widely recognised, not only among companies but literature as well (Tsoukas & Shepherd, 2004; Andriopoulos & Gotsi, 2006; Rohrbeck & Gemünden, 2011). Nevertheless, until today, the role of foresight remains poorly explored in the innovation literature with only few studies that have examined the processes firms apply to utilise foresight (Andriopoulos & Gotsi, 2006; Rohrbeck, 2010).

[3] The economy is moving from a traditional industry-driven economy to a knowledge-based economy due to ease of accessing information and thus knowledge (von der Gracht et al, 2010).
[4] Volvo Group (2014)

At the social level we apply foresight every day. Taking along an umbrella and stocking food are examples of activities in which we anticipate and prepare for the future (cf. Slaughter, 1990). Foresight is, and has always been, integrated in human life. However, what is interesting for this thesis is how it can be managed and operationalised in a corporate context. Corporate Foresight has to be more visible and integrated into organisational processes, such as strategy and innovation, to be successful (Neef & Daheim, 2005). Yet, studies have shown that there is lack of successful implementation and practice among companies (Rohrbeck & Gemünden, 2008). In addition, we have identified a lack of literature streams covering the actual organisation for foresight i.e. how it can be set up and managed. This opened up the opportunity to investigate the topic, which is why we wanted to examine how large companies can use foresight as a strategic ability to not just prepare for the future, but to capture new opportunities, that could otherwise not have been detected.

Large companies have reached a certain level of maturity with established processes and certain ways of working. For foresight to be meaningful, it needs to be integrated fundamentally into the ways of working, which is why we need to look at how foresight can actually be managed and implemented. To explore this, it is essential to examine the building blocks of foresight, which relate to it's meaning and the potential benefits, challenges, and the subsequent organisation that needs to be in place for foresight to be effective.

1.4 Research Question

The objective of this thesis is to support Volvo in exploring the way large companies can manage and organise for foresight. More specifically, we seek to discover whether the current way of working in the PI team within the Volvo is aligned with our findings. Foresight is very much a strategic activity and the target audience of this study is managers that deal with innovation in their active role.
Therefore, our resulting research question with relevant sub-questions is:

How can a Large Company Manage Foresight?

- What is Foresight?
- What are the Benefits of Foresight?
- How can Foresight be Organised for?

In this study the term 'Foresight' refers to foresight in a corporate context, unless stated otherwise. 'Managing' is associated with organising and coordinating activities to achieve defined goals and objectives of a firm. 'Organising' in this sense incorporates how it can be set up and how foresight activities are communicated.

This study aims to complement past research regarding foresight and how it can be used in innovation management. Studying foresight in an innovation perspective will contribute to the research field of innovation management, which is an area where foresight studies to date can be said to have been neglected.

1.5 Scope

This thesis focuses on providing an overview of how large companies currently manage foresight. This implies that we do not aim for providing in-depth information of the various cases but rather to provide the holistic picture on a managerial level. Moreover, we will not discuss the external environment and context the case companies operate in, but focus on the internal organisation of foresight. It should be kept in mind, however, that the context most likely affects how foresight should be approached. The methods and tools used for gathering, interpreting and diffusing future insights also lie outside the scope of this thesis, as it has been extensively covered in past research and as this goes more into depth of the various specific activities within foresight practices.

1.6 Disposition

This thesis will proceed with a definitional framework of foresight rooted in literature. This will cover various research perspectives and dimensions of foresight that exist. Thereafter, the paper will continue with an outline of the applied methodology to answer the research questions. The findings are then presented, followed by an analysis. The thesis ends by presenting the conclusions including recommendations and future research. Figure 1.1 below summarises this outline and the relevant content for each of the sections.

Figure 1.1 Outline of the Thesis

2 THEORETICAL FRAMEWORK

Conducting a systematic literature review on the issue of corporate foresight has resulted in the identification of certain building blocks of foresight necessary to answer our research questions. The first section revolves around the discussion of *what foresight is* and how it can be defined. The next section will present why companies should do it, i.e. *the benefits of foresight*, including its promises to innovation. How to *organise for foresight* is the topic of the third section and last, the *challenges* associated with managing corporate foresight will be discussed.

Figure 2.1 Outline of the Theoretical Framework

2.1 What is Foresight?

Foresight at the very basis is a human capacity by which we expand our awareness of the future to clarify the dynamics of emerging situations through scanning futures, as a kind of vision of the mind (Slaughter, 1990). According to Chia (2004), this capacity is widely recognized as a significant source of competitive advantage, wisdom and cultural renewal within nations and corporations. Others see it as a pre-phase of planning in which foresight is a collective term for probing into the future (Alsan & Oner, 2003). But foresight can also be seen as an ability to essentially cope with the future and to make sense of it (Tsoukas & Shepherd, 2004; Rohrbeck, 2010) and to use these insights in organisationally useful ways to detect conditions, shape strategy or explore new markets (Slaughter, 1990). Detecting insights and conditions is based on detecting weak signals, which are external or internal warnings that are too incomplete to permit an accurate estimation of their impact or to determine a complete response (Ansoff, 1975).

When the future is examined from a company's perspective the widely recognized term is Corporate Foresight (Rohrbeck & Gemünden, 2008). The rationale for defining corporate foresight as an ability is according to Rohrbeck (2010) due to its promise of developing the company's portfolio of strategic resources, which in turn enhance the firm's ability to create competitive advantage. Further, there is a need of dynamic capabilities as external changes constantly challenge a company's portfolio (Rohrbeck, 2010).

Noticeably, the views in research differ on whether foresight is considered a human capacity (Slaughter, 1990), an ability (Tsoukas & Shepherd, 2004) or a method (Destatte, 2010). However, all these have in common is that it is used to guide the search for valuable future opportunities to meet long-term goals. By doing it efficiently an organisation can spot developments before they can be named trends or even create them to shape the direction of future events (Tsoukas & Shepherd, 2004). Searching into the future leaves the organisation with possible opportunities, which in turn enable the organisation to be proactive and reactive to what may happen (Alsan & Oner, 2003).

Moreover, it becomes clear that foresight should not be confused with forecasting, single-point predictions (Alsan & Oner, 2003), or even speculation and prophesying (Tsoukas & Shepherd, 2004). Through foresight, an event can be anticipated that will take place at some future point in time (Tsoukas & Shepherd, 2004). Forecasting on the other hand has been the use of scientific techniques for predicting specific events on the basis of past evidence (Van der Heijden, 1996). Slaughter (1993) provides another clear distinction between a prediction, forecasts and foresight. According to Slaughter (1993), a prediction is a confident statement about a future state of affairs. Forecasts then, are based on "if … then" reasoning, based on past knowledge. That is, if certain conditions hold, then a particular outcome can be expected with a certain level of confidence. But merely bringing the future to bear onto the presence is not sufficient (Tsoukas & Shepherd, 2004). Foresightfulness is about the ability to cope with the future as an institutionalised capacity (Tsoukas & Shepherd, 2004). According to Slaughter (1993), it is first and foremost a human capacity and skill, to protect from harm and to smoothen operations day-to-day. He mentions examples of taking an umbrella, building defence, saving up for something and taking precautions to avoid something as a way of anticipating the future. In that sense it is a mental process, which we all use every day.

The definition in below is the view that will be adopted throughout this thesis and presents a combination of definitions by Rohrbeck (2010) and Slaughter (1990). Seeing foresight as an ability to cope with the future is adopted from Rohrbeck (2010) as it supports the view that companies constantly need to adapt their strategic resources to create competitive advantage. Making sense of insights in organisationally useful ways to detect conditions, shape strategy or explore new markets is adopted from Slaughter (1990), as it expresses that foresight can be applied today to shape the future of the organisation.

Definition of Foresight
Foresight is the ability to cope with the future, to make sense of it and to use these insights in organisationally useful ways to detect conditions, shape strategy or explore new markets.

By authors

2.1.1 Related concepts

Reviewing existing literature revealed a number of relevant concepts in various literature streams. Innovation Management, Strategic Management and New Product Development are bodies of literature that are all concerned with taking the future into account. For example, concepts such as opportunity recognition or market visioning can be viewed as related concepts to foresight, as these can be a part of foresight activities but in itself do not constitute the foresight concept, which we have established in the previous section. The related concepts will therefore not be discussed in detail, but a selection of examples of related concepts can be found in the table of Appendix A.

2.1.2 Key Findings 'What is Foresight'

Definitions of Foresight	Authors
Human capacity	Slaughter (1990)
Vision	Slaughter (1990)
Pre-phase of planning	Alsan & Oner (2003)
Probing into the future	Alsan & Oner (2003)
Ability to cope with the future	Rohrbeck (2010), Tsoukas & Shepherd (2004)
Detect conditions, shape strategy, explore new markets	Slaughter (1990)
Not forecasting or prediction	Slaughter (1993), Alsan & Oner (2003)

Table 2.1 Key Findings 'What is Foresight'

2.2 What are the Benefits of Foresight?

"The best way to predict your future is to create it"

Quote by Peter F. Drucker [5]

The rationale for using foresight can be put into four key points. The first one is that involving the future is an active view of decision-making, i.e. acknowledging that decisions have long-term consequences (Slaughter, 1993). This in line with Rohrbeck's (2010) notion of improving decision-making through the reduction of uncertainty, by challenging basic assumptions held today and by identifying trends and early warnings. Secondly, alternatives in the future can influence choices today. Becoming aware of those alternatives opens up new choices for the present. Similarly, action can be taken to avoid something or to create something (Slaughter, 1993). Probing into the future not only provides opportunities to react to and anticipate the future, but also to create it (Andriopoulos & Gotsi, 2006). Alternatives in the future can trigger action, new R&D projects and business developments, as well as support strategic decision-making (Rohrbeck, 2010).

Thirdly, forward thinking is preferable over crisis management, as it is possible to explore options and alternatives and with that anticipate eventualities and prepare for contingencies, whereas crisis management is expensive and wasteful (Slaughter, 1993). And lastly, the one thing that we know for sure, is that our present dynamism will continue to occur, i.e. we will face more radical changes in every aspect of our lives, which creates a major challenges to which we need to adapt (Slaughter, 1993). The merits are that possible consequences of actions and decisions can be assessed, that problems can be anticipated before they occur and that present implications can be considered of possible future events (Slaughter, 1990).

2.2.1 Benefits of Foresight for Innovation

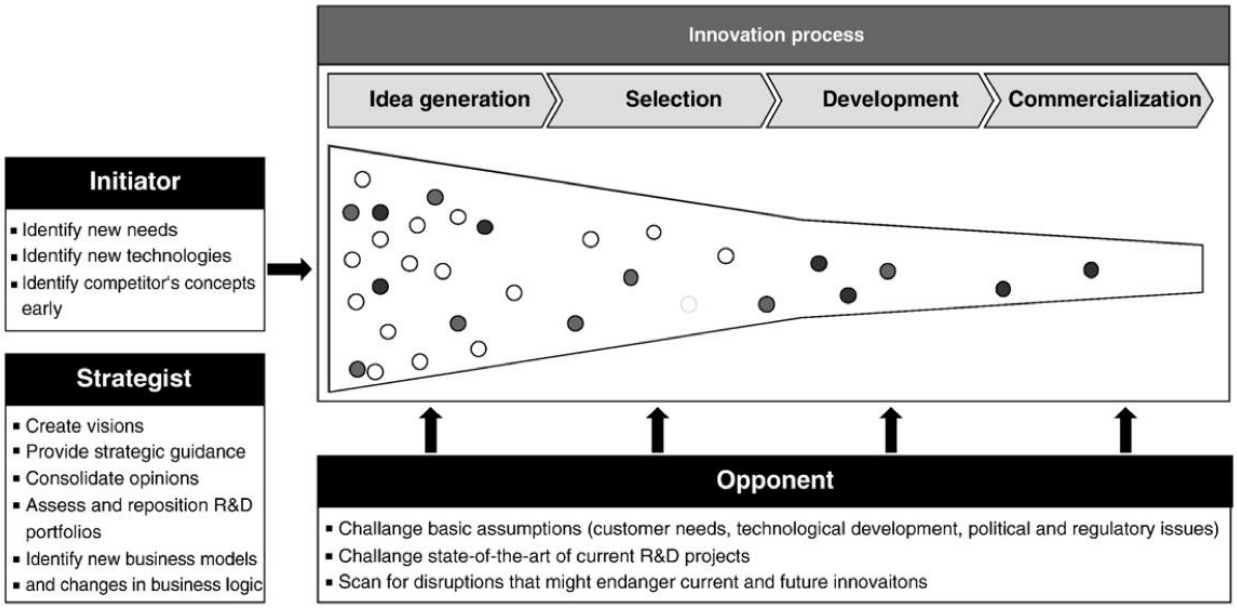
Foresight is a part of strategic innovation management, given it's overarching future orientation, which implies that foresight and innovation are closely interrelated concepts (von der Gracht et al., 2010; Rohrbeck, 2010). In line with this, Rohrbeck & Gemünden (2011) have discovered three major clusters,

[5] Good Reads (2014)

which can be described as roles of corporate foresight in benefiting the innovation capacity of firms. The innovation process illustrated in Figure 2.2 below refers to a four step process consisting of (1) Idea generation (2) Selection (3) Development and (4) Commercialisation.

In the beginning of the innovation funnel, foresight can play the role of an *initiator*, triggering initiatives through the discovery of new customer needs, technologies or competitor product concepts (Rohrbeck & Gemünden, 2011). A related finding is that of von der Gracht et al. (2010), who found that corporate foresight can benefit innovation in the idea generation phase by inspiring and developing new ideas from insights. Outside of this funnel, foresight can play the role of a *strategist*, guiding innovation activities by providing vision, consolidating opinions, reviewing innovation portfolios and identifying new business models. This role is further reinforced by von der Gracht et al. (2010), that corporate foresight can facilitate the assessment of the appropriability when the idea is already established. Throughout and along the funnel, foresight can play the part of the *opponent*, challenging the innovators by questioning basic assumptions and current R&D projects, by scanning for potential disruptions that can threaten current and future projects (Rohrbeck & Gemünden, 2011); in that sense foresight can also be used to kill projects.

Rohrbeck & Gemünden (2011) also state none of these roles is prevailing over the other. However, the front-end literature stream would argue otherwise. If one were to adopt this view, the initiator role would probably be believed to be the most relevant one for the innovation process. This is based on the front end of innovation often being described as the root of success for any company hoping to compete on the basis of innovation (Cooper & Kleinschmidt, 1987; Herstatt & Verworn, 2001; Reid & Brentani, 2004; Dewulf, 2013). Herstatt & Verworn (2001) believe that the early phases have the highest impact on the entire process and the result, as it will influence the design and total costs substantially. According to this view corporate foresight insights would then have the greatest impact in the front-end of innovation, taking on the role of an initiator. The figure below visualises these three roles along the innovation process, which are explained in more detail in Appendix B.



Source: Rohrbeck & Gemünden (2011)

Figure 2.2 Three Roles of Foresight in the Innovation Process

2.2.2 Key Findings 'Benefits of Foresight'

Benefits of Foresight	Authors
Improve decision making by reduction of uncertainty, identifying trends and early warning	Rohrbeck (2010)
Influence choices today	Slaughter (1993)
Create / shape the future	Slaughter (1993), Andriopoulos & Gotsi (2006)
Trigger action	Rohrbeck (2010)
Anticipate problems and eventualities before they occur and prepare for contingencies to avoid crisis	Slaughter (1993)
Consequences of decisions and actions can be assessed	Slaughter (1990)
Benefits of Foresight for Innovation	**Authors**
Inspiration and Initiation	Rohrbeck & Gemünden (2011), von der Gracht et al. (2010)
Strategic guidance	Rohrbeck & Gemünden (2011), von der Gracht et al. (2010)
Challenging assumptions and current R&D projects	Rohrbeck & Gemünden (2011)

Table 2.2 Key Findings 'Benefits of Foresight'

2.3 Organising for Foresight

This section is concerned with the way companies can engage in foresight activities, based on two approaches, i.e. whether it is organised on a structural or cultural basis, and presents a typology of different corporate foresight systems.

In literature various elements of foresight have been researched, such as what it is and the value it creates. However, there is a lack of literature streams covering the actual organisation for it in a corporate context, i.e. how it can be set up and managed. Rohrbeck (2010) is one of the few authors who has done comprehensive research on this subject, which is why this study will utilise his research extensively in this section. The existing research is particularly encompassing the specific methods and tools used for gathering and analysing insights, which is why these will not be discussed in detail. Nevertheless, a short table with commonly mentioned tools and methods that the literature review revealed can be found in Appendix C.

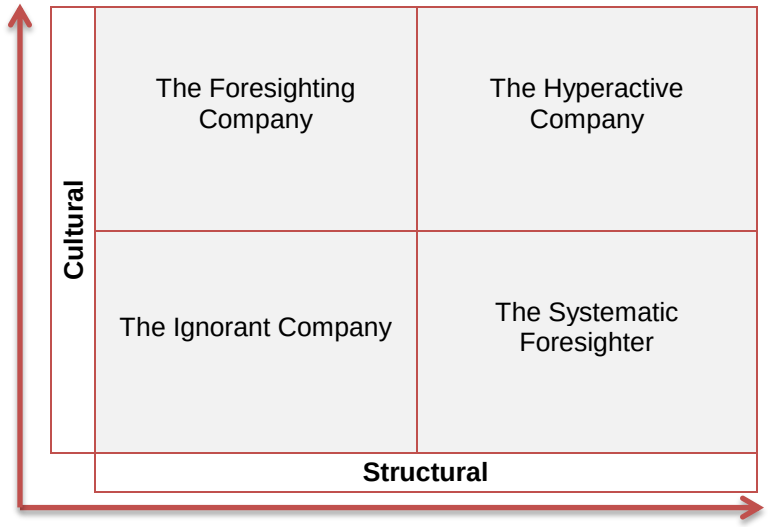
According to Andriopoulos & Gotsi (2006), foresight revolves around a cycle of environmental scanning, interpretation and learning. In that sense managers can scan the environment by collecting relevant information from various sources. Such sources may include customers, suppliers, competitors and other potential sources (Andriopoulos & Gotsi, 2006). This will in turn aid companies to build capabilities that can capture innovation opportunities, which is why innovation management is closely related to foresight. Large firms in particular need to build capabilities that enable to prepare for and proactively deal with innovation opportunities and threats created by emerging discontinuous conditions as they tend to be less responsive to change and exploiting or dealing with new situations (Bessant & Francis, 2005). This due to their established routines and processes (Bessant & Francis, 2005), which is why foresight can play an important role here.

To begin a foresight activity, Bessant & Francis (2005) highlight the importance of enhancing the signal processing capacity to make sure that companies don't automatically filter out discontinuous and disruptive information. An influential search strategy to enhance opportunity recognition is through the use of market and technology scouts (Bessant & Stamm, 2007). This is in line with a best practice found by Rohrbeck (2010) of employing a network of scouts. Using scouts can be motivated by the importance of direct communication among people and triggering management action through contextual information, instead of basing it on reports or presentations only (Rohrbeck, 2010). People as first-hand evidence of weak signals is an effective way to convince management to initiate major changes, as knowledge transfer is positively influenced by social proximity. Important here is that the network is global and tight, and enables frequent communication to validate signals. Companies can use both internal and external scouts, with external scouts possibly providing valuable regional and local knowledge of markets.

2.3.1 Building Corporate Foresight

Rohrbeck (2010) sees two approaches for building corporate foresight in organisations. The first one is a structural approach, in which corporate foresight is seen as a task, which is completed by dedicated units. The second one is a cultural approach, in which a large number of employees is involved, who are empowered to detect and respond to weak signals on discontinuous change.

A corporate foresight ability matrix that displays theoretical typologies of corporate foresight systems can be developed by combining the two above-mentioned approaches in a diagram, as demonstrated in Figure 2.3 below.



Source: Based on Rohrbeck (2010)

Figure 2.3 Types of Corporate Foresight Systems in Theory

The *Foresight Company* has practices that build on culture and involve a large proportion of the employees of the company. Here foresight is incorporated in traditional functions on a continuous basis where all employees are expected to be forward-minded. The *Systematic Foresighter* is a company strong in structural elements such as systematically gathering and analysing information with sophisticated

methods and formalised processes, which are linked to other corporate functions. The *Hyperactive Company* in turn is strong on both cultural and structural elements, which is not to expect due to high efforts and rivalry between informal and formal processes that simultaneously generate insights. This approach is therefore not desirable. Lastly, the *Ignorant Company* is neither strong in cultural or structural elements and is therefore expected to lack the ability to cope with and manage discontinuous change. In this position, companies are therefore not likely to succeed in times of discontinuous change. (Rohrbeck, 2010)

Concerning the choice between a cultural or a structural approach, Rohrbeck (2010) emphasises that companies have a more cultural approach to match the corporate culture based on individual initiatives and open communication. In contrast, companies that build more on structural approach rely more on formalised processes where clear responsibility is needed. Rohrbeck (2010) concludes tentatively, that companies that build their culture around empowering employees should focus on elements in the cultural approach. However, corporate cultures that emphasise clear processes and responsibilities have a better match with elements from structural approach.

All foresight activities have in common that it is important to give all involved parties enough time to discuss and challenge the insights generated in an activity. Failing to do so is associated with the threat to trigger a not-invented-here syndrome, potentially inhibiting the use of the insights (Rohrbeck, 2010).

2.3.1.1 Structural Approach

In the structural approach response to discontinuous change is achieved by linking the foresight process to other corporate functions. A best practice in this approach was found by Rohrbeck (2010) of a project-based approach, in which a central foresight unit on a corporate level identifies new business fields and trends and then translates those into individual business opportunities for the business units. This unit is responsible for foresight projects and for identifying key long-term technologies and developments with high growth and high disruptive potential, as well as identifying future customer needs and new business models.

In the structural approach, the foresight projects aim at facilitating collaboration between the business units and corporate unit, through steering by top management, collaborative project management and joint staffing. This ensures the buy-in of the business unit, which is needed to ensure acceptance and that action will be taken (Rohrbeck, 2010). An example of such a team could be two full time managers, four to six core members working between 40% to 80% of their time, experts on demand in several units, and external experts, such as thought leaders, university contacts and lead users (Rohrbeck, 2010).

Success factors in the structural approach are, according to Rohrbeck (2010) a high degree of participation of the foresight customer, for example the business unit, in the foresight activity. Involving the foresight customers, stakeholders and decision makers in the foresight process, for example in gathering real-life information and first-hand evidence, will enhance communication greatly (Rohrbeck, 2010). This increases decision-making speed, promotes a constructive dialogue to plan the future and increases likelihood that foresight results will trigger actions. In general, using a structured approach will enhance the transparency, speeding up decision-making and increasing the commitment of internal

stakeholders (Rohrbeck, 2010). The process should moreover be iterative and involve top and middle management.

Proceeding this line of thought, Rohrbeck (2010) has also identified a best practice of communicating insights through participation. This best practice incorporates seven mechanisms that facilitate communication and participation, which are described in more detail in Appendix B. An example of such a mechanism is making information as tangible as possible, by capturing for example lead user statements, interviews and communicating these through blogs, pictures, video and audio recordings. Prototyping is another way to make information as tangible as possible (Carleton & Cockayne, 2009; Rohrbeck, 2010). These can be used as a tool to envision complex systems to aid the exploration of future opportunities (Carleton & Cockayne, 2009). Engaging in prototyping at an early stage in new product development is commonly used to improve the product or service performance (Bogers & Horst, 2013). This is important to confront the decision makers with data, as future-oriented decisions are often based on gut feelings. In general, such mechanisms have a large potential for improving the impact of foresight activities (Rohrbeck, 2010). Blogs for example have a very wide reach and foresight insight presentations motivate more people to participate in future exploration projects (Rohrbeck, 2010).

Rohrbeck (2010) also pointed out a that employees in a structural dominated approach to foresight often experienced that the individual employee is being discouraged from scanning the environment due to the perception that foresight is a central function exclusively performed by dedicated units. As such, this perception can hamper the overall integration of foresight into ways of working.

2.3.1.2 Cultural Approach

Foresight in the cultural approach is incorporated in traditional processes such as New Business Development (NBD) and Corporate Entrepreneurship, on a more continuous basis (Rohrbeck, 2010). This is in line with Andriopoulos & Gotsi (2006) who state that foresight should not be seen as a end goal but rather something that emerges continuously in tandem with a firm's visions and strategies for the future through a learning and probing process. Here, incentives are in place to encourage every employee to scan for weak signals in the environment (Rohrbeck, 2010). Such incentives however, imply that there are still some formalised processes in place, feeding for example, into strategic planning or innovation processes (Rohrbeck, 2010).

Culture is an aspect that can have a direct effect on corporate foresight activities and can also enable corporate foresight systems. Cultural elements here include willingness to share across functions, readiness to listen to scouts and external sources, attitude of the organisation towards the periphery, willingness to test and challenge basic assumptions (Day & Shoemaker, 2005), and informal communication (Rohrbeck, 2010). Companies need to change employees' mindsets and internal processes in order to exploit opportunities of discontinuous change, going from "doing the same things but better" to "doing things differently" for types of innovation (Bessant & Francis, 2005). In order to do so, Bessant & Francis (2005) propose expanding the peripheral vision by finding ways of looking at the fringes of markets, existing technologies and corporate activity, by for example the use of Internet and networks (Bessant & Francis, 2005).

Andriopolous & Gotsi (2006) use the example of a successful multiple product innovation design company for effective foresight practices, in which experimentation is inherent in the corporate culture, promoting creative 'accidents' and a risk-taking culture. Through fostering quick trial and error experiments a probing culture is nurtured, which is beneficial for foresight activities.

To organise for foresight, proficient communication internally and externally and the involvement of the right people is essential (Rohrbeck, 2010). Involving the right people refers to certain characteristics of people that are desirable for foresight activities. Through his extensive study, Rohrbeck (2010) identified a best practice within this dimension to involve every employee to manage discontinuous change and to promote an external view. This is in line with Mendonc et al. (2004) and their notion of empowering organisational members to detect and deal with weak signals, and further allowing improvisation their area of expertise. Moreover, this involves not only asking all employees to have an external view, but also to propose appropriate managerial actions when coming across insights (Rohrbeck, 2010). In this best practice certain personal "growth traits" were applied, which foster foresight abilities and play a vital role in preparing the company for the future (Rohrbeck, 2010). These are often emphasised in day-to-day work in this practice and evaluated every year in a personal annual review. These traits are promoted as part of the corporate culture and summarised in the table below.

Personality Trait	Description
External focus	Employees are expected to actively look outside the company boundaries and continuously scan the periphery
Clear Thinking	The ability to translate strategy into action. A clear thinker communicates clearly and concisely
Imaginative	Employees should use their creativity to identify opportunities and take risks to make them reality and thus add to the company's competitiveness
Inclusiveness	The ability to connect and inspire other people to invest their efforts in new topics and the ability to create an environment of trust
Expertise	Employees should strive to continuously enhance their domain, functional, and industry knowledge, allowing them to make better judgments on opportunities and threats

Source: Rohrbeck (2010)

Table 2.3 Personality Traits that Foster Foresight Abilities

This leads to the conclusion that this mechanism successfully makes every employee part of a large foresight system, fostering the ability to detect and respond to discontinuous change (Rohrbeck, 2010). Moreover, the corporate culture is an important trigger for taking action. Employees are, in fact, expected to take action themselves if they have insights that open up windows of opportunities. The corporate culture also fosters fast communication across boundaries and hierarchies, which together with the internal network was said to be a crucial success factor. (Rohrbeck, 2010)

2.3.2 Key Findings 'Organising for Foresight'

Building Corporate Foresight Structural Approach	Author
Formalised foresight process	Rohrbeck (2010)
Linked to other corporate functions	Rohrbeck (2010)
Foresight seen as a task	Rohrbeck (2010)
Project-based approach	Rohrbeck (2010)
Dedicated central foresight unit	Rohrbeck (2010)
Translation to business opportunities for individual units	Rohrbeck (2010)
Workshops to challenge current projects	Rohrbeck (2010)
Collaborative project management approach	Rohrbeck (2010)
High degree of participation and involvement of foresight customer and stakeholder into foresight process	Rohrbeck (2010)
Making information tangible	Rohrbeck (2010), Carleton & Cockayne (2009), Bogers & Horst (2013)

Building Corporate Foresight Cultural Approach	Author
Empowerment of employees to detect and respond to signals	Rohrbeck (2010), Mendonc et al. (2004)
Incorporated in traditional processes such as NBD and corporate entrepreneurship	Rohrbeck (2010)
Activities conducted on continuous basis	Rohrbeck (2010), Andriopoulos & Gotsi (2006)
Willingness to share	Day & Shoemaker (2005)
Readiness to listen to scouts and other sources	Day & Shoemaker (2005)
Attitude towards organisational periphery	Day & Shoemaker (2005)
Willingness to test and challenge basic assumptions	Day & Shoemaker (2005)
Informal and quick communication	Rohrbeck (2010)
Individuals' mindsets	Bessant & Francis (2005)
Willingness to experiment	Andriopoulos & Gotsi (2006)
Risk-taking culture	Andriopoulos & Gotsi (2006)
Growth traits that foster foresight	Rohrbeck (2010)
Corporate Culture to trigger action	Rohrbeck (2010)

Table 2.4 Key Findings 'Organising for Foresight'

2.4 The Challenges of Managing Foresight

This section revolves around the challenges of managing foresight by laying out examples of barriers of foresight in a corporate context and by discussing psychological perspectives of foresight.

2.4.1 Barriers of Corporate Foresight

Rohrbeck (2010) identified five barriers in particular that companies face regarding corporate foresight activities. The first challenge is one of the organisational sensors not detecting change to begin with. A second barrier is that if change is detected, it might not be judged as relevant by the foresighter. If the foresighter judges the change as relevant, he/she faces the challenge of convincing decision makers about the relevance of change. The fourth barrier is that reaction strategies are not planned and/or decided, and even if, the responsible persons for acting might not be convinced and thus prevent change, which presents the fifth challenge. Oftentimes companies tend to not have a problem with identifying trends and changes or assessing their relevance. But what they did experience were the difficulties with convincing decision-makers about its relevance. (Rohrbeck, 2010)

These barriers can, according to Rohrbeck (2010), be managed by for example having the capacity to scan the environment, assigning clear responsibilities and having formal decision-making processes. Rohrbeck (2010) further demonstrates that developing individuals' foresight characteristics or hiring foresightful individuals corresponds with the first three barriers, whereas promoting internal networks may be beneficial to overcome the last two barriers. Important to note is that Rohrbeck's (2010) study implies that all of these barriers can be somewhat dealt with by defining accountability for sensing weak signals, establishing formal communication channels, triggering foresight activities top-down and bottom-up, and creating an open and sharing culture with an interest in the periphery.

When it comes to strategic management, the overall integration of foresight insights into decision-making is relatively low (Rohrbeck, 2010). Managers are expected to base decisions on facts, empirical data and forecasts. Foresight insights however, are often highly uncertain and ambiguous. This creates a challenge as such insights could be seen by management as yet another piece of information widening the various possibilities, making it seem more like a hurdle or hindrance in strategic decision making. Executives might feel more comfortable basing decisions on data and facts – even if they are incomplete or inconclusive. (Rohrbeck, 2010)

2.4.2 Psychological Perspective

A search process may to some extent be passive, depending on how confident the managers are of their existing activities which influences a bias towards confirming these existing activities rather discrediting those and looking for new activities (Andriopolous & Gotsi, 2006). To interpret and evaluate information, people use cognitive schemata in relation to past experiences to then develop possible futures (Andriopolous & Gotsi, 2006). In accordance with that, MacKay & McKiernan (2004) also claim how past thinking affects our ability to understand the future. These biases could result in misperceptions about events and in that sense impair certain foresight methodologies. Moreover, Blackman & Henderson (2004) reveal that the mental models of the individuals employing them bias foresight activities, which can lead to unproductive futures.

Neugarten (2006) adds another interesting perspective of how foresight can lead to tunnel vision and over-focusing on one direction, thereby neglecting context and periphery. He explains that foresight should not just be about looking forward but rather that it should encompass a wider view of where the organisation is now and the context in which it functions and operates. This is essential for organisations to be aware of competitors and innovations coming from the periphery, which is outside the immediate focus of activities (Neugarten, 2006). Organisations making use of future Vision and Mission statements regard this as a high degree of strategic foresight. However, Neugarten (2006) argues that a straightforward vision implies nothing about an ability to sense peripheral information, react to weak signals or to dynamically changing environments and thereby ignoring the discarding of relevant information.

MacKay & McKiernan (2004) claim that to be able to conduct effective foresight, effective de-biasing is required. The conclusions people draw in hindsight paint their picture of the future, as the underlying assumptions and perceptions can lead to path-dependencies from the past into the future (MacKay & McKiernan, 2004).

2.4.3 Key Findings 'Challenges of Managing Foresight'

Challenges of Managing Foresight	Author
Expectation to base strategic decisions on facts and empirical data	Rohrbeck (2010)
Confirmation bias towards existing activities	Andriopolous & Gotsi (2006)
Past experience bias	Andriopolous & Gotsi (2006) & MacKay & McKiernan (2004)
Mental models	Blackman & Henderson (2004)
Tunnel vision	Neugarten (2006)
Change not detected	Rohrbeck (2010)
Change not judged as relevant	Rohrbeck (2010)
Convincing decision makers	Rohrbeck (2010)

Table 2.5 Key Findings 'Challenges of Managing Foresight'

3 METHODOLOGY

3.1 Research Strategy

In order to understand the concept of foresight, a thorough analysis covering the various building blocks of foresight was needed. An external analysis of companies was suitable here as we sought to investigate how large companies can manage foresight including benefits, challenges and how it could be organised. Therefore, our main methodology was qualitative research to obtain rich data and information about strategies, processes and approaches used for deploying foresight and to be able to understand the big picture. This type of information is most likely to be found in views and perspectives of people as well as certain expertise, which is, by definition, unobtainable through the use of quantitative analyses such as surveys (Bryman & Bell, 2011). Moreover, a qualitative methodology provides a certain degree of flexibility, to adjust for example, interview questions throughout the processes in alignment with discoveries made, in contrast to testing an established hypothesis.

We are aware that this research strategy is highly susceptible to bias, due to the nature of qualitative research based on interpretations by the researcher. Moreover, the generalisability of this strategy is often of concern (Bryman & Bell, 2011). However, we did not aim at a generalisation across companies, but simply to provide an understanding of how things can be done in various settings.

3.2 Research Design

The research is considered explorative as we seek to draw comparisons and to obtain data with the use of a few case studies and qualitative interviews. The approach was chosen due to the novelty of the research subject of organising for foresight. More specifically we aimed at constructing comparative case studies in line with Yin (2011) who claims that this is a preferred method when dealing with *'how'* questions. This implies a study through qualitative interviewing of more than one case where we seek some comparison between them (Bryman & Bell, 2011).

The use of multiple case studies was a way of providing a general understanding and to be able to conduct some type of comparative analysis. Academically, the lack of research on foresight in the innovation management field motivates a study of several cases to broaden the knowledge and understanding of how foresight is organised for in a corporate context. This is accomplished by examining several cases to get the greater picture of the organisation and benefits of foresight rather than an in-depth analysis of few cases. This approach has been taken in research by Rohrbeck & Gemünden (2008) who claim that multiple case studies unavoidably will sacrifice some richness but also lead to developing theory that is more generalisable and easy to test. We will examine six external cases and one internal case as we argue that seven case studies is a reasonable number given the time constraint, which also allows for some degree of comparison and implications.

Moreover, certain experts in the field of foresight were invited to participate in our study. This was done with two objectives in mind. The first was to obtain guidance and insights on how research in this area could be done. This involved receiving direction of important areas to cover in our theoretical framework

and also the possibility to clarify or to make sense of theory. The second objective was to gain insights and support to our empirical investigation in terms of identifying best practices in the field and how to find the relevant individuals to talk to.

3.3 Research Methods

To answer our research questions in this study we used both primary and secondary data. This section provides an overview of the choices we made regarding the means of data collection, selection of firms and respondents and the practicalities of our study.

3.3.1 Secondary Data Collection

For the objective of this study we had to discover and investigate the concept of foresight and what it entails in a corporate context. The secondary data in this thesis is mainly based on articles and books, i.e. existing literature within the field of foresight. In addition to that, we also used company websites for background information about the case companies. Secondary data in terms of PowerPoint presentations available online supported us in deciding upon potential interviewees. The electronic databases we used to find relevant journals articles, books and dissertations were Business Source Premier, Emerald, ScienceDirect, SpringerLink, LIBRIS, GUNDA and GUPEA. How frequently the articles have been cited and whether they have been peer-reviewed were important criteria in our literature review, apart from the relevant content. We moreover screened the references of interesting articles and extended our search from there. By the use of a literature log and glossary of terms we kept track of all examined literature and concepts.

Important to note is that we decided to treat *'Corporate Foresight: Towards a Maturity Model for the Future Orientation of a Firm'* by Rohrbeck 2010 as our main source of information in our theoretical framework when investigating the managerial and organisational dimensions of foresight. This is not only because it is a comprehensive study on corporate foresight in companies over a longer period of time, but also because we discovered throughout our literature review that the aspect of 'what is foresight' has been researched extensively as well as the tools and methods available. Nevertheless, how to organise for foresight in a corporate context appears to be less explored. With the objective of our study in mind, which is to explore how large companies organise for foresight, we accepted the drawbacks of basing a major part of our theoretical framework on Rohrbeck (2010).

3.3.2 Primary Data Collection

Given the explorative nature of this study qualitative interviewing was the preferred method of obtaining data. We applied the technique of semi-structured interviewing due to its iterative nature to be able to adapt and restate questions according to the situational circumstances. This degree of flexibility and adjustment was our main motivation behind choosing this method. The flexibility is advantageous when exploring a topic and to be able to obtain richer information from the respondents, providing us with a more complete picture. On the other hand, the semi-structure assures a level of focus and guidance at the same time (Bryman & Bell, 2011), which is very helpful for researchers that are relatively inexperienced in the field of interviewing.

Initially, we conducted cross-functional internal interviews at Volvo to obtain an understanding of the research environment. The next step involved conducting external interviews with companies potentially working with foresight in a direct or indirect way.

3.3.2.1 Selection of Firms and Respondents

Each case in a case-study research should be selected for it's original way of answering the research question (Yin, 2011). Initially, we tried to identify companies upon their foresight activities, such as their willingness to plan 10-30 years ahead, or intention to take the future into account in some way. From our literature review we identified Germany and the United States of America as promising geographical areas where best practices can currently be found. From there we listed potential case companies and consulted our supervisors for potential contacts. The majority of our interviewees have been identified through a closed innovation network.

This network organises events such as company presentations, workshops and seminars etc. Besides our existing list of companies we were interested in, we pre-screened these PowerPoint presentations. Further on, the individuals presenting on or around the topic of foresight were identified and screened. The process of finding the right individuals involved examining their competencies and current positions, their use of valid references, and any other publications or published material. Up to date contact information was found mainly through the innovation network and additionally through the use of various search engines such as Google and the social media network LinkedIn. The company interviewees were moreover selected based on the criteria of working directly or indirectly with innovation, business development, strategy or similar and a position within the company of some type of leadership, i.e. Manager, Head, Director etc. This was important as the research context is within innovation and strategic decision-making.

When approaching the individuals we always asked that if they were not be able to participate themselves whether they could refer us to another suitable colleague to contact. Moreover, if we only had one confirmed contact person, we also asked for an additional recommendation, as we aimed to have about two interviewees per case companies. Through this we could obtain several more interviewees, which is also why the number of interviews at each company resulted in an uneven amount.

We contacted our potential interviewees via emails, in which we attached an information sheet about our research, the invited companies, whom else we contacted within the same company, etc. In a few cases we sent reminders after five to seven working days and we made sure to avoid sending it on Fridays, to improve the chances of the email being read. In total we sent out 27 emails to eleven external companies and received eleven responses agreeing to participate, resulting in seven external case companies.

The academic experts we contacted in this study were identified based on literature. The other experts who were consultants were identified based on availability and accessibility from Volvo's side, as either already existing external customers or potential ones in the future. We reached out to six experts in total and three of them agreed to participate.

Table 3.1 below provides an overview of all the interviews we conducted.

Company	Position of Interviewees	Date (2014)	Length (mins)	Channel
Gartner	Vice President and Gartner Fellow in Enterprise Leadership and Innovation	25/3	30	Phone call
N/A	Associate Professor of Strategy at Aarhus University	26/3	45	Video call
Institute for the Future (IFTF)	Business Development Director	1/4	90	Video call
Volvo Group HQ	Senior Analyst Strategic Competitive Intelligence	14/4	60	F2F
Volvo Group HQ	Director Business Development	14/4	60	F2F
Volvo Group HQ	Director Long Term Plans	14/4	45	F2F
Volvo Group HQ	Vice President Communication & Innovation	4/4	30	F2F
Volvo Group Venture Capital	Investment Director	15/4	45	F2F
Volvo Group Trucks Technology	Director Truck Multi-brand Product Planning	16/4	50	F2F
Volvo Group Trucks Technology	Senior Innovation Strategist	22/4	60	F2F
Swisslog	Innovation Manager	3/4	110	F2F
IBM	Chief Technologist, Enterprise Business Unit Technical Leader	11/4	90	F2F
DHL Customer Solutions & Innovation	Director Solutions & Innovation	23/4	60	Phone call
SKF Automotive	Innovation Strategy Advisor	16/4	60	F2F
SKF Research Centre	Research Centre Director	16/4	45	Phone call
SKF Group Technology Development	Director Innovation Management	30/4	45	Phone call
Novozymes	Innovation & Business Developer	15/4	60	Phone call
Novozymes	Head of Innovation Development	13/5	50	Phone call
AstraZeneca	Project Director Pharmaceutical Development	25/4	80	F2F
Siemens	Senior Key Expert Consultant Innovation Management	8/4	40	Phone call
Siemens	Head of Visioning and Scouting Team	24/4	45	Phone call

Table 3.1 List of Semi-Structured Interviews

One of the cases was excluded from our case studies after conducting the interview. This is due to the fact that in retrospect we judged the information to be inapplicable with regard to the objective and focus of this thesis.

3.3.2.2 Practicalities

Our interview guides were based on our research questions and structured in accordance with the building blocks in our theoretical framework. As our interviews were conducted with different purposes we constructed one interview guide for the experts (Appendix D) and another for our case companies (Appendix E). We had several questions under each sections, from which we would choose and adapt relevant questions in a given interview situation as we went along. This assured our preparation for tapping into various expertise areas, which we could recognise throughout the interview. Moreover, our interview guide made sure to avoid leading questions.

To be able to keep track of our data we recorded the interview sessions and took notes simultaneously, which would facilitate the later detailed transcription of the interview. We made use of a recording tool called "AudioNote" in which the notes taken are linked to the minutes of the recording in which that

particular note was written, which allowed us to backtrack important sections of the interview. As we were two interviewers, we could allocate the task of taking notes and recording to one person, and the role of moderation to the other. This allowed us to continuously keep focus and to listen carefully to be able to ask the right questions, without distraction of keeping notes, etc.

Some of the interviews were conducted on a face-to-face (F2F) basis in quiet and undisturbed meeting rooms. Most interviews however, due to geographical distances, were conducted on a conference or phone call basis, either through the use of a communication tool called "Lync" or tools such as "Skype". In some cases we used phone calls to avoid instable Internet connections disturbing the quality of our interviews.

Throughout the time of our research the CP&IT office of the Volvo Group hosted us. This enabled us to gain a more in-depth understanding of their way of working in comparison to the external cases. Here, we could sometimes capture more information in a rather informal setting with unstructured interviews and conversations.

Figure 3.1 below summarises and illustrates our approach taken in this study comprising our research methodology.

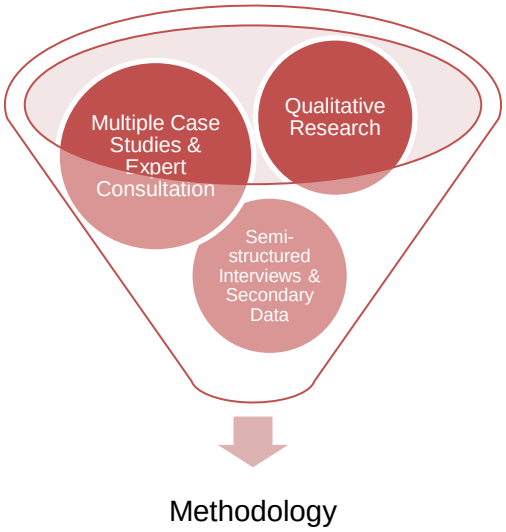


Figure 3.1 Overview Methodology

3.4 Data Analysis

After completing our literature review and writing up our theoretical framework we created tables after each chapter to provide an overview of our key findings. We used the same approach in the empirical findings chapter. After transcribing the interviews we summarised them in a text (Appendix F), which forms the basis of the tables of key findings in the empirical findings chapter. When analysing our results we compared our key findings, which could be seen as way of actually coding and categorising the data.

Our aim was to use grounded theory as means of analysing our qualitative data, which means that we attempted to analyse our data in tandem with the data collection. We further tried to take as many notes as possible during the interviews or immediately after to make sure not to miss any valuable information (see section on practicalities). We further used recordings to validate and extend our transcripts, which is important to be able to code and categorize qualitative data according to Bryman & Bell (2011). The evolving data was interpreted and coded somewhat during collection, and theoretical reflections were made throughout the research process.

3.5 Quality of the Study

3.5.1 Validity

Ensuring validity in qualitative studies is generally problematic (Bryman & Bell, 2011). Validity refers to what extent you are measuring what you are supposed to measure. As stated earlier, we do not seek to draw any general conclusions true for all large companies but rather to explore what foresight is and how large companies can organise for it. To make a study valid it is important to make the results generalisable to be applicable in other settings referred to as external validity by Bryman & Bell (2011). This is problematic in qualitative studies such as this one in which we use a few case studies. Making sure that the research question is well formulated and clear can increase the validity and also serves to steer the research direction. We also attempted to find the appropriate interviewees for the topic of interest with the criteria of having some type of leadership position and working directly or indirectly with innovation (‘Selection of Firms and Respondents’ section).

3.5.2 Reliability

Reliability refers to if a study can be replicated and this is also generally difficult in qualitative studies due to the problems of creating the same environmental settings under the investigation (Bryman & Bell, 2011). However, we argue that our thorough explanation regarding decisions we have made in terms of procedures and choices increases the reliability of this research study. Moreover, the lack of internal reliability has been reduced due to two authors validating each other in what has been heard and observed, ensuring inter-observer consistency by Bryman & Bell (2011).

4 EMPIRICAL FINDINGS

This section will outline the results of the empirical data collection. The empirical data can be classified into three distinct groups. The first group is that of the consulted experts. The information obtained from those interviews provides additional insights and will be treated as a type of extension to theory, i.e. the information will not be juxtaposed in opposition to the findings in theory. The second group consists of Volvo with the internal interviews. The information obtained from that case will be treated in two ways, one is as background information to provide the basis for appropriate managerial insights to Volvo, and secondly as a case company which will be compared against other cases. The last and final group is that of the external case companies, which provide us with an overall picture of the current foresight practices that found in practice today. It is important to note here that, as foresight in most companies is not yet an established concept, the information obtained relates mainly to the interviewees personal views and opinions. The analysis section will then compare the empirical data from all case companies to theory including the expert consultation.

This section is divided into the three empirical groups, each structured into background information and the building blocks of foresight, i.e. what it is, the benefits, the organisation and the challenges. Information in relation to these building blocks has been included and information that is unrelated to the building blocks has been excluded. The clustering into the building blocks resulted from the interview guides, which were originally structured according to these dimensions and can be found in Appendix D and E. The results from the interviews are summarised and presented in tables and the full description can be found in Appendix F.

4.1 Internal Case Volvo Group and PI

4.1.1 Background

Table 4.1 below provides a brief overview of key figures of the Volvo Group.

Company	**Industry**	**Revenue** (2013 millions)	**Number of Employees**	**Number of interviews**
Volvo Group	Transportation	SEK 272,622	115,000	7

Table 4.1 Key Figures Volvo Group

Planning & Innovation (PI), as part of Corporate Processes & IT, Volvo Group Headquarters, is a global team of eight individuals located in Sweden, France and China. The team's objective is to improve Volvo Group's overall business through leading the early stages of business innovation, set effective long-term plans and to challenge the more traditional ways of working. *Tech Watch* within PI provides insights, often technological and IT related, of what the future will bring and use this information for business developments to various internal and external customers. The team develops business innovation prototypes to visualise insights and concepts. PI makes sure that there is both supply push and demand pull within each business innovation prototype and provides half of the funding through pitching proposals to the internal R&D fund. To create an equal partnering for the development, the customer

matches the other half. The 50/50 partnership allows PI to bring risk into the scope with the purpose of generating more innovative developments. Since the founding in 2003 the group has developed over 80 business innovation prototypes. PI currently performs well in identifying and capturing technical and IT related trends, but is seeking to find a more mature way of working with foresight.

After getting an introduction to Volvo Group in meetings hosted by several individuals in the organisation internal data collection started off by the use of face-to-face interviews. Table 4.2 below demonstrates the interviewees and their position in the company. The interview guide for the semi-structured interviews can be found in Appendix E. The following section provides a description of the empirical findings.

Department/ Business Unit	Assigned Number & Position
Headquarters Innovation and Strategy	(1) Vice President Communication & Innovation
Headquarters Planning & Innovation	(2) Strategy & Planning
Headquarters Business Development	(3) Director Business Development
Headquarters Business Intelligence & Strategic Planning	(4) Senior Analyst Strategic Competitive Intelligence
Group Trucks Technology	(5) Senior Innovation Strategist
Group Trucks Technology	(6) Director Truck Multi Brand Product Planning
Volvo Group Venture Capital	(7) Investment Director

Table 4.2 Volvo Group Interviewees

4.1.2 Empirical Findings Volvo

Foresight at Volvo

This section revolves around what the interviewees associate with the term foresight.

Definition of Foresight	
Interviewee	**Response**
Interviewee (2)	- capability to take in things that may or could happen - to be aware of the possibilities but not how to handle them
Interviewee (3)	- foresight is more from the outside, unframed - entails customers, segments, needs, and requirement beyond product-focused market visioning
Interviewee (4)	- foresight is the same as business intelligence - GTT is the unit that is trying to figure out what is happening in the long run in terms of future and trends
Interviewee (6)	- a guided way of describing different scenarios for the future - if we can forecast to vision or even beyond, and backcast to where you are today, then this can result in a picture of something

Benefits of Foresight

This section revolves around the internal interviewees' perspectives on benefits of foresight.

Benefits of Foresight	
Interviewee	**Response**
Interviewee (1)	- a key function in the new innovation and planning function to steer the vision - serve as input for planning - a way to look into the future but outside the current path and boundaries
Interviewee (2)	- a way of challenging managers in the organisation - should be done on a on a continuous manner to be used as input for long term planning - radical ideas in the long term planning process starts with emerging trends, and that there is a need to continuously scan for them
Interviewee (5)	- help people to broaden horizons - cites Peter Drucker's *"the best way to predict the future is to create it"* - about taking incremental steps where you learn, and that it is not only about being prepared, but also to be able to create the future - creating signals or triggers to realise where you're going - foresight should be accessible for many people so they can use it in their work and for that it is essential that people understand it so they in turn can make actionable ideas and insights
Interviewee (6)	- foresight should challenge us - history has never been a straight line and that one needs to embrace radical ideas - no need to for plan things we know will happen, but rather see it as a potential of stretching the boundaries - not about predict what we do not know, but rather about being prepared for unexpected things and force us out of the comfort zone
Interviewee (7)	- avoiding to be disrupted by looking ahead and using basic common sense and qualified guesswork based on experience - companies are usually performing well in their current businesses

Organising for Foresight

In this section the internal interviewees were asked about how they organise for foresight, or how they would do it. They were also asked about factors they would need if they were to set up foresight.

Organising for Foresight	
Interviewee	**Response**
Interviewee (1)	- need to have strong interaction with Corporate Strategy
Interviewee (2)	- hard to organise for foresight and brings in the perspective of employees who have mindsets of doing everything in the value chain - tomorrow's work will based on value constellations - he organisational structure may hinder the innovative climate - non sharing information culture - problem with information that stays in the drawers - getting the attention from managers through face-to-face meetings & what direct competitors are doing
Interviewee (3)	- key success factors when doing foresight is to visualise insights, sharing them and having

	different perspectives
Interviewee (4)	- communication of insights - think about the audience & timing
Interviewee (5)	- used IFTF, Shell & Stanford University as inspiration when developing scenarios for Volvo - use scenarios as orientation - up to the innovation people to use foresight in the best way - mentions VUCA - having a digital platform to gather intelligence and sharing intelligence - open innovation platform to create a learning organisation - projects in collaboration with academia
Interviewee (6)	- need a toolbox as a first step including 5-6 approaches available with example situations - a need of connecting it to the formal processes and make it relevant throughout the whole process

Challenges of Managing Foresight

This section revolves around the internal interviewees' perspectives on challenges associated with managing foresight.

Challenges of Managing Foresight	
Interviewee	**Response**
Interviewee (1)	- how to package and communicate foresight to the right stakeholders - getting the information into the right decision rooms
Interviewee (2)	- important to make the information and insights understandable for the top management - not too theoretical
Interviewee (5)	- ability to spread the information in large companies - developing an absorptive capacity at Volvo would be beneficial for foresight - day-to-day people and experts tend to have a narrow view of what they care about
Interviewee (6)	- presenting and communicating foresight because it is extremely complex by nature

4.2 Expert Consultation

The interview guide, see Appendix D, was sent to the three experts in for possible preparation. In accordance with the semi-structured interview approach, the questions asked related to the current situation and conversation, which implies that some sections may be overrepresented by a certain interviewee and vice versa. In the following sections a description of the three expert interviews will be provided in accordance with the structure in the interview guide.

4.2.1 Introduction to Experts

Expert 1: Aarhus University
Expert (1) is an Associate Professor for Strategy with research interest in organisational change, strategy as practice, innovation management and corporate foresight (Aarhus University, 2014). Related to this research Expert (1) has published the book *"Corporate Foresight: Toward a Maturity Model for the Future Orientation of a Firm"*. His research has been published in various journals such as R&D Management, Technology Analysis & Strategic Management, Futures, Technological Forecasting and Social Change.

Expert 2: Institute for the Future (IFTF)
IFTF is an independent non-profit research organisation of about 45 employees, with 25 researchers, with the main purpose to help all kinds of organisations with coping with the future by providing foresight (IFTF, 2014). The interviewee works with business development at IFTF with focus on technology horizons and ten-year-forecast programs and constantly interacts with outside organisations (IFTF, 2014).

Expert 3: Gartner
The interviewee is the Vice President and a Gartner Fellow in enterprise leadership and innovation (Gartner, 2014). The interviewee works with defining best practices in innovation and advises companies on how emerging technology and societal trends will transform their business in a time horizon of 3 to 10 years. She is the originator of Gartner Hype Cycle model, published *"Mastering the Hype Cycle: How to Choose the Right Innovation at the Right Time"* in 2008.

Expert	Role
(1)	Associate Professor of Strategy at Aarhus University
(2)	Consultant Business Development
(3)	Vice President and Gartner Fellow in enterprise leadership and innovation

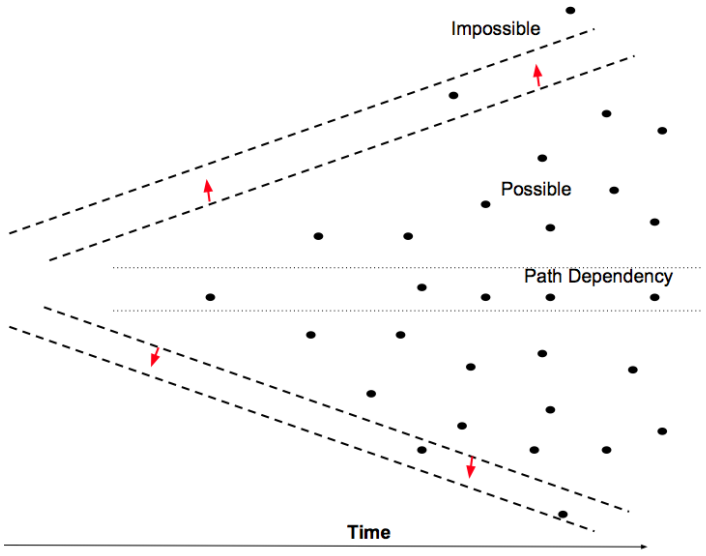
Table 4.3 Overview Experts

4.2.2 Empirical Findings Expert Consultation

What is Foresight

This section will revolve around what foresight is and whether the expert interviewees see any specific industries using, or being in particular need of doing foresight, and doing it better than others.

During the videoconference call with Expert (2), he explained his view of foresight by drawing the picture in Figure 4.1 below. It symbolises the extension of executives' mindsets away from the current path dependency (the dotted lines in the middle) towards the outer boundaries of the company's current scanning (dashed lines on the outside). The dots symbolise the opportunities that can be spotted and the picture illustrates that what we aim at, is to spot more opportunities beyond what we view as possible today. Foresight enables broadening the current business environment boundaries and making a move towards realising those opportunities outside, resulting in an act of shaping the future.



Illustrated by authors

Figure 4.1 Foresight - Shaping the Future

Foresight	
Interviewee	**Response**
definition?	
Expert (2)	- projections of the future for example in terms of how we will work and play - IFTF's mission is to provoke its audience about the future
- any specific industries?	
Expert (1)	- ICT industry and the fashion industry - seeing more industries becoming interested in foresight long-term-oriented like petroleum industry - hypercompetitive environment with temporal competitive advantage with firms are looking to get earlier information about new developments and opportunities

Expert (3)	- not so much industry specific but that Gartner divides companies into company type *A*, *B* and *C* - Type A companies are often leaders in each industry and tend to be technology aggressive, desiring junior ideas and leading edge technologies - Type A - where you find Foresight activities - a couple of industries that tend to think in longer term due to their asset basis, like oil, utility, and transportation - lead-time of 10-15 years and therefore need to think ahead in comparison to - nimble companies where the world is changing so much faster don't need a long-term perspective to the same extent - financial services companies will do technology and trend scan activities but probably on a shorter term on needs in upcoming years

Benefits of Foresight

This section revolves around the interviewees' perspectives on the benefits foresight creates.

Benefits of Foresight	
Interviewee	**Response**
Expert (2)	- executives need to know the varieties of possible futures - executives need to extend the limits between possibilities and impossibilities - with enough insights - people can act (entering a new market, hire new people with a new skill set, acquire companies, spin-off companies) - by taking action you are shaping the future - foresight is an around the clock process - VUCA: stands for volatile, uncertain, complex, and ambiguous and describes the world of business leaders - by doing foresight you can turn VUCA into another VUCA – vision, understanding, clarity and agility - provide a vision to your stakeholders, employees, and help them understand why they are doing what they are doing and multiple opportunities need to be agile

Organising for Foresight

In this section the interviewees were asked to speak about how companies organise for foresight including the set up, specific teams or units, and implementation across the organisation.

Organising for Foresight	
Interviewee	**Response**
Expert (1)	- many firms build their core foresight activities around a team - the size of the team depends on the size of the firm commonly 10 individuals on 100,000 employees - someone who connects internally and externally - IT tools (firms where people will still refuse to use computers at all) - *offline based* or *community* based - issue how to connect the offliners - example of consultation job: firm with 500 high-potentials, 3-10 years experience, managed by the HR department

	- fantastic group to free-ride on in scouting - can also build it around engineering leaders or technology experts identified for their knowledge in certain domains
Expert (3)	- three approaches: dedicated team, distributed approach and broad workshops - dedicated team: run foresight programs, come up with ideas, and feed insights into strategy - distributed approach: companies looking beyond a scan or scenario approach towards more disruptive ideas; use VC dragons den initiatives and other idea generation tools - broad workshops: organised internally or by consultants with people in different roles and perspectives, often senior, put together to brainstorm about the future - a full time line organisation team: full time job to drive innovation and new idea, partly run foresight activities, often annual foresight report where they will go out and look for trends typically technological - the output will determines the approach to foresight - hedge and cope with an uncertain future: maybe scenario planning as it will generate different views of what the future may look like - shaping the future: use a vision exercise to drive strategy and direction - often find a structure around specific types of activities, such as how to do a trend scan
Expert (2)	- hire internally and externally, don't be afraid of using external companies - someone needs to think about the outside perspective, bring in outside speakers, bring in provocateurs, other mindsets - related to his view of using the rising stars for foresight activities - leading stars have to believe passionately around foresight - essential to have individuals that know the foresight world or are willing to be trained on it - executives need to understand and giving a clear view of the future: where you want to be and then work towards that goal - day to day people tend to be interested in the most likely future, and the strategists are more outside the most likely and this is where disruptions happen and that disruptions provide opportunities, challenges, and limits

Best-Practices in Foresight

The interviewees were asked about whether they identified any current best practises.

Best-Practices in Foresight	
- do you see any companies doing particularly well?	
- if you were to make Foresight more formalised, what is needed?	
Interviewee	**Response**
Expert (1)	- setup is *continuous process* or *project-based* - *continuous process:* Deutsche Telekom, has copied extensively e.g. by Cisco Systems - *project-based:* Siemens, with their 'Pictures of the future'
Expert (3)	- see BP in *how a company do it and the scope of it* and *how a company format it* - BP in formatting foresight at IFTF: structured and range of topics created with online structured scan and prediction of major changes - simply put assigning people to do it - think about the output

Expert (2)	- an interest from the HR department is beneficial - HR departments reporting to Strategy or CEO (people are seen as asset) over departments reporting to CFO (people are costs) - senior level shows that foresight is important and that you care about the future - *a rising star network* is a better platform than just strategy department or corporate group focusing - on-going, and that someone needs to think about the outside perspective and for example bring in outside speakers, provocateurs, and other mindsets - IFTF see more success when foresight is spread out in the organisation and not limited to one area or group (e.g. marketing, market research, strategy, corporate development and HR) - roles and individuals in companies he usually sees taking on foresight activities he replies that it is all over the place and across borders - is giving employees permission to look into the future - give them ability to take future thinking across the organisation - have support from seniors - success in companies having buying from C level - having a champion for foresight in organisation, involving all stakeholders - being prepared for disruptions, new opportunities and dilemmas - having seniors that constantly take in foresight and appreciate it even when insights are contradicting the view of the organisation - people across whole organisation need to know that foresight is something that the organisation feels strongly about and will support company wide

Challenges of Managing Foresight

The expert interviewees were asked to state the main challenges of doing foresight for a large firm.

Challenges of Managing Foresight	
Interviewee	**Response**
Expert (1)	- getting *attention from stakeholders and internal customers;* executives already are exposed to lots of reports and information: Understanding customers and finding the right format, right communication channel, right frequency of spreading insights - *crowdsourcing:* large firms face the problem of employees opportunistic behaviours when having a bit of information advantage over colleagues - *operationalization of foresight knowledge sharing:* should be a "fair game": develop a process to force customers into formalised way of asking the question and scope it properly., have a follow-on option co-funded projects
Expert (2)	- actually using the foresight you possess - users need to accept failure: failures happen all the time, and it's through these you learn - Silicon Valley mantra (fail early, smartly and cheaply) and that it is important to place some bets and try to do things on the edge

4.3 External Case Companies

4.3.1 Introduction to External Case Companies and Interviewees

Case 1: Swisslog
Swisslog is an automation logistics company that designs, develops and delivers efficient automation solutions for forward-thinking hospitals, warehouses and distribution centres[6]. An example of such a solution is a robotic system lifting and stacking boxes. The idea is to add efficiency to the customers with automatic workstations. Swisslog has about 2,200 employees is organised into three regions and is represented in 20 countries across North America, EMEA and Asia-Pacific.

The interviewee works as an Innovation Manager for Swisslog's technology centre, which provides the solutions, products and software for the regions to sell.

Case 2: DHL
DHL provides solutions to a number of logistics needs and is present in over 220 countries. It belongs to the postal and logistics group Deutsche Post DHL and encompasses three divisions: DHL Express, DHL Global Forwarding, Freight and DHL Supply Chain[7].

The interviewee is working as a Director of Solutions and Innovation in a small trend research team located at the innovation centre, which is a platform where exhibitions and shows of future trends are undertaken. They have approximately 5000 customers visiting each year. The team completes all trend research for the DHL Group. Further, they develop and use the tool *"The Logistics Trend Radar"* & *"Key Logistics Trends in Life Sciences 2020+"* with trends in business, society and technological trends in the upcoming 5 to10 years.

Case 3: SKF
SKF is a global technology provider for over 40 industries with platforms such as bearings and units, seals, mechatronics, services and lubrication systems[8]. SKF is represented in 28 countries and describes itself as a knowledge engineering company.

The first interviewee at SKF is an Innovation Strategy Advisor for the automotive business unit of SKF, setting projects in different research areas, products and markets looking for new opportunities The second interviewee works as a Research Centre Director at the corporate R&D centre of SKF with new technologies and patents. The third interviewee is an Innovation Strategy Director on a corporate group level, spending most of his time on managing large long-term projects, which are intended to result in radical and transformative innovations.

[6] Swisslog (2014)
[7] DHL (2014)
[8] SKF (2014)

Case 4: Novozymes

Novozymes is an industrial biotech-based company and a world leader in bio-innovation with a strong focus on enzyme production. The company works within in research, production, and sales around the world. The enzyme production leaves Novozymes with a global enzyme market share of an estimated 48%[9] and products in about 130 countries.

The first interviewee has worked at Novozymes for about 2 to 3 years with idea management and front-end projects as a Business & Innovation Developer within Novozymes' Business Innovation Department. The second interviewee is the Head of the Innovation Development at Novozymes, nurturing customer-centric innovation capabilities and facilitating Innovation Processes.

Case 5: AstraZeneca

AstraZeneca is a global biopharmaceutical company specialising in the discovery, development, manufacturing and marketing of prescription medicines. The British-Swedish company operates in over 100 countries[10].

The interviewee has worked at AstraZeneca for about 15 years, starting as a scientist in discovery then moving towards development and now working as a project leader.

Case 6: Siemens

Siemens is a German multinational electrical engineering and electronics conglomerate [11]. The 4 main fields of activity are within Industry, Energy, Healthcare, and Infrastructure & Cities in nearly 190 countries.

The first interviewee works at the central R&D department of Siemens, called Corporate Technology, as an in-house Senior Key Expert Consultant within innovation management. She is responsible for trend monitoring and analysis. The second interviewee is the head of the 'Pictures of the Future' team responsible for visioning and scouting at an innovation and technology level, also within Corporate Technology.

[9] Novozymes (2014)
[10] AstraZeneca (2014)
[11] Siemens (2014)

Overview Case Companies

Table 4.1 below outlines a brief summary of the studied case companies and the following Table 4.2 summarises the interviewees and their positions.

Company	**Industry**	**Revenue** (2013 millions)	**No of Employees**	**No of interviews**
Swisslog	Logistics	CHF 633	2,200	1
DHL	Logistics	EUR 55,085	435,520	1
SKF	Manufacturing	SEK 63,597	46,775	3
Novozymes	Biochemistry	DKK 11,746	6,200	2
AstraZeneca	Biopharmaceutical	USD 25,711	51,500	1
Siemens	Electrical engineering and electronics	EUR 75,882	362,000	2

Table 4.4 Key Figures and Information External Case Companies

Company	**Assigned Number & Position**
Swisslog	Innovation Manager
DHL	Director Solutions & Innovation
SKF	(1) Innovation Strategy Advisor Automotive
	(2) Research Centre Director
	(3) Innovation Management Director
Novozymes	(1) Business & Innovation Developer
	(2) Head of the Innovation Development
AstraZeneca	Project Leader
Siemens	(1) Senior Key Expert Consultant
	(2) Head of 'Pictures of the Future' team

Table 4.5 Interviewees External Case Companies

4.3.2 Empirical Findings External Case Companies

The primary data collection was conducted through semi-structured interviews, where the questions could be adapted to the situations accordingly and select the appropriate ones from the interview guide (Appendix E) throughout the course of the interview. This implies that the amount of data will vary in the different sections determined by the interview situation within the case companies. The following section will outline an overview of the key responses to the questions. The fully written out text can be found in Appendix F.

What is Foresight

To get an understanding of what foresight is all interviewees were asked to share their perception of foresight. This section will therefore lay out the base of the empirical findings of what foresight means to the interviewees and their definitions of it. The results are summarised in table below.

Association with the term Foresight	
Interviewee	**Response**
Swisslog	- new concept to him, since 6 months

	- inspiration from BMW who look 20 years ahead, Swisslog only 6 to 12
DHL	- looking into the future and making the future tangible today - look at trends in the next 5 to 10 years - 'zooming in' - look into future and zoom in on what it means for business today
SKF Interviewee (1)	- following customer demands is more profitable than vague idea with 5 year horizon that could turn out wrong, at least for automotive unit - could be more beneficial for R&D to make investment decisions
SKF Interviewee (2)	- related to different signals of what is happening in the future, which have to be taken into consideration even if they are not well measured - can never predict the future, but can shape it, knowing the signals - Intelligence more measurable, numerical information - foresight as a vision, looking beyond horizon, towards a direction - not just listen to customer problems today or in 5 years, that is not very innovative
SKF Interviewee (3)	- a picture of the future, but we need one that makes sense to us and from which we can get a lot of information
Siemens Interviewee (2)	- structured analysis of trends and deviations and the subsequent definition on shaping the market, but *not* prediction - an analysis of key assumptions and taking deliberate actions
Novozymes Interviewee (2)	- praxis and ability to create scenarios in the future, coupled with on-going strategic work in the presence and using these scenarios to backcast strategic requirements to set in motion today to reach those scenarios - currently a new notion, a practice or a skill to learn, not doing it systematically yet - in the praxis foresighting is done a lot, it is just not a described activity
AstraZeneca	- looking ahead and analysing potential scenarios, getting more insights for here and now, but also for the future, e.g. how market will develop

Benefits of Foresight

This section revolves around which benefits interviewees might expect from conducting foresight activities or which benefits foresight activities have created in their company. In some cases the question were clarified by mentioned examples such as reducing uncertainty, warning for discontinuities or influencing the future. Moreover, this section also relates to where in the innovation process the interviewees see foresight as most important.

Benefits of Foresight	
Interviewee	**Response**
Swisslog	- creating scenarios would make phenomena more believable and more likely to trigger action - chance for being quicker and maybe first ones do it, also chance for more disruptive innovations
DHL	- marketing, image of DHL as thought leader and innovative - opening new arenas for product development, because BUs do not have capabilities
SKF Interviewee (1)	- showing trends enables people to talk more freely, opens up for ideas - facilitate discussion to then influence strategy and long term planning

SKF Interviewee (3)	- not reduce uncertainty or risk because future is uncertain, but warning to company that things will be different - inspire towards the future, excite, something we can expect, whether good or bad
Siemens Interviewee (1)	- a large company needs to plan for the future, too big to turn left or right, wherever they see fit
AstraZeneca	- if don't do foresight run the risk of working on something that might become obsolete (once resulted in a whole reorientation of research area) - important for understanding what to aim at, especially in long term horizon - being better prepared, identifying gaps and identifying capabilities that we might need
Novozymes Interviewee (2)	- creating better strategies in collaborative approach - strength of foresight comes from the collaborative creation, with suppliers, customer, competitors, the public, etc. - being open to universe of future and broaden our minds to it

Foresight in the innovation process	
Interviewee	**Response**
Swisslog	- foresight is most relevant before it all, before the FE, to identify needs and opportunities of what to scan next, improving idea generation
SKF Interviewee (2)	- foresight could be a nice initiator of a creativity session - it is even essential in the inspiration phase - could also be a verification to demonstrate that it works - idea to go into something tangible
Novozymes Interviewee (1)	- foresight has to be the starting point of any innovation process, defining scope of what to investigate - scenarios and foresight in the beginning of the funnel - also justification for looking into these areas
Novozymes Interviewee (2)	- foresight is crucial for innovation - starting point is customer needs which resonate big global trends of what is happening - foresight is clearly important in the beginning - unsure about whether it can play a role throughout the process, because once you commit into a direction, you are committed to that direction

Organising for Foresight

This section involves the largest part of the empirical data. It covers various aspects such as whether foresight is conducted continuously or on a project basis, how to communicate and diffuse foresight insights, which people and units are involved, links to other processes and departments, who is responsible, where in the innovation process foresight is most important, how to bring foresight to attention of decision-makers, how to incorporate it into long-term planning and important factors to foresight success and when setting up a structured process.

Organising for Foresight	
Interviewee	**Response**
Swisslog	- currently no structured way in place - could imagine doing foresight in projects, choosing a topic for a year and conducting project about it, with rhythm to revisit every 6 months

	- maybe workshop every 6 months with senior people
DHL	- team working with trend radar consists of 4 cross-functional members with an innovation background - structured approach - looking at trends for next 5 to 10 years in society, business and technology - whether it turns into action is up the individual BUs, as after piloting and showcasing the solutions it needs to be handed over them - not a structured approach to put into action, but happens ad-hoc - corporate development team only other team that works with trends to a larger extent for their 5 year strategies - trend radar steps are: desk research, then showcase things, i.e. prototype solutions and portray them at the innovation center, then pilot cases with the BUs and customers to prove concept from technological and business perspective, lastly handover to the relevant unit which develops the solution and then markets it
SKF Interviewee (2)	- in most structured way 4 people working with technology intelligence and gathering mega trends - group level function with 2 people working on competitive intelligence - currently no formalised way of working with foresight
SKF Interviewee (3)	- always take future into account in project for business cases, assumption about future market size, growth, etc. - team should continuously validate and review business case - all decision makers are expected to be informed and exposed to trends - gatekeeping tech watch activity where 2 people continuously look at what's happening in the world
Siemens Interviewee (1)	- trend & monitoring function (within Corporate Technology) works like in-house consulting, BUs can given orders for specific projects - always mixed teams, some from Corporate Technology, some from BUs - trend monitoring is continuously, on macro environment level, big picture (e.g. gaming, social media), for that BUs might not have time or see relevance - BUs themselves monitor industry-specific trends about competitors, suppliers - projects usually last 5 to 9 months before handover to BU - if things get into "Master Plan", it will be done - only success you have to measure is to be successful in the future market, which is the best measurement for foresight success
Siemens Interviewee (2)	- if they see an interesting topic, they can offer it to BUs - necessary to have early discussion with stakeholders, to involve them in the process to reach actionable ends - foresight is successful if outcome is concrete, aligned with the respective entrepreneurs making decisions in the end, if it is technologically feasible and economically viable and relevant
Novozymes Interviewee (1)	- e.g. scenario challenge, gathered global team for face-to-face ideation
Novozymes Interviewee (2)	- team of 4 to 5 people that work with innovation development en
AstraZeneca	- foresight-like activity could start with R&D leader, needing to plan for the future - also a central team in marketing that does foresight, 30 people forecasting on expected sales - one could also waste a lot of time on trying to formalise foresight, as it needs to tailored to projects - continuously bring in intelligence during their projects as things are changing in high speed

	- all teams have cross-functional representation - base of everything - recently opened up environment by inviting biotech companies to on AstraZeneca's campus, work with external partners - individual initiative is expected, to be aware and to break out of silos, encouraging a certain mindset

Collaboration	
Interviewee	**Response**
DHL	- when deep diving into a specific solution or trend, partner up with research institutes or technology partners
Siemens Interviewee (1)	- get a lot of outside perspectives to validate scenarios, interviewing for example, different people in various regions, in academia, governments, suppliers, leading customers, etc.
AstraZeneca	- bring in external people, e.g. opinion leaders within a certain disease area

Communication and spread of insights	
Interviewee	**Response**
Swisslog	- could imagine going around offices showing scenarios and inspiring thoughts and getting some feedback, e.g. describe use of drones in scenarios to people - Dragon's Den approach for foresight to draw people with vision into it
DHL	- uses "Logistics Trend Radar" report to spread and communicate insights - assessing impact of trends and visualising it - use all types of marketing channels to promote the report, such as campaigns and showcasing - structured approach of trend radar appreciated by everybody, good for the marketing and sales to have this report to use in customer engagement, something tangible that they can spread - having a clear product, department won't just know about trends, but talk about them, communicate throughout organisation
SKF Interviewee (1)	- intranet news page, however to get a space there is tricky and reading frequency low
Siemens Interviewee (1)	- after handover up to BUs, and how they spread and communicate this information - important to have good stories, to get people onboard and to understand and to see the big picture, otherwise they will just think it's idiotic what we talk about - important to communicate what insights mean for BUs and individual teams - responsibility of foresight team should be to create short stories, movies, pictures of the future, which is powerful - the emotional part of it is very large, so people are excited or scared when talking about the future, but part of the story is to be emotional because you want to provoke people to think in new ways
Novozymes Interviewee (1)	- strategies and presentations for communication, make sure substantial evidence behind all the assumptions - if discover something cool, use intranet to spread ideas, also crowd-sourcing activities
Novozymes Interviewee (2)	- enterprise social network an ideal to spread insights, networks are communities

AstraZeneca	are fostered in this - word-of-mouth not scalable - email is a closed system - intrawebs not reflecting what employees think, top-down information - outside of team don't take much time to tell people what they're doing - insight would be discussed on strategy level, leaders will hopefully spread the information

Important factors for setting up foresight or for foresight to be successful	
Interviewee	**Response**
Swisslog	- would need a good view of overall market, closer interaction with customers, not just about next projects and improvements but more about future - important to build it into agenda of senior people, e.g. a 20 minute discussion in every meeting that takes place every 3 months - get it into an annual rhythm to make it happen - he is the only person responsible for innovation management, would need involve more people - involve marketing unit, as they have most forward thinking and market understanding
DHL	- important to think about end product of your activity - need to have steps in the process, clear starting point and handover - important to make things tangible - need to accept failure - need to have a clear product, something tangible (such as report) and to be perceived as structured for output to be recognised - need to be perceived as adding value and helping the BUs - important to support innovative culture and needs to be clear that management thinks its important
SKF Interviewee (1)	- activity would need to be on high level, CEO needs to find it important
SKF Interviewee (2)	- need combined view of market, taking into account all potentials of SKF, and not view the business areas separately, cross-business approach - make quick, fail quick without much cost, e.g. transform concepts into simple demonstrations (prototypes, simulations)
SKF Interviewee (3)	- need curious people that read and are interested in technology - need the right input, not too few sources, and quality - good internal communication with continuous flow, e.g. newsletters, events, presentations - make sure information reaches key decision makers, and not just obvious receivers, create sub-track - team must also be on a corporate level to influence the long term
Siemens Interviewee (1)	- to make the best of foresight, she continues, you need to try out some things and experiment. Management attention is important, but you also need to enable people to be active on this - to gain management attention bring together people from the whole company who work with innovation, trends, foresight etc. to present what they see and discuss together, powerful tool - important for large companies to bring diverse people together, e.g. strategy, marketing, R&D, sales, spirited people who deal with this topic as part of their job

	and they can make something of it
Siemens Interviewee (2)	- need top management buy-in - need clear picture on what will happen - need quick wins as results (motivation for people) - need to be concrete (make sense from business and technological perspective) - need to take people through the process (let people drive impact themselves), because humans usually base their decisions on experience, which is something we don't have about the future - important to create pictures of the future, for people to visualise, workshops can be a useful tool, e.g. with adult LEGO models to build the future picture, or stories, such as "A day in the life of…"
Novozymes Interviewee (1)	- relevant to have access to top management - foresight is a success if it turns into an innovation project - want to be the black swan, to be the disruptive innovation - important to have C-level or top management support - entrepreneurial and visionary leadership, not too focused on short term sales and current businesses, which is what most companies do - to get attention of decision makers, critical to able to say that competitors are looking into this area to say "we have to make a move here before competitors do" - to formalise foresight important that team is not part of the big running machine organisation, but takes outside-in perspective and is allowed to fail - important to communicate purpose of being, make team famous
Novozymes Interviewee (2)	- culture needs to be permissive for innovation and collaboration, where people are not afraid to share knowledge on a mature level - digital collaborative tools useful,
AstraZeneca	- important to be bold and broad in approach, not just narrow extrapolation from today - should talk to more young people, who are the patients of the future, have a complementary panel for example, which is multicultural and of mixed ages

Challenges of Managing Foresight

This sections addresses the challenges associated with communicating insights and incorporating a forward-view or foresight into processes.

Challenges of incorporating foresight	
Interviewee	**Response**
Swisslog	- time and effort required, would need to dedicate more resources and money - skills, no experience within foresight - people find it very hard to think ahead - difficult to see how long term crazy things could have something to do with us - all comes down solidly to people thing - analysis, observation, convincing, all about mindsets, people's experiences, the time to do it, a sense of urgency, standing by decisions and so on - disconnect between what we and what our customers think is important
DHL	- all up to the individuals you deal with, people's business - challenge is institutionalise foresight - challenge to not hype trends too much and stay realistic - careful not to overengineer process, creativity over administration, right people over right processes
SKF Interviewee (1)	- for supplier much harder to have future visions
SKF Interviewee (2)	- greatest challenge in industry like theirs is to interpret the voice of the customers, further than the customers express themselves - much of the company is currently very short-term viewed, and forced from the market
SKF Interviewee (3)	- resources, not an obvious justification to have a specific team, given what companies already have in place, i.e. informed managers, gate keeping, etc. - not sure they need more people to look into the future, but maybe more efficient methods and structures - difficult to do foresight for 30 years, because no one will be interested, because it will change again - product focus SKF has, which is a general limitation of engineering companies.
Siemens Interviewee (1)	- communication is always really hard, because on the one side you want to communicate things you want to achieve, on the other hand, if you're disrupting your own business people get scared, maybe you need new people working there or new expertise - hard to derive from visions and new opportunities what the BU should really do, what does it mean for their strategy - need people that are trained in transferring future opportunities into roadmaps and doable things and understandable stories - difficult to get things into "Master Plan" with more disruptive or explorative ideas
Novozymes Interviewee (1)	- challenge to predict the black swans that can be very good for you or change the whole game of your industry, you can never know if positive or negative for your business, difficult to predict and assess - for the scouting team hard to know what to search for, they want to find next big thing but it is a needle in a haystack and often only low hanging fruits detected - we cannot change the problems we have with the same mindset that created them, we need to have input from outside, otherwise we get stuck in what we are doing today
Novozymes Interviewee (2)	- the point really is the culture, and not the system, because the technology is often

	widely available, but people will not engage unless the cultural conditions are right - disconnect between the real cultures when it comes to innovation, knowledge, collaboration which you can observe and the "narrative" official story of what the culture is like, or what they would like it to be like - not many companies, especially at C-level, are aware that culture is a major driving force for innovation and strategy - we all know foresight and the good practices, but to really harvest and seize opportunities in the future, the biggest success factor is the culture. - challenge to get a cross-functional establishment with enterprise social media, but that's where the value lies, C-level would need to approve such an investment, and it is too hard to accept something you don't understand - needs to be initiated by middle management, who still have 20 years ahead of them in the company

5 ANALYSIS

This chapter reviews the empirical findings in relation to each case study and theory. Moreover, the various topic areas will be cross-analysed, to place statements in the appropriate contexts, e.g. challenges mentioned but the context of organising for foresight. The section will begin by summarising the expert consultation, to provide an extension of the theoretical basis, to which findings from the case studies will later be compared. The results from the case companies will then be analysed and clustered according to the building blocks of foresight.

5.1 Expert Consultation

This section is as stated above intended to be used as an extension to theory. The expert interviewees provided us with hands-on insights of how companies manage foresight.

Industry, Strategy and Outcome Dependence

The experts emphasised that the need of foresight could be industry dependent (for example industries with relatively long lead-times would be in greater need of foresight) due to more forward-looking nature, in contrast to nimble companies where the market is changing very fast. The findings in this study further show that the strategy pursued can play role in where to most likely find foresight activities. That is, technology aggressive or leading companies are more likely to employ foresight activities, according to the experts. From this it can be concluded that the need of foresight also depends on the strategy of the company i.e. if the aim is to be a leader or a follower.

Moreover, this study found that that the intended outcome of foresight should determine which approach is taken. For example, if the intention is to hedge for the future, then developing scenarios would be preferable, but if it is to shape the future, a vision exercise would be suitable. The experts had differing views on how foresight is or could be organised for, which led us to conclude that is no one way to organise for foresight, but rather that the approach taken depends on industry, strategy and intended outcome. Expert (1) commonly sees foresight in practice being organised around a team of about 10 individuals in large companies (>100.000 employees). Expert (2) identifies great success in companies with a cross-functional approach, support from seniors, interaction with the corporate level, and having a champion for foresight, apart from using ‘networks of rising stars’ over a strategy or corporate group function.

Shaping the future

From the interview with Expert (2) it was found that the greatest benefit of foresight can be for managers to break out from path dependency and to extend and widen the borders between the possible and impossible, which allows them to shape the future. The acronym VUCA symbolises how foresight can help managers turn **V**olatility, **U**ncertainty, **C**omplexity and **A**mbiguity into **V**ision, **U**nderstanding**, C**larity and **A**gility**.**

Involve individuals who connect internally and externally

It is according to the experts important that individuals dedicated to foresight connect internally and externally. This is most likely due to the essential information input needed and how the scanning for such information is extended when the responsible individuals have a reach outside the organisational boundaries. This inevitably enhances opportunity recognition, which in turn benefits innovation. Connecting internally also benefits innovations as a good understanding of what the company currently offers will aid in deciding on which insights that can be used to shape the future of the firm.

Building foresight around certain employees

Another interesting finding from the expert consultations is that managers of foresight could potentially consider organising it around certain employees. Expert (1) mentioned to build foresight around high potential in a company whilst Expert (2) expressed it similarly and mentioned using rising stars networks. As mentioned earlier, foresighters should connect internally and externally, and this is also what the experts refer to as a desired ability that these individuals have. Expert (2) further pointed out the importance of hiring externally and internally, with curiosity, passion and eager to learn about foresight as the main personality traits. This leads us to conclude that managers of foresight should consider whom they engage in foresight activities.

Mindsets and Culture

The previous finding regarding involving certain employees with specific personality traits is further confirmed by findings, which reveal that culture is important. Day-to-day people tend to be more interested in the most likely future, according to Expert (2). Bringing in provocateurs and people with different perspectives and mindsets is a way to mitigate this problem. It is moreover important to be prepared for disruptions and to accept failure, which is a very similar aspect to when engaging in innovation activities.

The view that Expert (2) has of foresight appears to be very cultural dominated. The interviewee emphasised that foresight should be something that is communicated as important and supported throughout the organisation. Further, every employee should be encouraged to look into the future. However, it shouldn't be done within one department only in one particular part of the organisation, or seen as a task completed by any particular roles, but rather incorporated into the traditional processes. Expert (1) further emphasised that participation of employees is vital for foresight to be effective. Oftentimes for example, communication or collaboration tools are widely available, but the culture needs to supportive of it and encourage the right mindsets. Similarly, information sharing needs to be promoted as knowledge is often power in large companies, meaning that employees may be unwilling to share information to protect their own position and personal career, according to Expert (1). It can therefore be concluded that for managers of foresight it is essential to promote a sharing culture among employees and clearly communicate the benefits of involvement.

5.2 What is Foresight

As demonstrated in the theoretical framework there is some dissent over defining foresight and what it means (Slaughter, 1990; Alsan & Oner, 2003; Tsoukas & Shepherd, 2004; Destatte, 2010). The empirics clearly prove that this is a similar situation in practice. As only few companies today have something that can be called a highly developed approach to foresight, with a corporate definition in place, and as it is fairly new concept to most companies in practice, definitions of the interviewees are based on personal views and perceptions, some have a clearer view of what foresight is, and others don't.

This study reveals that among the case companies foresight is often associated with a methodology of conducting foresight, i.e. scenario planning and trend analysis. Moreover, it can be seen that in practice the boundaries to related concepts, which were touched upon in theory, are relatively unclear, which is why foresight is sometimes confused with forecasting and business/competitive intelligence and is sometimes interpreted in relation to market vision (Reid & Brentani, 2010; 2012)

However, commonalities to definitions in theory were found in practice as well. For example, foresight as a vision of the future has been mentioned a few times, which is in line with Slaughter (1990). Moreover, it is important to know that all interviewees actually associated the term foresight with the future, meaning that there is a level of familiarity with the term. Three of the interviewees referred to shaping the future or the market, and five of the interviewees referred to making sense of insights today. Interviewees referred to for example backcasting from a vision to strategic requirements to set in motion today, making the future tangible today, getting more insights for here and now, etc. This is considered to be aligned with the definition adopted[12] earlier in this thesis, "to make sense of it and to use insights in organisationally useful ways", which essentially means making sense of insights in a way to benefit the business, today and in the future. Even though definitions vary, interviewees in this study mostly associated foresight with looking ahead and also towards the outside and beyond the horizon of the current path and boundaries. Some even clearly stated that it is not prediction because the future by definition is unpredictable.

5.2.1 Conclusion What is Foresight

Concluding, the results in this study reveals that the concept of foresight in itself is not new as it is in essence a human capacity, it is however, less explored in a corporate context. Companies that have foresight activities in place tend to have a clearer view of what foresight is. Although, some see foresight more as a method or tool and the word "ability" has not been mentioned once. However, making sense of insights and using these in organisationally useful ways appears to be a common perception.

[12] "Foresight is the ability to cope with the future, to make sense of it and to use these insights in organisationally useful ways to detect conditions, shape strategy or explore new markets"

5.3 Benefits of Foresight

This section begins by outlining the key findings in Table 5.1 below of the various benefits of foresight for innovation and strategy found when comparing theory and practice, which will subsequently be explained in more detail.

Benefits of Foresight	Theory & Experts	Volvo	External Cases
Broadening Horizon	✓	✓	✓
Warning	✓	X	✓
Triggering Action	✓	✓	✓
Influence Strategy & Planning	✓	✓	✓
Marketing	X	X	✓
Challenge Managers	✓	✓	X
Benefit Innovation in FE	✓	✓	✓
Benefit Innovation throughout Process	✓	X	✓

Table 5.1 Benefits of Foresight in Theory and Practice

✓mentioned
Xnot mentioned

Broadening Horizon

A view commonly found among all case companies is that looking into future allows us to broaden the horizon or to broaden the minds. This was mentioned in terms of having the potential to stretch the boundaries, outside the current path and the current boundaries and to force us out of our comfort zone. This was clearly the perception of the main benefits foresight can bring.

At SKF foresight was seen as enabling discussion and opening up for ideas more freely. Comparably, for DHL foresight opens up for new arenas of product development, for which the BUs do not have the capabilities. Once we accept that the future is unpredictable and has a universe of different scenarios, we can be open to that universe and broaden our minds to it, according to Novozymes. This is closely related to Expert (2)'s notion of breaking out from path dependency and to widening the borders between the possible and the impossible. Most people find it difficult to think ahead in longer terms, and plan for it, as things will change again anyhow. Broadening the horizon will in turn aid managers to spot opportunities outside their current path in which they are accompanied by competitors, resulting in a benefit of being able to be more innovative and create competitive advantage.

Warning

In line with the definitional framework of foresight and with it that it is not prediction (Slaughter, 1990), some interviewees noted that the future by definition is unpredictable and uncertain, which is why foresight does not necessarily reduce uncertainty or risk, which is a value contribution identified by (Rohrbeck, 2010). However, it presents a warning to the company that things will change, and that can inspire and excite for something we can expect, whether good or bad. If we don't do foresight, we run the risk of working towards that something that might be obsolete in the future, as another interviewee noted. This is because through foresight, we are better prepared, we can identify gaps and the capabilities we might need to develop. This is what Bessant & Francis (2005) identify as vital to be able to proactively deal with innovation opportunities and threats created by emerging discontinuous conditions.

Triggering Action

Interviewees from Swisslog and Volvo expressed that foresight could specifically be of benefit to make a phenomenon more believable and understandable, which would then be more likely to trigger action. Making trends for example more believable will lead decision-makers to connect the dots as to why it matters, hence making it more likely to act upon them, i.e. to use these insights to prepare for or shape the future (Rohrbeck, 2010). The benefit of triggering action can be directly connected to enhancing the ability to innovate, as ideas need to be acted upon to become an innovation and foresight can therefore initiate new innovation projects.

Influence Strategy and Planning

Another often mentioned benefit is foresight as an input for long-term planning and influencing strategy, which can be associated with improved decision making as mentioned in theory by Slaughter (1990). Looking into the future will allow companies to see more opportunities outside the current business, and with utilising the company's current resources and capabilities this can potentially determine the future direction. A vision or scenario of the future, of for example where the companies want to be can become reality by feeding into long-term planning and strategy. But not only can foresight feed into planning and strategy, but according to Novozymes, it can also create better plans and strategies. This can be done through a collaborative approach built around the involvement and participation of various stakeholders such as customers, suppliers, and competitors.

Marketing

One point found of was of particular interest, which is a benefit that was mentioned by DHL. This has not been found in theory, but is very relevant for managers. Doing foresight activities not only has direct benefits of being more prepared and shaping the future for example, but also indirect effects. The interviewee at DHL pointed out that doing foresight conveys an image of the company of being innovative and forward-looking. This is related to how the company markets itself in terms of branding and image. Moreover, as outlined in the introduction of this thesis, companies are facing intense competition (von der Gracht et al., 2010), and many firms need to collaborate to remain competitive, as firms tend to move away from innovating in closed systems. Being able to market a company as innovative and forward-looking will be vital to retain partnerships, which are essential in the widespread open innovation climate of today's business environment. Therefore, the existing gap in theory regarding this benefit should further be investigated.

Foresight in the Innovation Process

Two interviewees at Volvo mentioned that foresight should challenge them and managers. However, this was not mentioned in the context of innovation, but rather the general benefits foresight can bring. In the innovation setting this would be closely related to the opponent role (Rohrbeck & Gemünden, 2011) foresight can play in the innovation process, in which basic assumptions and current projects are challenged. Foresight as a challenger is not something that the other case companies commonly stated as benefits. In fact, most interviewees viewed foresight as playing an important role in the beginning of the innovation process, before and during the FE. Here, interviewees mentioned e.g. improving the idea generation, initiating creativity sessions and defining the scope of what to investigate, which represents the initiator role of foresight for innovation (Rohrbeck & Gemünden, 2011).

This view would most likely be supported by Dewulf (2013), Reid & Brentani (2004) and Herstatt & Verworn (2001) who are followers of the perception that the FE often is the root of success for any company hoping to compete on the basis of innovation. The opponent role, however, (Rohrbeck & Gemünden, 2011) challenges basic assumptions and current projects. Foresight could play the role of verification for innovation, demonstrating that something works, according to only one interviewee. This statement can be seen as a mixture of the strategist role, providing strategic guidance, and the opponent role to challenge it. Both, the strategist and opponent can act as verification throughout the process. What is important to note, however, in the findings it could be observed that most interviewees seeing foresight as clearly relevant in the beginning of the innovation process, whereas both the strategist and opponent roles (Rohrbeck, 2010) present very important functions for the innovation process. It can therefore be concluded that there is a lack of perception in practice of the various benefits foresight can have throughout the entire innovation process. This implies that the common view of foresight in practice in the innovation setting is not as multi-faceted as it is in theory, confirming that it is still a relatively new concept in a corporate context.

Position in Company & Perception

The perception of the benefits of doing foresight moreover tended to differ depending on where in the organisation the interviewees worked. At least within Volvo and SKF, that foresight seems to be perceived as more beneficial and applicable within technology departments. Within Group Trucks Technology (GTT) at Volvo people had a clearer view of what foresight is and how it can be beneficial for them. Similarly, the interviewee at SKF from the automotive unit also mentioned that foresight probably makes more sense for R&D, given their more long-term perspective. Moreover, an interviewee within Corporate Strategy of Volvo noted that is GTT the unit which is trying to figure out what is happening in the long run in terms of future and trends. It could also be noted that interviewees within R&D or GTT had a clearer picture of foresight and its importance. Moreover, it was found that Siemens' foresight activities are also conducted within the unit of Corporate Technology.

Pursued Strategy & Perception

Furthermore, it could be seen that the perception of the benefits of foresight varies according to the pursued strategy. At SKF for example it was highly related to whether the business unit was in the need of listening to customers or not. The interviewee emphasised that SKF is a supplier following customer requirements, therefore reactive to the market, which led the interviewee to believe that looking ahead is less suitable and does not make much sense. Interestingly, one interviewee at another company also presumed that the reason they are not doing foresight yet is because they are only being reactive to customer inquiries. Proactive companies in contrast tend to view foresight as more beneficial. This may be grounded in that strategies also entail whether employees are encouraged to look outside the current boundaries and whether companies want to be leaders or aim to be fast-followers, as mentioned by the experts. This study argues that foresight enables companies to be both, reactive and proactive, which is in line with Alsan & Oner (2003). This is because foresight provides companies with a chance for being quicker at something, maybe even the first ones to do it, hence potentially moving from a reactive to proactive strategy. Swisslog also added that foresight might increase the likelihood for disruptive innovations as well.

Moreover, findings in this study indicate that the overall lead-times in the industry affect interviewees' perception of the need of doing foresight. Expert (3) saw more reason to do foresight when the time horizon is longer. Similarly, interviewee (1) at Siemens referred to the fact that for their industry 2 to 3 years in foresight activities in nothing, because of their long cycles. She compared it to the telecommunications industry, which is very dynamic and fast changing, for which foresight 3 years could be considered foresight. In addition, also AstraZeneca had a more natural approach to think long-term due to longer cycles of projects.

5.3.1 Conclusion Benefits of Foresight

To sum up, in practice an often-mentioned benefit of foresight could be seen, which is that of opening up and broadening our minds and horizons. As this is an intention of foresight it is a positive aspect to see that it already a widely acknowledged benefit. Moreover, as the expert consultation is viewed as extended theory, this is considered to be confirmed in practice. In the expert theory the need to challenge and provoke executives was also established, which is more in line with Volvo's view of the benefits foresight can bring. Many have mentioned preparation, triggering action, input for planning and shaping strategy. In turn, theory has not shown to discuss the marketing aspect and image benefit of foresight, which was found to very relevant for foresight managers in this study. Moreover, the benefits for innovation in practice are clearly associated to the beginning of the process; however, the view of how foresight can benefit innovation throughout the process is not yet very established. Lastly, it was found that the perception of potential benefits varies according to the pursued strategy (reactive vs. proactive) and by departments.

5.4 Organising For Foresight

This chapter will begin by discussing the four types of corporate foresight systems (Rohrbeck, 2010), which had been presented earlier in Section 2.3. After discussing the model and presenting an alternative version the case companies will be clustered into these types and their future potential will be discussed. With that in mind, some of the answers and findings in this section are based on what interviewees believe would be key factors to have in place if foresight was to be implemented.

Theory has shown that companies can organise for foresight in two approaches, either based on structural or on cultural elements, resulting in four types of corporate foresight systems companies can employ (Rohrbeck, 2010). The findings of this study indicate however, that there is no clear line that can be drawn between these two approaches and the four company types. Each approach can include elements of the other approach, e.g. structural processes still need to have the right people involved and a cultural approach may still have some sort of processes in place. The information obtained from the cases is moreover not sufficient to support claims of either of the two approaches. In addition, the four company types presented by Rohrbeck (2010) could not be fully supported either. As all the case companies studied showed an interest for foresight activities and motivation to advance their approaches they cannot be named ignorant, even if there are no approaches in place yet. Moreover, the hyperactive company in this typology is in essence inefficient, given that building on both informal and formal approaches will result in a duplication of efforts, ambiguities and rivalry between the two.

However, the findings reveal that the approaches can be easier differentiated upon whether the approach taken is on an informal or formal basis. This has resulted in an adaptation of the potential approaches companies can take and a modified typology of corporate foresight systems, as can be seen in Figure 5.1 below, following a more detailed description of the findings.

Informal Approach

To be classified as a company employing an informal approach certain criteria have been applied to the empirical findings. In an informal approach, foresight lies essentially integrated into the ways of working as an implicit activity. There is no dedicated unit taking on the task, but rather all employees are empowered and expected to think forward-minded, particularly in departments such as New Business Development, Strategy or Innovation Management. This approach needs to be matched with a corporate culture relying on individual initiatives and open communication. Moreover, the corporate culture in place needs to be supportive of collaboration and information or knowledge sharing.

The advantage of an informal approach is that foresight takes place on a broader level and is integrated into the way of working, improving existing functions with forward thinking and having a direct effect. This can also be seen as very beneficial for innovation as foresight is inherently integrated in innovation activities without being very resource-intensive. A potential problem however, is the lacking of clear responsibilities of e.g. ensuring forward thinking in ways of working and ensuring that action is taken, etc. Moreover, as all employees are encouraged to look outside the organisational boundaries it could result in a duplication of efforts, hence inefficiency with several people collecting similar information for example, and spending time on analysing it. There could also be a problem with inconsistency of approaches taken, resulting in potential rivalry within the same approach and potential inconsistency in striving towards the same goals.

Formal Approach

To classified under the formal approach to foresight, some type of dedicated unit or function needs to be in place. Here the approach to foresight is more process-oriented and systematic, in contrast to the informal approach. Moreover, foresight takes place as an explicit, standalone activity, with linkages to other processes and functions, but not directly integrated as such. The formal approach is more suitable for companies focusing on formalised processes. The advantage here is that this function or unit is expected to be on a corporate level, implying that foresight benefits from a holistic function and potentially an organisation-wide reach. It can moreover be said to be an efficient and effective approach, given the transparency of a structure and clear assigned responsibilities.

This approach however, also comes with a few potential drawbacks. One of the problems associated with this approach the lack of agility that comes as a price to process orientation. Similar to innovation activities, creativity should not be forgone, as it plays a vital part. Another problem is that of others outside of this function potentially feeling discouraged to do similar activities on their own part, potentially losing valuable contributions and insights. A potential challenge is also to assure the involvement of the right people in the process, again potentially losing valuable contributions from visionaries and experts. Lastly, as established previously in theory, a too process-oriented approach can lead to tunnel vision (Neugarten, 2006) and neglecting the periphery (Dodgson et al., 2008).

Resulting Typologies

A company with currently no approaches to foresight in place or a low level of activities can be classified as a *Beginner Company.* Companies taking a more formal approach will be named a *Systematic Company* in this study and companies taking a more informal approach will be named a *Forward-Minded Company.* Companies applying both in turn will be named the *Inefficient Company.*

5.4.1 Clustering of Case Companies into Foresight Company Types

The Figure 5.1 below visualises the positions of the case companies based on the above discussion of the company types, inspired by Rohrbeck (2010). After presenting the figure the various positions will be discussed for each case company in more detail. The arrows in the figure indicate the potential this study sees in these companies of a future direction. It is important to note that the positioning is based on interpretations of the interviews, not only with the regard which type of foresight system they could classify for, but also the relevant levels of formal and informal approaches, and the interrelations between those. The scales of low-high indicate the level of formality and informality in the respective approach. The dotted lines separate the company types, however, indicate that it is not a clear line that can be drawn between them and that these borders are considered blurry.

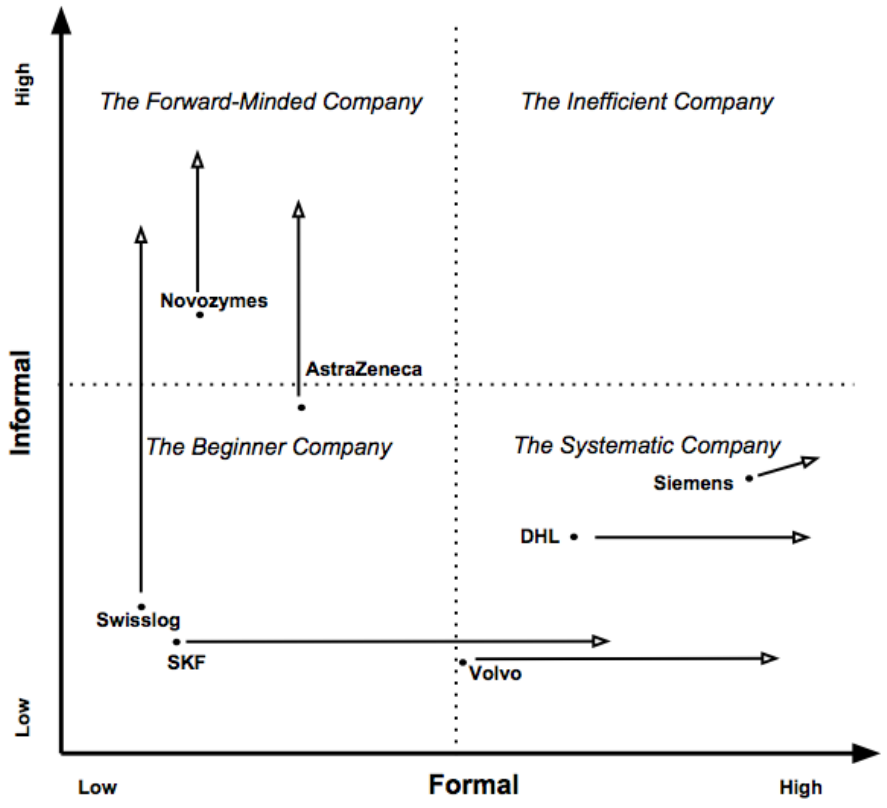


Figure 5.1 Visualisation of the Case Companies' Current and Potential Future Positions

Overall, this figure indicates that companies tend to be either positioned along the formal or informal line. None of the case companies would classify as the Inefficient Company and only Siemens could potentially move in that direction in the future. This result is due to the fact that the Inefficient Company requires too many resources and efforts and causes rivalry between formal and informal processes and is

therefore rather difficult, but also undesirable, to achieve. From the figure it can also be seen that the Beginner is represented by three of the cases. This implies that there is still a large potential to improve or become stronger in one of the approaches.

The Forward-Minded Company is presumably the most desirable position to achieve, as foresight is essentially integrated in the corporate culture and people's way of thinking, but also presumably the most difficult position to achieve, as it cannot just be implemented or easily changed. For most large companies it can be concluded, however, that a more formal approach will be most suitable, given the large size, complexity and the inherent process-orientation. This also justifies the cultural orientation of both Novozymes and Swisslog in light of their relatively smaller size in comparison to the other case companies.

5.4.2 Mapping of Case Studies

Swisslog

From the findings it could be seen that Swisslog currently has no established approach to foresight, which is why Swisslog's position can be classified as a Beginner Company. However, as the interviewee was interested in and open towards setting up foresight there is potential for the company to move out of this position. The interviewee could imagine setting up a foresight process on a project basis and sees potential in involving the marketing unit due to their forward view, mindsets and understanding within the group. Swisslog can be seen as less process-reliant in comparison to most of the other case companies and also significantly smaller in size. Therefore great potential can be seen to move towards a more cultural, informal based approach to foresight, i.e. the Forward-Minded Company. Here it would not necessarily be the setup of a dedicated team and process but foresight would rather be integrated into existing functions, ways of working and thinking. The Innovation Management activities by the interviewee seem to be perceived well within the company, which motivates that he could potentially act as a "champion" for promoting forward thinking.

SKF

Similar to Swisslog, SKF conveyed the impression that there are currently no established foresight activities in place. The interviewees mentioned intelligence functions and business case calculations as foresight activities, which however, is not in line with the definition of foresight adopted in this thesis as it would classify as related concepts such *forecasting* and *prediction* instead. This has led us to conclude that SKF also classifies as a Beginner Company.

The only activity at SKF which could classify as foresight is that of gatekeeping, in which two people look at what's happening in the world and conduct some type of technology scanning. This is something that could be built upon to create a team and foresight activity around. Moreover, one interviewee stated that every decision-maker is expected to be informed and exposed to trends, which indicate that some cultural prerequisites are in place. In that sense SKF can currently be positioned as low in both the informal and formal approach. Potential for SKF can be seen in a structured approach towards the Systematic Company, in which foresight is built on and into the current processes, due to the size of the company and that it is most likely process-reliant. In accordance with Bessant & Francis (2005) concern regarding ability to unlearn established processes and routines, it would be difficult to push a culture-

based approach into SKF. As the empirical findings show, mindsets appear to be rather problematic for SKF, which is why a structured and transparent approach could enable the company to comprehend what foresight means, how it is beneficial and how it can be utilised.

AstraZeneca

Findings show that some forward-thinking at AstraZeneca is in place, due to the very long cycles of projects of about eight to ten years, it comes more natural to anticipate the future as they need to look ahead a things will change a lot during that amount of time. In the case of AstraZeneca some indications for an existing cultural approach can be seen, with cross-functional teams, R&D leaders being expected to be informed and recent initiatives for collaboration with biotech companies. Moreover, they have a network of experts and external thought leaders at their disposal to assist with future insights and trends. However, this is not a formalised approach but rather occurs as on a case-by-case basis. With those cultural aspects already in place AstraZeneca could be classified as already moving towards the Forward-Minded Company, therefore being positioned somewhere on the line between the Beginner Company and the Forward-Minded Company.

There is potential for AstraZeneca to continue in this direction, which is possible as the current corporate culture is already permissive for foresight. The interviewee also doubted whether a formalised approach to foresight would be beneficial for them, as it should be adapted to the various projects. To move further in this direction, AstraZeneca would need more information sharing, also outside their research teams. This is in line with bringing in provocateurs and people with different perspectives as mentioned by Expert (2). The interviewee also argued for a bold and broad approach with experimentation, which can be compared to what experts referred to as willingness to accept failures in line with Andriopolous & Gotsi (2006).

DHL

Through the company's *Trend Radar* comprising society, business and technology trends for about 5-10 years ahead, DHL can be viewed as a company that has a relatively structured approach to foresight. This is based on a dedicated team conducting foresighting work in structured steps, resulting in a process. The team consists of four cross-functional members with a background in innovation. Moreover, their work comprises making insights tangible and understandable through showcasing, prototyping, simulations etc. These are all indications for a formalised approach which is why DHL's current position could be classified as in the beginning of being a Systematic Company, with more potential to move further along that line. Here, the potential is for the team to work more closely with the BUs, to translate various insights into individual business units and to help the units initiate action based on those. The approach is fairly new to DHL and according to the interviewee, having a structured approached enhanced the perception of team to be value adding to the company.

Siemens

Among the case companies Siemens can be regarded as having the most formalised approached. The trend monitoring & analysis function is the basic input for foresight and operates like an in-house consultant on a continuous basis to supply requirements of the various business units in a pull-manner. Siemens has, moreover, another function also working with foresight, which is in contrast pushing out topics and projects to the units. Both are situated on a corporate level within Corporate Technology and operate in a highly structured manner. Moreover, they always have mixed teams, continuous monitor

macro trends and bring in outside perspectives (academia, governments, suppliers, leading customers, etc.). This is in accordance with Expert (2)'s statements on best practices in foresight, to bring in provocateurs and people with different perspectives from the outside. It was further mentioned that the likelihood of taking action increases if it becomes part of what interviewee (1) calls the "Master Plan", which is Siemens' overall strategic long term plan. These aspects led us to conclude that Siemens has the most sophisticated and established approach and can be classified as the Systematic Company.

However, Siemens has also emphasised many cultural aspects during the interviews, such as provoking people, communication and participation, which indicate some form of cultural approach as well. Siemens was therefore been placed higher up on the cultural scale with a potential of moving slowly towards the Inefficient Company, given the simultaneous cultural orientation.

Novozymes

This study found that there is currently no formalised approach to foresight at Novozymes. As of now, they are 4 to 5 people working with innovation development, who also take on the implicit role of doing some foresighting work. The two interviewees also saw Novozymes' sustainability department as conducting most foresight-like work at the moment, as they are looking into long-term developments and trends. They both argued that this was the case due to this department's need of bringing in insights and opportunities in order for the company to maintain its reputation of being perceived as an environmentally friendly organisation. Even though no structured formalised process for foresight is at place at Novozymes, the impression was that foresight is more implicitly embedded throughout the company's activities on an informal basis. One of the interviewees also strongly stressed that the biggest success factor to harvest and seize future opportunities is the culture, which needs to be permissive to innovation and knowledge sharing. Based on that, Novozymes could currently be classified as the Forward-Minded Company, potentially moving even higher up the same direction.

Volvo

The findings of this study indicate that several units and departments at Volvo are engaged in foresight-like activities but all on a case-to-case basis. The most developed way of working with foresight at Volvo can be found in the PI team, which is a similar approach to what Expert (3) referred to as a dedicated team doing foresight. In their Tech Watch function they conduct what they call digital foresight. Moreover, scenarios and trends is what has mostly been associated with foresight at Volvo. It could be identified that interviewees saw communication of insights as the main issue around which foresight should be organised for. Interesting is also that one interviewee strongly emphasised cultural aspects such as the need to change mindsets of employees and support an information sharing culture at Volvo. This leads to conclude that an informal approach currently would not be suitable.

Mentioned by Volvo interviewees was also that foresight should be closely connected to corporate strategy, is also in line with what Expert (2) mentioned as a best-practice. Interesting is also that an additional interviewee at Volvo argued that foresight should be connected to the formal processes and further addressed the need of having some sort of toolbox to support the first steps. Seeing that Volvo is a large mature company with established routines, a formal approach is considered a more suitable fit for Volvo. Given a current dedicated team on a corporate level, Volvo's position would be at the beginning

of a Systematic Company, but with a potential to move more along the same line with a strong focus on systematic methods and formalised processes given Volvo's process orientation.

5.4.3 Factors Important to Foresight

Accepting Failure

The notion of accepting failure mentioned by Expert (2) as a key challenge was, in contrast, mentioned as an important success factor for setting up foresight activities by interviewees of almost all case companies and Expert (1). This is supported by Andriopolous & Gotsi's (2006) argument regarding organisation's ability to foster quick trial and error experiments. Apart from Expert (2), interviewees from Siemens and Volvo adapt varieties of the Silicon Valley's 'Fail Fast' mantra.

Cross-Functional Teams & Corporate Reach

In order to lay the foundations of foresight, all case companies directly or indirectly mentioned having cross-functional teams as an important factor, which is further, in line with Expert (1) and Expert (2). There is also a common view among the majority of the interviewees that in order to advance foresight and to succeed with it you need to have top management support, sometimes referred as needing to have access to top management or buy-in.

Communication

On the topic of spreading insights the overall responses from interviewees in the external case companies revolved around making insights understandable by the use of e.g. stories, movies, showcasing, reports and presentations. "A day in your life activities" and scenarios can also be used to inform and make insights about the future understandable. Interviewees from Novozymes and SKF pointed out that intranets are often used but that information on these sites often is top-down and seldom expresses employees' reflections. Moreover, it is difficult to break through already existing information on these sites. Novozymes emphasised the use of enterprise social media instead as an important tool to foster communities and networks and Volvo mentioned crowdsourcing in particular as an important tool. Four interviewees at Volvo stressed the importance of sharing information, and one interviewee pointed out that a digital platform would be beneficial for gathering and sharing intelligence.

Siemens stressed the importance of using emotions when spreading information and insights about the future, to provoke employees to think in new ways about the future. This is further in line with what Expert (2) identifies as a best practice in companies. When doing foresight you need to, according to him, involve people who take on that role. Siemens' 'Pictures of the Future' is something that Expert (3) has seen in other companies too. Interviewee (2) at Siemens stated that important factors revolve around having a clear picture on what will happen, quick wins as a result, be concrete and take people through the process. Taking people through the process enhances transparency and makes people understand, and according to Interviewee (1) this is important for people to believe in what you are saying and to trigger action, also according to the best practice in theory (Rohrbeck, 2010) of communicating insights through participation.

5.4.4 Conclusion Organising for Foresight

Overall, it can be seen that there are several ways to organise for foresight and that most likely companies will tend to move either towards a formal or informal approach, as both strategies together is too resource-intensive. When setting up a foresight process it is important to think about the end product of it or the intended outcome, which can determine which is the more suitable approach. Moreover, current strategies and positions in industries appear to influence the type of foresight system pursued and how it is perceived.

To conclude it can be said that only few companies to date employ a very sophisticated approach to foresight, as it is relatively new phenomenon in a corporate context, which has not been considered as an explicit activity for that long. However, companies tend to do some sort of foresight-related activities, may it be scanning the environment or monitoring trends, on an implicit basis. This section has outlined the various ways companies can manage foresight and provided an overall picture of how companies currently do it.

5.5 Challenges of Managing Foresight

This section begins by outlining the key findings in this study concerning the challenges of managing foresight found in theory and practice, which will subsequently be explained in more detail.

Challenges of Managing Foresight	Theory & Experts	Volvo	External Cases
Communication (reaching and convincing decision makers, making insights understandable)	✓	✓	✓
Required Inputs for Foresight	X	X	✓
Mindsets & Mental Model	✓	✓	✓
Corporate Culture	✓	✓	✓
Over-focus leading to Tunnel Vision	✓	X	X
Over-engineered Process	X	✓	✓

Table 5.2 Challenges of Managing Foresight in Theory and Practice

✓ *mentioned*
X *not mentioned*

Communication, Reach and Convincing Decision-Makers

A tendency to view communication as the main challenge has been identified in the Volvo case. This mostly concerns the question of how to "package" and present it. An important concern expressed by the interviewees was to get the information and insights to the right stakeholders and decision rooms, to make it understandable to top management, i.e. not too theoretical for example. This is related to the challenge of managers being expected to base decisions on facts and empirical data (Rohrbeck, 2010), which is in essence grounded in making decisions transparent and understandable for those not involved in the decision-making process. Ambiguous and uncertain foresight insights might not be sufficient to convince decision makers, which has also been outlined as another challenge (Rohrbeck, 2010). One interviewee at Novozymes also highlighted that substantial evidence should be behind all assumptions. One way to overcome this challenge is to make insights tangible (Rohrbeck, 2010), as has been established earlier. Making insights tangible will make them more believable and hence, more likely to trigger action.

Similarly, as already mentioned, taking people through the foresight process (Rohrbeck, 2010) is another way to mitigate this challenge to gain understanding, participation and support. This is moreover related to a challenge outlined by Expert (1), which is that of getting attention from stakeholders and internal customers with finding the right communication format channel and the frequency of spreading insights.

In line with that, Siemens stressed the issue of communication, how to communicate what you want to achieve but on the other hand not to scare people. Moreover it is a challenge to translate visions and opportunities into what it means for the individual BU's, for individual teams, employees and for their strategy.

Required Inputs for Foresight

For Swisslog, the time, resources and skills required presented a potential problem in setting up a foresight process. Similarly interviewee (3) at SKF mentioned that it is not that easy to justify having specific resources for foresight, like a dedicated team, given what most companies already have in place, e.g. informed managers or gatekeepers. He added that he is not sure companies need more people, but maybe simply more efficient methods and structures for foresight. This particular challenge of resources was not identified in theory, as it appears to be a very practical issue companies face.

Mindsets & Mental Models

Almost all interviews in this study emphasised the issue of employees' and managers' mindsets. It all comes down to the fact that it is up to the individuals, according to the interviewees. People generally find it difficult to think ahead, to see how some more abstract things could be related to them and to see how looking many years ahead could be relevant, given that things will change again anyhow. Volvo also noted that most day-to-day people tend to have a narrow view of what is relevant, which again relates to widening the borders between the impossible and possible by Expert (2).

Foresighting involves activities such as analysing and observing that are largely based on people's experiences, the sense of urgency, standing by decisions, etc. Novozymes also pointed out that we cannot change the problems that we have with the same mindsets that created them in the first place, then we get stuck in what we are doing today. This is not only related to mental models affecting and biasing foresight activities (Blackman & Hendersen, 2004), but also as not judging change as relevant (Rohrbeck, 2010). It is one thing to detect changes, but it is another to find them relevant and to act upon them. Foresight managers might also seek to confirm existing activities rather than to discredit those (Andriopolous & Gotsi, 2006). People become scared as foresight can disrupt existing activities and therefore threaten people's current positions, according to Siemens.

Corporate Culture

Building upon the previous section, it very much comes down to the culture. Novozymes strongly stressed that oftentimes the technology is widely available, but people don't engage unless the cultural conditions are right, and not the system conditions. He stresses that not many companies, especially at a corporate level, are aware that the culture is a major driving force behind innovation and strategy. As outlined in the previous section, the culture needs to be permissive for knowledge sharing, in line with what Expert (1) also pointed out as a challenge, as having knowledge in large companies often means having an advantage over colleagues. Volvo faces the same problem, according to interviewee (2) as currently there is no information-sharing culture in place.

Over-engineered Processes

Another very interesting point is also related to the benefits of formalising foresight. Here, DHL, noted that one must also be careful not to over-engineer foresight processes, as creativity is wanted over administration and the right people over the right processes. The challenge is to institutionalise foresight. This also related to AstraZeneca, who has pointed out that foresight projects might need a certain degree of adaptability and to Volvo, where interviewee (2) touched upon the fact that an organisational structure may actually hinder the innovation culture.

Over-focus leading to Tunnel Vision

Another interesting point mentioned by Novozymes is that is also difficult to know what to search for, everyone wants to find the next big thing, which really is a needle in a haystack and often only low hanging fruits are detected, in line with Rohrbeck's (2010) challenge of not detecting change. Interviewee (2) also referred to the challenge of remaining realistic and not to hype trends too much. This can be related to what Neugarten (2006) referred to as tunnel vision, i.e. over-focusing on one direction and thereby neglecting the periphery. When hyping a certain trend too much, it might result in such a tunnel vision, which is an important challenge to consider.

5.5.1 Conclusion Challenges of Managing Foresight

To conclude, a significant challenge regarding mindsets and culture could be found in both theory and practice. This is important as foresight requires people to think ahead and broader, whilst simultaneously being supported by an open and knowledge-sharing culture. Moreover communication is a great challenge to get the attention of stakeholders and to convince decision. An interesting aspect is that of not over-formalising foresight, as a certain degree of creativity and adaptability should be desirable.

6 CONCLUSION

The thesis demonstrated an overall picture of how large companies can manage foresight, with the expected outcome of supporting future insights, leading to improved innovations and sustained competitive advantage. The purpose of this study was to examine foresight in a corporate context and how it can be managed. To do so the following research question guided the approach:

How can a Large Company Manage Foresight?

To investigate how companies can manage foresight the starting point needed to be structured around what foresight is. The literature review revealed that there is currently no clearly defined or widely adopted definition of foresight to be found. The concept of foresight in itself is not new, as it is in essence a human capacity. However, in a corporate context it has been less explored, in literature as well as in practice, where it has not been considered an explicit activity for that long. Nevertheless, some similarities among definitions could be observed, e.g. foresight being associated with insights about the future, and making sense of these insights for today, which is in line with the definition adopted of "the ability to cope with the future, to make sense of it and to use these insights in organisationally useful ways to detect conditions, shape strategy or explore new markets". The empirical findings in this study demonstrate that foresight can be confused with forecasting or business intelligence, and is often associated to the methodologies of foresight, such as scenario planning.

As previously mentioned, studies have shown that there is lack among companies to successfully implement and practise foresight. As the concept is essentially new in a corporate context, only few companies to date can be said to have an established approach to foresight. However, findings in this study show that many companies would be interested in having a more advanced approach. This is because the benefits foresight can bring appear to be well acknowledged. An often-mentioned benefit of foresight in practice is that of broadening horizons and individuals' minds. This is important as managers need to break out from path dependency and widen the borders between the possible and impossible to spot opportunities that would otherwise not have been detected, thus enhancing innovation potential.

The benefits of foresight for innovation in practice are most often associated to the beginning of the innovation process, i.e. during or before the FE. The view of how foresight can benefit innovation throughout the process is not yet very established in practice, however benefits of foresight have been associated with serving as an input to long term planning and strategy. This study identified a gap in theory of an important benefit of foresight found in practice, which is that foresight can portray an innovative and forward-looking image of the company to the outside.

Organising for foresight for large firms can be done on a basis of two approaches, either formal or informal. This is based on theory and has been extended and modified in this study. An informal approach is based on culture and embedded in mindsets and ways of working. It is therefore most often conducted in traditional functions such as NBD and involves all employees. The formal approach in turn is based on

structured processes and is linked to dedicated units and functions conducting foresight activities. No approach is superior over the other; however, the informal approach is more difficult to achieve for large companies with established processes and a grounded corporate culture. However, if the corporate culture in place is already supportive of knowledge sharing and forward perspectives then an informal approach would be more desirable, due to the fundamental integration of foresight into all ways of working. This study has also revealed that for potential foresight managers it is important to think about the intended outcome of the foresight activities, for example whether the intention is to shape the future or to hedge against the future, which can then assist in determining the more suitable approach.

This research provided an overall picture of how companies would currently classify according the developed typology. It was found that companies tend to either move towards the formal or the informal approach, as both strategies together would be too resource-intensive and inefficient. For all case companies there is potential to move to a more intensified position of either one of the directions.

In practice it was found that to manage foresight it is important to gain senior management support and to operate from a corporate position. This is not a surprising finding as foresight is a vital part of strategy, which involves decision-making about the company's future development. To get the attention of stakeholders, to convince decision makers and to trigger action, clear communication has in this study been identified as one of the greatest success factors, rooted in making insights tangible and believable. It was also found that for foresight to be successful the mindsets and culture are absolutely essential. Foresight requires people to think ahead and to think broader, whilst simultaneously being supported by a knowledge-sharing culture with an acceptance towards failures.

Overall, this study has contributed to literature by outlining some of the current foresight applications in practice and by adapting a theoretical model to empirical findings, thereby contributing to research concerning the management of foresight.

6.1 Recommendations to PI

The study outlined two approaches around which a large company can build foresight abilities. Volvo would most likely benefit from a more formalised approach based on the company's process orientation and cultural settings. We therefore identified the need of having clearly assigned responsibilities, and to support an information sharing culture.

The PI team currently has an agile approach to foresight. In light of the disadvantages a structural approach can have, this agility presents a good way of counteracting a potential over-focus on processes or tunnel vision. This leads to conclude that an agile approach should be continued. The team could potentially benefit from more transparency, which would enhance the team's company-wide perception and recognition, due to an improved understanding of their activities. This study has found that it is important to promote the team for it's forward thinking and to make it 'famous', internally as well as externally, additionally enhancing the overall group's image of being innovative and forward-minded. In that sense the PI team should fully utilise the benefits of operating on a corporate and cross-functional level. With that in mind, the team's work has the potential to influence long-term strategy and to not only initiate new innovation projects but also to challenge current ones and to provide overall strategic guidance in determining the future direction of the company.

Similar to the case of DHL the PI team could potentially benefit from a structured output, such as for example the *Trend Radar* report and showcases of future scenarios. This presents a good format to promote and communicate the team's work and to spread insights on a company-wide level and to external customers. The report can then be used as a basis to engage in collaborations and partnerships to apply insights and initiate action in a business environment permeated by open innovation. The report however, should not just be seen a report, but rather as a strategic orientation to broaden executives' and customers' minds and push more forward thinking, resulting in higher innovation potential. Here it is crucial to trigger emotions to provoke thinking in new ways, thereby more likely triggering action. The report should also be substantially marketed, through the use of for example short videos or blogs. This way the report will not just be a report, but a story can be created around it, attracting people's attention.

There is also potential for PI to adopt a Siemens-similar project approach, in which foresight insights are translated into concrete actions and opportunities for the various business units or customers. PI could then act as a consulting function in assisting with the implementation of foresight insights. Projects could be initiated in two ways. One is by the PI team itself in a push-manner, as a suggestion to the potential foresight customer about an interesting opportunity. Another way is that projects can be initiated in a pull-manner by an inquiry from customers about areas they might be interested in. The 50/50 approach PI currently takes is a good way to ensure participation and attention from stakeholders in the projects.

In general, we would advise the team to attempt to move away from the digital and technological focus, and like Siemens' *Trend Monitoring & Analysis* team adopt a more holistic view, by for example looking into seemingly unrelated areas, for which the BU's do not have the capacity or do not see the relevance in. To conclude, we believe that the PI team could benefit from more transparency and intensified marketing efforts.

6.2 Future Research

As stated in the introduction, discussing the external environment and the context in which the case companies of this study operate lied outside the scope of this thesis. However, as the context most likely affects foresight approaches taken, further research may potentially examine growth paths of companies, how and why companies make certain decisions, i.e. which contextual factors they are depending on.

This thesis focused on providing an overview of how large companies currently manage foresight by conducting multiple case studies. The aim was not to provide in-depth information of the various cases but to outline the big picture. Another area outside of the scope of this research was therefore to examine the specific practicalities around organising for foresight, such as e.g. the required resources, budgets and deliveries. Further research could benefit from focusing on such managerial issues. This could further be complemented by a longitudinal study on foresight practices and value creation. Here, it would be interesting to explore the cause-and-effect relationship between foresight and innovation.

Lastly, future research could examine what the various positions in the typology entail to extend the model and to investigate the requirements and necessary action to move to potential future positions. This would involve specifics on implementation and costs as well as managerial implications.

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8 APPENDICES

Appendix A: Concepts Related to Foresight

TERMS	DEFINITION	LITERATURE
Market Visioning	A clear and specific mental model or image of desired and important product-market for a new advanced technology, linking it to a future market opportunity. Vision implies some sort of knowledge or insight.	Reid & Brentani (2010) Reid & Brentani (2012)
Fuzzy Front End (FFE) or Front end (FE)	The FE begins when an opportunity is first considered worthy of further ideation, exploration and assessment and ends when a firm decides to invest in the idea, commits significant resources to its development, and launch the project. The earliest stage of the NPD process, pre-project or predevelopment activities. Roughly meant to denote all time and activity spent on an idea prior to the start date of team alignment.	Cooper (1988), Khurana and Rosenthal (1997), Verganti (1997), Smith and Reinertsen (1991)
Front-Loading	A strategy that seeks to improve development performance by shifting the identification and solving of problems to earlier phases of a product development process.	Thomke & Fujimoto (2000)
Strategic Renewal	It is a set of practices that can guide leaders into a new era of innovation. It is neither an event nor a detailed program.	Binns, Harreld, O'Reilly & Tushman (2013)
Opportunity Recognition	Using cognitive frameworks to "connect the dots" between changes in technology, demographics, markets, government policies, etc. The patterns perceived then can potentially serve as the basis for new ventures.	Baron (2006)
Idea Screening	Typically include a set of criteria e.g.; strategy, markets, resources, technology, and risks, through which projects are assessed to help compare the projects with one another and the company strategy.	Martinsuo & Poskela (2011)
Strategic Opportunity	Competitive potential and future business potential created by the evaluated product concept in the front end of innovation.	Martinsuo & Poskela (2011)
Business Intelligence	Theories or methodologies that transform raw data into meaningful information for business, to make use of a new opportunity to provide a competitive market advantage and long-term stability.	Rud (2009)

Appendix B: Summary of Best Practices of Corporate Foresight

The following Best Practices are summarised from Rohrbeck (2010).

IT-based collaboration tools

News Reader	software program to collect relevant information on predefined topics, e.g. RSS-feeds (really simple syndication) that make it possible to subscribe to news tickers or web sites to collect information in an automated fashion on a topic of interest
Internal Libraries	gives all employees access to centrally stored reports and studies through intranet
Document Management System (DMS)	stores electronic documents centrally to facilitate collaboration by allowing documents to be accessed and worked on by many employees, includes functionality of checking in and checking out documents to prevent version conflicts can be used to disseminate foresight insights
Corporate Directory	listing of all employees allowing searches for internal experts and stakeholders in most developed directories full profiles were available, including work area, projects and fields of expertise
Instant Messaging (IM)	form of communication that allows sending of text messages and other documents instantaneously to increase frequency and speed of communication some also provide virtual whiteboards where users can jointly draw diagrams
Tagging Platforms	systems that assign keywords to any kind of electronic information or file, which can be seen by other users to help identify the relevance of information from different perspectives impact of efficiency for foresight is high as e.g. a technological development could mean efficient gain from one point of view, and new functionalities from another, the foresighter can tag both keyboards and thus enables the distribution to differing internal customers
Instant Delphi Analysis	program which runs Delphi-like analysis in 1-2 days, with multiple rounds among virtual expert panel to consolidate opinions on trends key and barrier for this tool is participation
Wikis	web page that can easily be edited by anyone to collaboratively create knowledge (on new topics for foresight) information can be added, completed or corrected in an efficient and effective manner, where insights can be published directly
Mailing Lists	predefined groups with a common need for specific information in a one-to-many mode, can be used to disseminate foresight results
Blogs	web sites used to regularly post new information, commentaries, graphical elements and videos, communicate in fast-changing domains with time-critical information

Source: Rohrbeck (2010)

These can be classified according to which phase of the corporate foresight process they have been employed (Data gathering, Interpretation, Communication), and according to their implementation effort,

which was based on subjective information by the respondents (Rohrbeck, 2010). The Figure below outlines this result. (Rohrbeck, 2010)

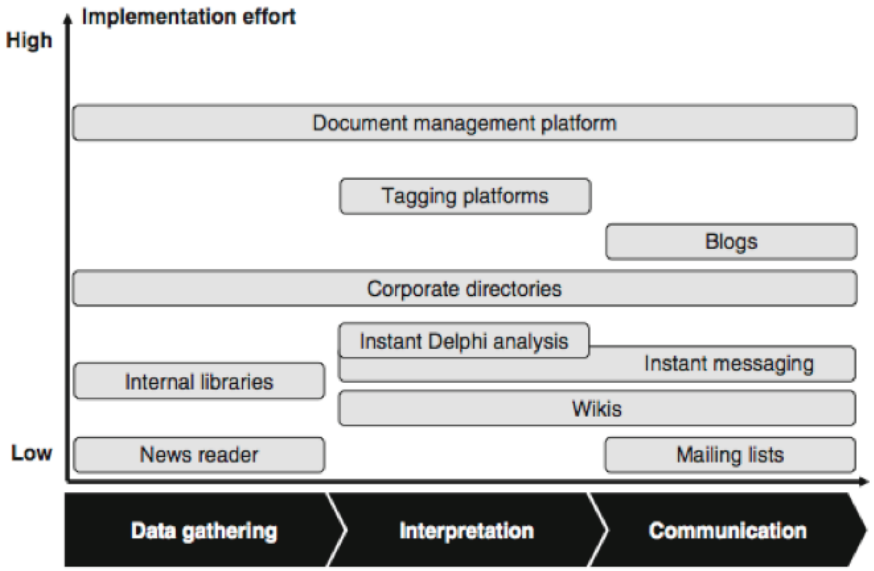

Fig. 5.10 IT collaborations tools and implementation effort

Source: Rohrbeck (2010)

For large companies, the greatest challenge is to overcome the individuals barriers of using these tools (Rohrbeck, 2010). Some tools can create benefits with just a single individual using them, but most tools will only generate the desired benefits if it is employed by all relevant stakeholders. A wiki, for example, will only work if all stakeholders use it as their main source of reference, which mean that all potential participants need to be persuaded to use it as their personal knowledge management tool. (Rohrbeck, 2010)

7 mechanisms to facilitate the communication of insights through participation

Mechanism	**Example**
Integrate Functional Units Into Project Team	company-wide selection to include 23 employees in team representing all major functions, these were put on leave of duties in operational units and assigned full-time to this project → maximizes communication presentation by word-of-mouth transfer to units
Internal Customer Gather Real-life Evidence	Internal customers and stakeholders are involved in gathering information and thus get firsthand evidence and real customer testimonials e.g. through overnight stays at customer homes or talking to trend setters
Making Information as Tangible as Possible	Lead users, prototypes and interviews with lifestyle visionaries were captured and communicated through blogs, pictures, short videos and audio recordings
Representations of Future Customers	To communicate customer preferences and profiles, real world presentations were composed of 200 personal items that are typical for

	that group. Testimonials together with traditional market research provided product designers and engineers with guidance for adapting the product
Physical Future Living Spaces	Future living spaces of the year 2020 were built with 40 other companies from different industries, these were used for corporate board meetings to transfer future insights directly to top management and to make future scenarios perceivable, thus broadening perspectives and future orientation in decisions
Encourage Word-of-Mouth Communication	During the 18 months, various company groups were invited to get firsthand insights from lead users and thought leaders, this encourage word-of-mouth communication within the whole company By showing tangible insights back in the home country, other employees were confronted with the insights, resulting in a more emotional perception and thus trust in the information
Using Virtual Communication Channels	The insights were documented in video, audio, pictures and written reports, which was all made available through the intranet and regularly updated in e.g. daily blog (6000 readers per month), allowing to target a large audience at a limited cost

Source: Rohrbeck (2010)

The mechanisms showed the large potential to improve the foresight activities' impact. Examples like blogs have a very wide reach at a negligible cost and foresight insight presentations motivate more people to participate in future exploration projects. It is recommended to experiment with those mechanisms to enhance the use of foresight result, thus improving the Return on Investment of foresight activities or projects.

Linking Foresight to Innovation Management

The Initiator Role

Here, foresight feeds directly into the the innovation process by triggering new activities, R&D projects and business model innovations. It aims at increasing the quantity and quality of the innovation output. Companies that a strong focus on this role have often established direct links to the process. Others, without the strong link, preferred the communication of insights through the intranet or printed reports, leaving the responsibility to take action with the individual managers. Three distinct outputs of this role have been found summarised in the table below.

Identification of new customer needs	analyzing cultural shifts and collecting the needs of lead customers
Identification of new emerging technologies	scanning the science and technology environment against disruptive and substitution technologies
Identification of new competitors' concepts	monitoring the activities of competitors to anticipate future actions

The initiator role has been said to be crucial in times in which the company wants to move into new business fields and in times of discontinuous technological change.

The Strategist Role

This role is not directly linked to the innovation process. It provides strategic guidelines, identifies new strategic innovation areas and scans for disruptive business models, creating 5 distinct activities, summarised in the table below.

Supporting the strategic review of R&D portfolios	Emerging innovation opportunities are identified and compared with current R&D priorities and budgets. The foresight activity provides the needed arguments for taking decisions on re-allocating R&D investments
Providing strategic guidance	e.g. producing visualizations of future product use scenarios to direct and align thinking and working throughout company to promote common goals and synchronize innovation activities
Identifying the potential and disruptive power of new business models and logics	e.g. scenario analysis to explore possible changes in home market in the next 15 years include scanning for new (and rival) business models which have the potential to threaten current activities
Consolidating opinions	trigger and internal discussion with multiple internal stakeholders, including discussion on probability of trends, judging the size of a business opportunity, validating market forecasts
Vision creation	aim for certain fuzziness to emphasize uncertainty and ensure that vision inspires company to create the future by working in the direction of the vision, rather than demotivating through rigid goal definitions

The Opponent Role

This roles impacts the entire process through 3 activities, summarised in the table below.

Challenging ideas and basic assumptions of innovators	assumptions that are typically built on views of the world and are undisputed in the company, even though controversially discussed outside the corporate environment, foresight facilitates re-adjustments of innovation activities or triggers cancellation
Identifying technologies, products, changes with disruptive potential	changes with disruptive potential as they come from a domain outside of the scope of current business, e.g. alternative or substitute technologies outside of areas currently used by the company
Ensuring state-of-the-art R&D projects	challenging current activities with what is observed in environment or already available in lead markets in face-to-face workshops with R&D teams

Appendix C: Summary available Tools & Methods

METHOD	DESCRIPTION	LITERATURE
Forecasting	In its simplest form, organisations attempt to predict the future with the tool of forecasting, using econometrics to identify possible futures based on past evidence	Andriopoulos & Gotsi (2006) (M.Godet, F.Roubelat, Creating the future: the use and misuse of scenarios, Long Range Planning 29 (1996) 164–171.)
Experimentation or creative accidents	Learning through trial and error	Andriopoulos & Gotsi (2006) Constanzo (2004)
Knowledge brokering	Connecting different industries or projects when looking at the company's portfolio or the competitive environment.	Andriopoulos & Gotsi (2006)
Updating	For example meetings to update staff about projects and discussions and information sharing about future trends. Teams should be appointed to formally keep staff up to date with latest development and promote future thinking, e.g databases and idea banks containing past projects, sketches proposals etc., as a means of inspiration for future trends	Andriopoulos & Gotsi (2006)
Blue sky projects	Used to generate wild and impractical ideas. This was a formalised activity in the examined company because it allowed a recognition of remotely possible futures.	Andriopoulos & Gotsi (2006)
Brainstorming	Process of generating creative ideas and solutions through intensive and freewheeling group discussions. Used to enhance creative thinking and probing into the future and is a well recognized method in many researches	Businessdictionary.com Andriopoulos & Gotsi (2006)
Scanning the external environment	Possible through for example attending seminars or conducting company visits with the aim of identifying future trends in different industries and to identify weak signals for example PESTEL: Political, Economical, Social, Technological, Environmental, Legal	Andriopoulos & Gotsi (2006) Constanzo (2004) Mendonc, Pina e Cunha, Kaivo-oja & Ruff (2004) Schwarz (2008)
Wild Cards (Management System)	To predict and plan for potential disasters, occurrence that are assumed to be improbable, but which would have large and immediate consequences for Organisational stakeholders if it were to take place. Usually such events are serious, destructive, catastrophic or anomalous and essentially not predictable Companies can search for weak signals and through this process identify possible wild	Mendonc, Pina e Cunha, Kaivo-oja & Ruff (2004) Andriopoulos & Gotsi (2006)

	cards and by that also prepare for and reduce the consequences of them	
Organisational Intelligence	Can be comprehended as e.g. trend analysis, scenario analysis, Delphi studies, weak signal analysis	Mendonc, Pina e Cunha, Kaivo-oja & Ruff (2004)
Organisational Improvisation	Responding to unforeseen opportunities or threats. Often neglected in foresight studies but relevant because not all crises can be prevented.	Mendonc, Pina e Cunha, Kaivo-oja & Ruff (2004)
Prototyping	Pre-producing a model of a product or service, commonly used in design and engineering practices where the aim is to make ideas more tangible	Carleton & Cockayne, (2009) Bessant & Stamm (2007) Bogers & Horst (2013)
Scenario Planning	Visualising probable future conditions or events, their consequences and effects, and how to respond to or benefit from them To identify possible futures that need to be taken into consideration when developing the corporate strategy	Andriopoulos & Gotsi (2006) Ramiez, Roodhart & Manders, (2011) Postma & Liebl (2005) Börjeson, Höjer, Dreborg, Ekvall, Finnveden (2006) Van der Heijden (1996) (D. Stout, Technology foresight—a view from the front, Business Strategy Review 6 (1995) 1–16.) Bessant & Stamm (2007)
Technology roadmap	- roadmap: a plan how to achieve something - A technology roadmap is a plan that matches short-term and long-term goals with specific technology solutions to help meet those goals. It is a plan that applies to a new product or process, or to an emerging technology. Three major uses: It helps reach a consensus about a set of needs and the technologies required to satisfy those needs; it provides a mechanism to help forecast technology developments and it provides a framework to help plan and coordinate technology developments.	Cambridge Dictionaries Online Wikipedia Garcia & Bray (1997)
Counterfactual Analysis	Asking of 'what if' and 'if then' questions about the past. The expression "hindsight is always 20/20" is based on the premise that, retrospectively, the causal chain of events leading to an outcome is obvious after the fact	Sarpong, Maclean & Davies (2013) Booth et al. (2009) MacKay & McKiernan (2004)
Competitive Intelligence	Knowledge about the environment, now and in the future	Neugarten (2003) Sarpong, Maclean & Davies (2013)
Peripheral Visioning	Formally assessing the external world, identifying trends and threats which normally would blindside the firm, and defining potential new products (a deliberate strategic	Cooper (2011) citing Day and Shoemaker (2005) Sarpong, Maclean & Davies (2013) Brown (2004)

	exercise)	
Data Mining	text analysis tool to cross-link databases, linking pieces of information and showing these relationships, visual exploration allows for discoveries of interdepencies and thus for better decision-making	Rohrbeck (2010)

Appendix D: Interview guide Thought Leaders / Experts

What is Foresight?

- What do you associate with the term foresight? *(Rohrbeck, 2010)*

Benefits of Foresight

- What is the promise of Foresight? Outcome?
- In what way do you think is foresight related to innovation activities?

Organising for Foresight

- How and where do you see companies searching for relevant information?
- Which processes, methods and tools are commonly employed by leading companies?
- Do you consider there to be a best practice in the field of foresight, and if so what?
- What organisational roles are typically involved in incorporating foresight activities?
- How can foresight be managed and operationalized in a way to benefit strategic planning and innovation functions?
- What are the relevant questions to ask when examining a large company's current foresight practices?
- How do you see Volvo using foresight?
- Will different areas / functions / departments in an Organisation need to apply different processes / methods?
- Are there different areas large companies typically need to look into when setting up foresight?

Challenges

- Are there any highlighted challenges in incorporating foresight (or similar approaches) into processes for innovation within large firms?

Companies / Industries / Individuals

- Can you recommend any other knowledgeable individuals within the field to which we could reach out to for our research?
- Are there any company individuals that you could recommend us to contact with regards to our project?
- Where could we find relevant individuals (i.e. in which departments or positions)?
- Which companies are leading in foresight practices?
- In which industries and companies is foresight most used and/or relevant?

Appendix E: Interview Guide Case Companies

Background

- What is your position within the company? *(Rohrbeck, 2010)*

What is Foresight?

- What do you associate with the term foresight? *(Rohrbeck, 2010)*
    - If unfamiliar: use terms such as future orientation of a firm or dealing with disruptions in the environment

- What is your relation to foresight activities in your company? *(Rohrbeck, 2010)*
    - If unable to answer: ask about relation to strategic management, innovation management, marketing and corporate development

Benefits of Foresight

- Which benefits do you expect from foresight activities? *(Rohrbeck, 2010)*

- Which benefits have foresight activities created in your company? Please name concrete examples *(Rohrbeck, 2010)*

- Where in the innovation process do you think foresight is most important or relevant?

- How do you account for the future in innovation projects or incorporate future-related information?

Organising for Foresight

- Which information source do you use in order to anticipate and monitor future innovation / developments? *(Rohrbeck, 2010)*
    - What inputs are required?

- How are foresight insights diffused within your company? *(Rohrbeck, 2010)*
    - Formalised process?

- Are foresight activities linked to any other processes or departments? *(Rohrbeck, 2010)*

- How are foresight activities started (triggered) in your company? *(Rohrbeck, 2010)*
    - Proactive vs. Reactive

- Please name units which are involved in foresight activities within your company and where are they positioned in the Organisational structure? *(Rohrbeck, 2010)* Benefits and drawbacks?

- Is the responsibility for foresight clearly assigned? *(Rohrbeck, 2010)*

- Which factors do you consider important to foresight success? *(Rohrbeck, 2010)*

- How do you divide your investments among continuous improvements and transformations?

- How did you bring your foresight activities to the attention of executives and / or decision-makers?
- In what way does foresight help steering the organisation in the long term?
- How can foresight activities be incorporated in long term planning?
- If you were to evaluate your current way of working, how could you possibly improve your future-oriented activities (detecting and incorporating trends and opportunities)?
- If you were to set up a formalised foresight process, what do you think you would be to be successful?

Challenges

- What are / would be the greatest challenges in setting up a foresight process?
- What are / would be the greatest challenges in conducting foresight activities?

Appendix F: Empirics in Text

VOLVO

Foresight at Volvo

This section revolves around what the interviewees associate with the term foresight. *Interviewee 2 (CS)* views foresight as the capability to take in things that may or could happen, to be aware of the possibilities but not how to handle them. For him, business intelligence is a bucket of intelligence in some sort of document, and foresight is concerned with how that intelligence may impact the organisation in terms of how to make money on it, and assessing competencies and skills needed. *Interviewee 4 (CS)*, who works with competitive intelligence, states that foresight is the same as business intelligence. She further states that GTT is the unit that is trying to figure out what is happening in the long run in terms of future and trends. *Interviewee 6 (GTT)* states that he is possibly affected by his previous work where he did foresight as a methodology to get useful results but that it is different from brainstorming and storytelling. He further states that it is a guided way of describing different scenarios for the future. *Interviewee 3 (CS)* was asked to explain his view of the difference between market visioning and corporate foresight and he stated that foresight is more from the outside, unframed. He continued with saying that when we talk about the future we tend to forget about customers, segments, needs, and requirement and that this is done in foresight but that market visioning is more product-focused. Further the interviewee stated that if we can forecast to vision or even beyond, and backcast to where you are today, then this can result in a picture of what he calls something.

Benefits of Foresight

This section revolves around the internal interviewees' perspectives on benefits of foresight. Foresight could potentially, according to *Interviewee 1 (CS)*, be a key function in the new innovation and planning function to steer the vision and basically serve as input for planning. *Interviewee 1* is further asking for a way to look into the future but outside the current path and boundaries and to use these input and insights for strategy development. *Interviewee 2 (CS)* identifies a potential in foresight as a way of challenging managers in the organisation and further highlights that it should be done on a on a continuous manner to be used as input for long term planning. He further states that radical ideas in the long term planning process starts with emerging trends, and that there is a need to continuously scan for them.

Interviewee 5 (GTT) states that foresight can help people to broaden horizons and cites Peter Drucker's *"the best way to predict the future is to create it".* He continues with saying that it is about taking incremental steps where you learn, and that it is not only about being prepared, but also to be able to create the future. This is according to *interviewee 5* done by looking into the past and the future that might become true and creating many truths. He further states that it is about creating signals or triggers to realise where you're going. To him, foresight should be accessible for many people so they can use it in their work and for that it is essential that people understand it so they in turn can make actionable ideas and insights.

Interviewee 6 (GTT) responds with stating that foresight should challenge us. He exemplifies this with saying that history has never been a straight line and that one needs to embrace radical ideas. He further argues that there is no need to plan things we know will happen, but rather see it as a potential of stretching the boundaries what it would mean for e.g. technology. To him it is not about predict what we do not know, but rather about being prepared for unexpected things and force us out of the comfort zone. *Interviewee 7 (VC)* sees avoiding to be disrupted as a potential benefit of foresight. With that he means that companies are usually performing well in their current businesses, but this can be disrupted so you better make sure to have profits by then. Looking ahead, using basic common sense and qualified guesswork based on experience can avoid this, according to *interviewee 7*.

Organising for Foresight

In this section we asked the internal interviewees about how they organise for foresight, or how they would do it. We also asked for factors they would need if they were to set up foresight. If a foresight team was to be be set up, *Interviewee 1 (CS)* highlights the need of having a strong interaction with Corporate Strategy. *Interviewee 5 (GTT)* brings in past experience in foresight activities and points out that he used IFTF, Shell and Foresight & Innovation at Stanford University as inspiration when conducting a scenario analysis for Volvo's Technology Plan 2030-2040. He further states that after developing scenarios you need to conclude which scenario you are moving towards and create triggers that need to happen to end up there. By doing so you recognize when you are moving in a specific direction and when it is time to act. Without identifying the triggers you do not have any use of your foresight work over time. With that said *interviewee 5* also brings in VUCA and states that scenarios should be used as orientation along the way and that it is up to the innovation people to use foresight in best way. He further highlights the benefits of having a digital platform to gather intelligence and sharing intelligence. With an open innovation platform he is hoping to create a learning organisation and also by doing projects in collaboration with academia.

Interviewee 4 (CS) works in a small team for BI and her work is used as input in strategy and long-term planning. In her role she develops newsletters, board materials, profiles of competitors among other studies. When communicating insights it is according to the interviewee important to think about the audience and adopt the message accordingly, as well as considering the timing. *Interviewee 3 (CS)* states that the key success factors when doing foresight is to visualise insights, sharing them and having different perspectives.

Interviewee 6 (GTT) points out that different departments have their own scouting. The interviewee continues with stating that they have networks around competitors where they share believes about the market, in addition to using the general consultancy firms for future insights. When asked about what he believes that need to be in place if foresight would be more formalised and implemented he stated that there is a need of having a toolbox as a first step including 5-6 approaches available with example situations "this is good for this type of discussion and that is better for …", which is a Stanford University methodology according to the interviewee. He further sees a need of connecting it to the formal processes and make it relevant throughout the whole process.

Interviewee 2 (CS) responded that organising for foresights starts with defining the possible impacts, and that the gathering of these insights are done by the use of partners, 3-4 normal institutes working full days (e.g. Forrester, Gartner, McKinsey) plus industry organisations. He further identifies a problem with information that stays in the drawers and highlights that there is a website available where the Process and IT community working with strategies collect information. In terms of communicating insights and getting the attention from managers interviewee 2 highlights the importance of face-to-face meetings. To get their attention he uses external examples starting off with what the direct competitors are doing. According to him, planning is more important than the plan and that today's output from long term planning is a set of projects with a strategic objective.

Interviewee 2 (CS) believes that it is hard to organise for foresight and brings in the perspective of employees who have mindsets of doing everything in the value chain. He further states that tomorrow's work will based on value constellations where there is no need to do everything yourself. To him what is really interesting is how one can organise a company in a value constellation environment? He further claims that a common mindset among managers in the group is "You have one hour, make up 5 ideas", and that this view of innovation is wrong. Another important aspect is the interviewees' view of a non sharing information culture. In addition, the interviewee claims that the organisational structure may hinder the innovative climate as people that are meeting customers often belong to different functions.

Challenges of Managing Foresight

The challenge in implementing some form of more advanced foresight will, according *interviewee 1 (CS)*, be on how to package and communicate foresight to the right stakeholders and getting the information into the right decision rooms. Therefore, the interviewee seeks to know how foresight insights can be communicated and diffused, and the preferred format of doing so as executives already are exposed to a lot of information. *Interviewee 6 (GTT)* sees a great challenge in presenting and communicating foresight because it is extremely complex by nature. *Interviewee 2 (CS)* argues that it is important to make the information and insights understandable for the top management, and points out that it should not be too theoretical. *Interviewee 5 (GTT)* identifies the ability to spread the information in large companies as the major challenge. If a topic is regarded as strategically important it tend to stay high up in the organisation and diffuse slowly. The interviewee further states that developing an absorptive capacity at Volvo would be beneficial for foresight. Following, he argues that day-to-day people and experts tend to have a narrow view of what they care about.

Expert Consultation

Foresight

This section will revolve around what foresight is and whether the expert interviewees saw any specific industries using, or being in particular need of doing foresight, and doing it better than others.

When Expert (2) was asked to define foresight he responded that in his view it is projections of the future for example in terms of how we will work and play, and that IFTF's mission is to provoke its audience about the future.

Expert (1) replied that there is a dual answer to this question. He sees some doing foresight to a larger extent than others, and gives the ICT industry and the fashion industry as examples. According to him, the fashion industry is probably the most natural trend-seeker. He further explain that a trend for them is something that often lasts a season or less, but contrasts this with that they might also come across longer-term trends, like health and green living, which has implications for multiple seasons on material used for trends. So these are two industries, which have been doing it for a long time, according to Expert (1).

Expert (3) said that foresight is not so much industry specific but that Gartner divides companies into company type *A, B* and *C*. Type A companies are often leaders in each industry and tend to be technology aggressive, desiring junior ideas and leading edge technologies. According to her, this is where you typically find foresight activities. Type B companies more deliberate and conservative, according to this definition. Having said that, Expert (3) points out that there are a couple of industries that tend to think in longer term due to their asset basis, like oil, utility, and transportation. According to her, they do little more of foresight because they are aware of the lead-time of 10-15 years and therefore need to think ahead. Other companies are much more nimble and the world is changing so much faster around them so they don't need a long-term perspective to the same extent. Expert (3) further stated that financial services companies will do technology and trend scan activities, as well as consumer goods companies concerning demographic and consumer patterns. However, these will probably be conducted on a shorter term on needs in upcoming years, according to Expert (3).

Expert (1) stated that he is now seeing more and more industries becoming interested in foresight, and says that they are maybe more long-term-oriented, like the petroleum industry. However, he also highlights that this kind of scenario technique has been employed at Shell for a long time already. Continuous scanning and monitoring of trends and weak signals have been moderately used by companies in the petroleum industry because they are in long term business, and CF becomes more the frontier on how you manage a firm these firms, according to Expert (1).

We live in what some people call a hypercompetitive environment, where any product has at any point in time multiple competitive products, which offer more or less similar solutions for certain needs according to Expert (1) which results in a matter of temporal competitive advantage. He further stated that more firms are looking to get earlier information about new developments and opportunities.

Benefits of Foresight

When talking about why foresight is important Expert (2) states that executives need to know that there is a variety of possible futures, and that they need to extend the limits between possibilities and impossibilities. According to him, there is a need of employees to come together as an organisation and agree where they want to be, as a preferred future. With enough insights, people can do actions, such as entering a new market, hire new people with a new skill set, acquire companies, spin-off companies etc. By taking action you are shaping the future, according to Sean Ness. However, he further highlights that people within the organisation are not the only ones taking action, but everybody around the world do it. Therefore, foresight becomes an around the clock process and not something we do once a year, according to Expert (2).

Further, Expert (2) exemplifies the benefits of foresight with what in the army is referred to as VUCA, which stands for - volatile, uncertain, complex, and ambiguous. This is according to Expert (2) the world of business leaders as their work is complex, and ambiguous, and there are some holes in the vision of the future. But by doing foresight you can **t**urn one VUCA to another VUCA – vision, understanding, clarity and agility. The consensus is that if you have done enough foresight your are going to have a pretty clear view of the future, and you can provide a vision to your stakeholders, employees, and help them understand why they are doing what they are doing and multiple opportunities need to be agile.

Organising for Foresight

In this section the interviewees were asked to tell us about how companies organise for foresight including the set up, specific teams or units, and implementation across the organisation. Expert (1) replied that many firms build their core foresight activities around a team and the size of the team depends on the size of the firm but that core team commonly consists of 10 individuals for firm with 100,000 employees.

Expert (1) further emphasise the need of having someone who connects internally and externally channeling information from inside-outside and from outside-inside, and particularly within the internal networks. According to him, IT tools are important when organising for foresight. There are firms where people will still refuse to use computers at all and where emails are printed by secretaries. The real issue in foresight is therefore how to connect the offliners, as these people might have very valuable information and knowledge, according to Expert (1). Following, he states that there is a question whether foresight should be *offline based,* with a clear team that gets information and redistributes it**,** or whether you can do it based on a *community*. Expert (1) exemplified this with telling us about a consultation job where the firm had a group of 500 high-potentials with 3-10 years, and managed by the HR department. This was according to him a fantastic group to free-ride on in terms of scouting as these people are eager to advance and get in contact with as many people as possible in the organisation. By giving these individuals a platform to share on and paying for a few workshops and travelling budget you end up in a big team of scouts. Another way of organising for it can be to build it around engineering leaders or technology experts, which have been identified for their knowledge in a certain domain.

Expert (3) responded that she sees three approaches used by companies doing foresight in terms of how they achieve it, processes and methods. Firstly, by the use of a *dedicated team* whose role is to run foresight programs, come up with ideas, and feed insights into strategy. The second approach is *broad workshops* organised internally or by consultants and here Expert (3) highlights people in different roles in different perspectives, often senior, are put together to brainstorm about the future. The third way is a *distributed approach* which she sees this more when companies are looking beyond a scan or scenario approach and towards more disruptive ideas by the use of VC dragons den style initiatives and other idea generation tools. Expert (3) was further asked to clarify what she means with team and she replied a *full time line organisation team* with the full time job to drive innovation and new idea, and as a part of doing that they will run foresight activities. She further stated that there is typically not a whole year spend on that but a portion or kind of annual foresight report where they will go out and look for trends typically technology trends.

Overall, Expert (3) highlights the importance of thinking about the beginning and the end point of foresight. That the approach you chose will depend on what outcome you are expecting and that it will differ if you do foresight to see all the things happening out there, hedging your bets to the uncertain or shaping the future. If your outcome is to hedge and cope with an uncertain future then maybe scenario planning is powerful as it will generate different views of how the future may look like. If it is about shaping the future Expert (3) emphasises that you can use a vision exercise to drive strategy and direction. So the output will, according to Expert (3), determine your approach to foresight.

When asked about particular methods and tools used in foresight Expert (3) replied that every activity at Gartner starts off with a scan and commonly used tools are PESTEL and STEEP and these should be scanned on an annual basis. Another tool that they frequently use, and that she sees organisation using, is scenario planning. Expert (3) emphasises the Shell style approach where you look at how the world will be changing, identify critical dependencies that you can't predict, take two of these and come up with four way scenarios and later try to make them real. She also mention that you could start with a date and think what the changes will be by that date, and that this information could feed into scenario planning. Another tool mentioned by Expert (3) is *"A day in your life activity"*, where you look at different roles of people and potentially use storytelling to bring these ideas to life. One can also work with what she called *"Persona"*, where you look at a certain personality and say what will their life be like in a certain timeframe, go through the changes you see happening. Expert (3) further highlighted that you often find a structure around specific types of activities, such as how to do a trend scan and that thy at Gartner have and use their document "84 Trends". Expert (3) explained that at Gartner they put together, and collect trends and technologies on an annual basis and develop their annual *"Hype Cycle Update"*. She further states that this is probably the largest technology maturity database with approximately 2000 technologies.

Best-Practices

The interviewees were asked about if they can identify any best practises in the way they are doing foresight. Expert (1) responded in the ways companies chose to set it up in terms of if it is *continuous process* or *project-based.* Best practice for a continuous process can according to Expert (1) be found at Deutsche Telekom, one of the most advanced one that has been copied quite extensively, for example by Cisco Systems. When it comes to project-based foresighting Siemens with their 'Pictures of the future' is a best-practice according to Expert (1).

Expert (3) see best-practice in terms of *how a company do it and the scope of it* and *how a company format it*. She says that best-practice in formatting foresight can be found at IFTF how it was structured and the range of topics that they created with their online structured scan and prediction of major changes. Expert (3) continues with stating that best-practice is simply put assigning people to do it, and again think about the output taking developing a report as an example. She points out that rather than best-practices she would say that there are specific types of innovation activities and approaches that address that perspective. She further gives an example stating that having a dedicated incubation fund that would allow something to take on its own life and get into the point where you could feed it into normal processes. If that is not possible, there is a need of having a special track that allows you to take it to

customers, market, trail internally and test it for real without impacting the brand or the overall operations.

When Expert (2) was asked about his interaction with other companies and if he saw any best-practices and how foresight can be more formalised he replied that an interest from the HR department is beneficial as they are challenged with identifying future employees. HR departments that are reporting to Strategy or CEO (people are seen as asset) are preferable over departments reporting to CFO (people are costs). Expert (2) further stated the value of, from a senior level, showing that foresight is important and that you care about the future. Expert (2) states that *a rising star network* is a better platform than just strategy department or corporate group focusing on foresight. He further argues that foresight needs to be on-going, and that someone needs to think about the outside perspective and for example bring in outside speakers, provocateurs, and other mindsets. A company that has a HR perspective on foresight can use the rising stars and fast track people of an organisation; with special training inside and outside the organisation; travelling around the world; PhD or Masters paid by the company; networking in different cities; to conduct foresight. Expert (2) further says that IFTF see more success when foresight is spread out in the organisation and not limited to one area or group (e.g. marketing, market research, strategy, corporate development and HR). When asked about which roles and individuals in companies he usually sees taking on foresight activities he replies that it is all over the place and across borders. He further highlights that the best-practice here is giving employees the permission to look into the future and ability to take future thinking across the organisation and to have support from seniors. Expert (2) concludes with saying that he has seen success in companies having buying from C level.

The next topic for Expert (2) was if Volvo where to implement foresight on a more formal level, how could they do it? Expert (2) was clear on expressing that he is biased but that it is all about hiring from the inside and outside and that a company shouldn't be afraid of taking in external people.

> *"If you're gonna cut back, cut back, but foresight is still necessary and the future will happen whether you like it or not and you need people that are whispering in your ears about the future possibilities"*
>
> *Expert (2) IFTF*

He further highlighted to use rising stars network, evangelize and get other people to appreciate it as well. He sees the benefit in having a champion for foresight in organisation, involving all stakeholders, being prepared for disruptions, new opportunities and dilemmas, and having seniors that constantly take in foresight and appreciate it even when insights are contradicting the view of the organisation. Expert (2) further argues that people across whole organisation need to know that foresight is something that the organisation feels strongly about and will support company wide.

When it comes to culture Expert (2) pointed out that someone needs to think about the outside perspective, bring in outside speakers, bring in provocateurs, other mindsets and this is related to his view of using the rising stars for foresight activities. He further states that leading stars have to believe passionately around foresight. When it comes to people he claims that it is essential to have individuals that know the foresight world or are willing to be trained on it.–Expert (2) further highlights that the important thing for executives is understanding and giving a clear view of the future in terms of where you want to be and then working towards that goal. He further states that day to day people tend to be

interested in the most likely future, and the strategists are more outside the most likely and this is where disruptions happen and that disruptions provide opportunities, challenges, and limits.

Challenges of Managing Foresight

The expert interviewees were asked to state the main challenges of doing foresight for a large firm. Expert (1) stated that there are especially three challenges. The first is getting the *attention of stakeholders and internal customers* which relates to the fact that executives already are exposed to lots of reports and information. Understanding customers and finding the right format, right communication channel, right frequency of spreading insights will aid in overcoming this challenge, according to Expert (1). The next challenge is *crowdsourcing* where large firms face the problem of employees opportunistic behaviours when having a bit of information advantage over colleagues will advance one's own career so giving away that information becomes tricky. The third challenge is *operationalization of foresight knowledge sharing* where Expert (1) emphasises that it should be a "fair game". With that he means that foresighters often run into trouble when giving answer to a question on e.g. new technology. People tend to ask for further information before it is an actual project which puts the foresighter in a difficult position as this person has limited time and resources and needs to attract funding from the person who's asking the questions. To establish fair game situation Expert (1) recommends having or developing a process to somewhat force customers into a more formalised way of asking the question and you also scope it properly. He also suggests having as a follow-on option - "well this is how we go from foresight and our general scanning activities but if you want to know more we need to formulate a project, the project could be run by us, but must be co-funded by you.

Expert (2) points out the challenge of actually using the foresight you possess. He suggests that it should be used to make decisions but at the same time users need to accept failure. He continues with stating that failures happen all the time, and it's through these you learn. He further refers to the Silicon Valley mantra (fail early, smartly and cheaply) and that it is important to place some bets and try to do things on the edge. Linking back to the Facebook example he states that the company will be okay even if they fail. Along the way they learnt something, e.g. bargaining with states, talents, market knowledge.

External Case Companies

Foresight

To get an understanding of what foresight is we started by asking all our interviewees to share their perception of foresight. This section will therefore lay out the base of our empirical findings of what foresight means to the interviewees and their definitions of it.

For **Swisslog** foresight is quite a new concept. The interviewee's interest was triggered only a few months ago by a BMW design presentation on foresight at a conference in Munich. He has then realised that while BMW is looking 20 years ahead, Swisslog's roadmaps look about 6 to 12 months ahead. Since then he has been pushing people at Swisslog to think at least 2 to 3 years ahead, because he felt that what they are doing at BMW is really something that they should be doing.

When asked about what foresight is, our **DHL** respondent replied that it means looking into future and making the future tangible today. They look at what trends they see as relevant in the next 5 to 10 years and what that means for business today and in the coming years, the effect on the current product portfolio of current solutions. They call it a 'zooming in' approach, to look into the future and zoom in on what it means to them already now.

The perception by **SKF** interviewee (1) of foresight was defined the view that following customer demands will be more profitable rather than developing vague ideas with a 5 year horizon that could turn out wrong. As a supplier like SKF it is more difficult to have future visions, as it is a strong customer driven business, at least for the automotive unit. He adds that for the R&D unit long-term foresight would be more beneficial, as it fits with their way of thinking to make decisions on investments.

At the corporate R&D centre of **SKF** interviewee (2) that foresight is related to different signals of what is happening in the future, which have to be taken into consideration even if they are not well measured. She highlights that we can never really predict the future but we can shape it, knowing the signals, and drive how we accommodate to a changing future, looking at where we want to stay or not to stay. Intelligence is more measurable, numerical and specific information whereas she sees foresight more as a vision, not very specific but also looking beyond the horizon, leading towards a direction. The innovations at the R&D centre are more tech-push, pushed by people that see an opportunity to add something not existing today, even if there is no customer need today. She adds that if we only listen to customer problems today or in 5 years, we don't really do something that is very innovative to be honest. Interviewee (3) at SKF viewed foresight as having a picture of the future, but we need one that makes sense to us and from which we can get a lot of information.

Interviewee (2) at **Siemens** defined foresight as a structured analysis of trends and deviations and the subsequent definition on shaping the market, but *not* prediction. Rather, it is an analysis of key assumptions and taking deliberate actions. Interviewee (1) stated that at the corporate technology function foresight is key.

Regarding foresight Interviewee (2) at **Novozymes** emphasised that they do not have a corporate definition, but for him it is the praxis and ability to create scenarios in the future, coupled with ongoing strategic work in the presence and using these scenarios to backcast strategic requirements to set in motion today to reach those scenarios. Foresight at Novozymes is currently a new notion, a practice or a skill to learn, and that they are not doing it systematically yet. He adds that in the praxis foresighting is done a lot, it is just not a described activity.

Lastly, for **AstraZeneca** foresight means looking ahead and analysing potential scenarios, getting more insights at AstraZeneca for here and now, but also for the future, for example, how will the market develop, what will the healthcare system look like in 40 years.

Benefits of Foresight

This section revolves around which benefits interviewees might expect from conducting foresight activities or which benefits foresight activities have created in their company. In some cases we clarified the question by mentioned examples such as reducing uncertainty, warning for discontinuities or influencing the future. Moreover, this section also relates to where in the innovation process the interviewees see foresight as most important.

At **Swisslog** the interviewee replied that for example creating scenarios around a phenomena, would make it more believable and is more likely to trigger action. If it would trigger action and Swisslog would move quickly, then they could stand a chance of being the only ones to do it (for example using drones) and a better chance for disruptive innovations. When asked if where he would think foresight would be most relevant in the innovation process, he replied that foresight is most relevant before all of it, before the FE, to identify needs and opportunities, not really the idea but more of an opportunity of what to scan next. In that case foresight would be an activity to better describe what that opportunity is, so when it comes to the actual process the idea generation will be better.

DHL brought up the marketing aspect of it. Through doing foresight DHL is seen as a thought leader and as an innovation company, which they can demonstrate to customers. The second mentioned benefit is that it allows them to look into the future and opening new arenas for product development, which is important because the business units themselves do not have the capabilities.

Interviewee (1) at **SKF** spoke about that showing trends enables people to talk about some areas more off-record, and providing a discussion in their community, whether it is something to consider or not. It can be an instrument to facilitate discussion and then influence strategy and long term planning. It opens up for ideas, "taking off the lid" and think about it more freely. Interviewee (3) replied that foresight provides a warning to the company, or can inspire towards the future. He added that it does not so much reduce uncertainty or risk, because the future is uncertain by definition, but it warns people that things will be different so they can imagine how things might change. It can also excite the company, something is out there that we can expect, that can change the place dramatically, whether good or bad. Interviewee (2) also responded that at the end of the day, the market will not be there forever to wait for us to develop a technology. When asked about where foresight could feed into the innovation processes she replied that foresight could be a nice initiator of a creativity session. *"I would say it is even essential in the inspiration phase".* It could also be a verification to demonstrate that it works - idea to go into something tangible.

Interviewee (1) at **Siemens** replied here that Siemens is like a big elephant, and that they need to plan and cannot just turn left or right however they see fit. They are too big and inflexible for that. They need to do foresight strategically to plan. It is very hard for large companies to make the disruptive happen and to deal with it. But for business units or divisions, it is actually doable, because they are more like one organisation. She also adds that for example 2 to 3 years is nothing in their company because of the long cycles, but when it comes to telecommunications 3 years could be foresight, which would only be a minimum for us, because it is a flexible dynamic industry.

For **AstraZeneca** thinking about the benefits of doing foresight meant thinking about it from the other side, what would happen if we don't do it. If we don't do it it would mean that we are running the risk of working on things that might be obsolete in the future. Foresight has always been important for projects to understand what you're aiming at, especially for the long term horizon. Foresight provides the benefit of being better prepared, identifying gaps and identifying capabilities that we might need. Foresight insights, once resulted in a reorientation of whole research area, realising that it was not viable for the future.

Interviewee (1) at **Novozymes** emphasised that foresighting has to be the starting point around any innovation process, it defines the scope of what you are investigating, so you want the scenarios and foresight in the beginning of the funnel. According to him, foresight needs to be aligned with the vision and strategy of the whole company, also to argument that you have a right to look into these areas, sort of like a justification. He adds that at the end of the process they never go to the market without a partner, so that insights feeds into the process from the start. They then use the social space to find potential partners, and we try to predict the best partner to go with when they want to commercialise the product.

Interviewee (2) spoke of creating better strategies in a collaborative approach as the greatest benefit of doing foresight. Once we have accepted that the future is not predictable, we can be open to the universe of future scenarios and broadening our minds to it. We are then more likely to create better strategies for these scenarios. He adds that the strength of foresight comes from the collaborative creation, with suppliers, customer, competitors, the public, etc. Regarding how foresight feeds into innovation interviewee (2) responded that foresight is crucial for innovation. The starting point of innovation is customer needs and customer needs are just a resonance of big global trends of something that is happening or impacting the customer. We should engage in activities to understand those better. He also notes that it is clear that foresight is important in the beginning, however, he is unsure about how and whether it can play a role throughout the process, because once you commit into a direction, you are committed to that direction.

Organising for Foresight

This section involves the largest part of the empirical data. It covers various aspects such as whether foresight is conducted continuously or on a project basis, how to communicate and diffuse foresight insights, which people and units are involved, links to other processes and departments, who is responsible, where in the innovation process foresight is most important, how to bring foresight to attention of decision-makers, how to incorporate it into long-term planning and important factors to foresight success and when setting up a structured process.

As **Swisslog** currently has no structured way in place, the interviewee mentioned that he could imagine doing foresight in projects, choosing for example a topic for the year and conducting a project about it. He highlights that a certain rhythm would be good to revisit e.g. trends every 6 months.

DHL mentions that when deep-diving into a specific solution or trend they will partner up with research institutes or technology partners. The team working with the trend radar consists of 4 cross-functional members with an innovation background.

When interviewee (2) at **SKF** was asked how many people currently work with foresight or similar she responded with very few. In the most structured way it is about 4 people that work mainly with technology intelligence and gathering mega trends. But they also have a function on a group level, where about 2 people are working on competitive intelligence, which involves some types of megatrends. There is currently no formalised way of working with foresight in place, according to her.

Interviewee (3) at **SKF** points out that they always take the future into account in their projects, for the business cases, making an assumption about the reference market and its future size, growth, penetration, etc. The project should then continuously validate and review the business case. He mentions a few ways of using foresight. One is in an informal way, where every decision maker is expected to be informed and exposed to trends. Secondly for technology strategy, regarding technology areas to invest in and thirdly, in a gatekeeping activity where 2 people look at what's happening in the world, so "techwatch" continuously.
Within **Siemens** interviewee (1) explains that the trend monitoring & analysis function works like an in-house consulting contractor. This means that the relevant business units can give an order to them to ask for specific projects. The strategy department in which interviewee (2) works have more like push, where they can see an interesting topic and then offer a project to the units. Interviewee (1) mentions that they always have mixed teams, some people from Corporate Technology, some from the business units. The trend monitoring is something they do continuously, on a macro environment level. They get a lot of outside perspectives to validate scenarios, interviewing for example, different people in various regions, in academia, governments, suppliers, leading customers, etc. The business units themselves monitor industry trends about competitors, suppliers, like specific ones e.g. minimal invasive procedures in medicine, that is something that the health care unit takes care of. Their department takes more care of the big picture, political or legal things changing, things in gaming or social media. For that the business units might not have time or might not see the relevance.

The projects will usually last around 5 to 9 months before it is handed over to the business units, and how they spread and communicate this information is then up to them. She brings up a "Master Plan" they have at Siemens, which is a very strictly organised part, regarding the big goals and the big budget. If you get something in here, then it will be done, and everything will be sponsored and monitored. However, it is difficult to get things in there with more disruptive or explorative ideas. To make the best of foresight, she continues, you need to try out some things and experiment. Management attention is important, but you also need to enable people to be active on this.

Interviewee (2) at **Siemens** refers to 5 important factors to organise for foresight. Firstly, getting top management buy-in. Secondly, you need to have a clear picture on what will happen (that is because if we would know when we will die, we would take better decisions). Thirdly, you need quick wins as a result, because people ask "what's in it for me". Fourthly, be concrete, it needs to make sense from a business and technological perspective. And lastly, take people through the process. Don't just give people the trends, they need to drive the impact themselves, because humans usually base their decisions on experience, which is something we don't have about the future. It is important to create pictures of the future, for people to visualise. Workshops can be a useful tool, for example with adult LEGO models to build the future picture, or stories, such as "A day in the life of…". Regarding the organisational structure interviewee (2) mentioned that it is relevant to have access to top management.

When asked about the organisation for foresight activities, **Novozymes** interviewee (1) responded with an example of a scenario challenge, where they gathered a team from all over the world to have face-to-face ideation. To communicate insights he mentions strategies and presentations, it is important however, to make sure that substantial evidence is behind all the assumptions. If they discover something cool, they will usually create intranet articles to spread the idea, also share crowd-sourcing activities or discoveries with the rest of the organisation. For him, a foresight activity is a success if it turns into an innovation project. He emphasises that what you want to do is actually to be the black swan, we would all love to be the disruptive technology in the market and change everything.

At **AstraZeneca**, a foresight-like activity could start with the R&D leader of a research area, in which he/she needs to plan for the future according to the respondent. There is also a central foresight team within marketing. The R&D leaders are usually senior, who bring in commercial resources. They bring in external people too, e.g. opinion leaders within a certain disease area. The interviewee refers to a central unit at AstraZeneca, which 30 people doing a lot of forecasting and foresighting work on expected sales volumes. As their projects often last 8 to 10 years there is a lot of guesswork in the beginning, and many things can still happen. The interviewee believes that one could also waste a lot of time on trying to formalise foresight, as it needs to tailored to projects, and he wonders what kind of value that would bring. They continuously bring in intelligence during their projects as things are changing in high speed.

All teams have a cross-functional representation, which according to the interviewee is the base of everything. AstraZeneca recently started a "Biohub", in which they invite biotech companies to sit on their campus and use their unutilised lab space. This way they opened up the environment and can work with external partners. Moreover, individual initiative is expected at AstraZeneca, to be aware and to break out of silos, encouraging a certain mindset.

When asked how we would spread foresight insights to people, the **Swisslog** interviewee came to think of an exercise they did 2 years ago, going around the offices asking people what they thought and needed. In the foresight context they could then show scenarios and inspire some thoughts, as well as get some feedback, e.g. taking the foresight activity here to describe to use of drones in the future. He also thinks that a type of "Dragon's Den" approach for foresight might be an interesting idea to draw people in the organisation with vision into it.

DHL in turn, uses a tool called "The Logistics Trend Radar" to spread and communicate insights, where they are looking at society, business and technology trends for the next 5 to 10 years, assessing the impact and visualising it. They use all types of marketing channels to promote the report, such as campaigns, showcasing, etc. Whether or not this turns into action is up the individual business units of the company, as after piloting and showcasing the solutions it needs to be handed over to the relevant business unit. This then is not a structured approach, but happens ad-hoc. Our interviewee highlights that a structured approach is appreciated by everybody, and that it is also good for the marketing and sales unit to have this trend radar report to use in customer engagement. It is something tangible that they can spread. The corporate development team at DHL is the only other team that works with trends to a larger extent for their 5 year strategies.

In the case of **SKF** interviewee (1) mentioned the intranet news page, as a way of spreading information. However, to get a space there is tricky and he believes that the frequency of people really reading it is low.

Regarding communication interviewee (1) at **Siemens** brings up that it is important to have good stories, to get people onboard and on the same page. Because otherwise people will not understand, and if they don't understand they will not see the big picture and think it's just idiotic what we talk about. It is important to communicate what these insights mean for the business units and individual teams. The responsibility of the foresight team should be to create short stories, like short movies and pictures of the future, which are powerful opportunities. In the past Siemens used to have an initiative, which interviewee (1) brings up as a way to gain management attention. Here they brought people together from the whole company who are working with innovation, trends, foresight, business model innovation, and so on, to present what they see and discuss together, which was a very powerful tool.

When asked about the diffusion of insights interviewee (2) at **Novozymes** names enterprise social network as an ideal. Word-of-mouth is not scalable, email is a closed system, intrawebs are not reflecting what employees really think and provide only top-down information. But in enterprise social media, networks and communities are kickstarted and fostered, with a great value creation. The interviewee's team is comprised of 4 to 5 people working with innovation development.

Outside of their team, the interviewee at **AstraZeneca** says, they don't take a lot of time to tell people what they're doing. Regarding the communication of insights, an insight would first be discussed on a strategy level within the research area. The leaders will then hopefully spread the information.

In order to set up a more structured process, the interviewee at **Swisslog** responded that he would need a good view of the overall market, what's growing and what's not, what are people spending money on, etc. He also adds that he would need a closer interaction with customers on specific topics, as today the interaction is based mainly on the next project and improvements and less about the future. He believes that it is important to build this into the agenda of senior people, e.g. a 20-minute discussion in each meeting, or turn it into a workshop every 6 months. If you get it into the annual rhythm of the company, it could become a key thing and really happen. At Swisslog the interviewee was the only person responsible for Innovation Management. He acknowledged that he sees it as his role too adopt a more forward-looking view. In a future-related innovation project, the interviewee would involve the marketing unit, as they have the best market understanding in the group and think more ahead, instead of just the next project. He adds that they might have the best mindset. Moreover, he would involve the solutions management unit, as it is their job to think more strategically and about the whole solution, rather than just the product and how these should be integrated together for the future.

When asked about important factors for setting up a structured foresight process the **DHL** interviewee emphasized that it is important to think about the end product of your activity. Moreover you need to have steps in the process. It needs a clear starting point and a clear hand-over. For example for the trend radar, their first step is to desk research for the trend report. The second step is then to showcase things, i.e. prototype solutions and portray them at the innovation center, tangible is important! The third step is to pilot cases with the business units and customers to prove the concept from a technological and business perspective and then lastly the hand-over to the relevant unit which develops the solution and then

markets it. Another thing is to accept failure, which in this case would result in no hand-over. Having a clear product, resulting in something tangible will help that departments not only know about trends, but actually talk about them, have them communicated throughout the organisation. An interesting point is when the team started, they were not perceived as structured, which means that their output was not recognised. Now they are perceived as a unit that is adding value and helping the business units.

To set up a structured foresight process interviewee (1) at **SKF** responded that the activity would need to be on a high level, the CEO needs to find it important and recognise it. Interviewee 2 at SKF stressed that factors for setting up such a process would be a combined view of the market, taking into account all potentials of SKF, and not view the three traditional business areas (automotive, service and industrial) separately when a market need is coming from these areas. The approach should be cross-business or cross-area. In addition, she stresses *make quick, fail quick*, without much cost, to transform concepts into simple demonstrations. Prototyping might prove if it is meeting the need or not, which could be done with a simulation. This could speed up the decision of what to and what not to pursue - fail cheap, learn cheap, adapt cheap.

When setting up a structured process, interviewee (3) at **SKF** points out that we would need a number of things. Firstly, curious people, that are interested in technology, like to read, etc. Personality is important. Secondly, to have the right input, making sure we don't rely on too few sources, and also of the right quality, going to conferences, talking to consultancies, other company contacts, some more local contacts, etc. And lastly, to have good internal communication in a continuous flow, e.g. newsletters, events, presentations. Make sure that information reaches key decision makers, but not just to the obvious receivers, but also create a sub-track, which might have a more long term effect. The team must also be on corporate level to influence the long term.

When asked about important factors interviewee (1) at **Siemens** emphasises that it is important for all large companies to bring diverse people together, who are part of the innovation community, maybe from strategy, marketing, R&D, even sales, just spirited people who deal with this type of topic as part of their job and bring them together. This can get a good impact because these people together can make something out of these topics. At the end, she says, the only success you have to measure is to be successful in the future market, which is the best measurement for foresight success. As another important factor in the process interviewee (2) notes that it is necessary to have a discussion early on with stakeholders, and to involve them in the process to reach actionable ends. For him, foresight is successful if the outcome is concrete, if it is aligned with the respective entrepreneurs making decisions in the end, if it is technologically feasible and economically viable and relevant.

Novozymes interviewee (1) explained that for foresight to be beneficial or successful, it is important to have C-level or top management support. It is also important to have entrepreneurial and visionary leadership, not too focused on short term sales and current businesses. Many companies have a great vision, but tend to invest mostly in current businesses. He mentions an example of what could be a good way to make use of foresight, in a place with no corporate timeline. In this example a scientist from the Chinese division was given an almost unlimited budget, no responsibility to report, and was assigned to innovate and tap into the newest stuff. At Novozymes, he says, they probably invest about 60% in transformative business, and 40% in current businesses.

In order to get the attention of decision makers, interviewee (1) notes that it is critical to be able to say that competitors are looking into this particular area, to be able to say "we have to make a move here, before competitors do." Novozymes makes use of an internal social platform to post for example challenges the customer faces for people to come up with ideas or solve them. The people who are then involved in assessing these ideas consist of an account manager who is in contact with the customer already, someone from R&D, possibly director, and people from the business side, also a VP or director, could be from business development, but also from innovation unit, or a project manager, and a technical service guy who can implement the technology later at the customer. This would be the classical setting of their screening team.

When formalising foresight, it is important that the innovation or scouting teams are not part of the big running machine organisation, but rather take an outside-in perspective. Management must see it as a department that is allowed to fail. He continues that it is also important to communicate your purpose of being, use intranet articles to make your team famous, and to communicate that you are a futuristic department. This must be clearly articulated otherwise it is just blurry for everyone else in the organisation. When asked about what needs to be in place for foresight, interviewee (2) responded that the culture needs to be permissive for innovation and collaboration, where people are not afraid to share knowledge on a mature level with the according protection of knowledge. Moreover, certain digital and collaborative tools could be beneficial, that use for example algorithms in social media to combine similar posts and get emerging topics.

When asked about factors for foresight to be successful, the interviewee at **AstraZeneca** mentioned that it is important to be quite bold in your approach, and broad in the way you look at things, not just narrow extrapolation from today. For it to be valuable, you need to stress test some scenarios or variables. The interviewee brings up that he probably could do much more, they are not talking enough to young people for example, who are the patients of the future, to get a feeling of what they think is okay or not okay. He says that clearly they are still underdeveloped in that sense, and probably a bit old fashioned and traditional. He suggests that instead of having old key opinion leaders, they could have a complementary panel, which is multicultural and of mixed ages. Like they do within consumer products, there is a lot more interaction with the consumers, and they could get a lot more insights from that, also to understnd current trends. Another important factor is that senior leaders care.

Challenges of Managing Foresight

This sections addresses the challenges associated with communicating insights and incorporating a forward-view or foresight into processes.

When asked about what he sees as the biggest challenge to incorporate a forward-view into their processes, the interviewee at **Swisslog** replied that the time and effort required is the the biggest challenge. To do foresight properly they would need to dedicate some resources and money into doing it, and he is at the moment just one person so he would try to get more people involved. Another barrier he mentioned is skills, he has been in the innovation area for quite a long time, but he has no experience within foresight. He continues that he has been pushing people to think 2 to 3 years ahead and to extend that horizon, but it has been very difficult as many people find it hard to think that way, and even he himself needs to learn it too. As an example he explains that the first time he heard about drones, he

thought about all the reasons of why it wouldn't work for Swisslog, which surprised him as he is not supposed to think that way. It took him about 6 months to realise that it might make sense. He also adds that probably 99% of the people in the company would think the same way, which is that that has nothing to do with us. However, the respondent sees it as his role do some thinking and investigation about those more "long term crazy things".

He moreover points out that it all comes down solidly to a people thing. Within foresighting there is analysis, observation, convincing people, etc. It all comes down to mindsets, people's experiences, the time to do it, a sense of urgency, standing by decisions and so on. He also mentions an example of a mega trend workshop a while ago, in which they involved customers. What was interesting, he said, is what customers thought was important was very different from what our people thought was important, so there was a disconnect between the two, providing another challenge. He also wonders what do if the majority does not believe, but one person is passionate, and might be right, because they have the knowledge / expertise, how do you handle that?

The interviewee at **DHL** pointed out that it is all up to the individuals you deal with. As it is a people's business, there will always be some that are more concerned with operational efficiency. It is important to support an innovative culture in the group and it needs to be clear that management thinks innovation is important. The challenge is to institutionalise foresight, and it needs to be recognised as important from the CEO. He adds that another challenge is to not hype trends too much, but to be realistic of what can be done in the near term horizon and to see what is behind those trends. He also emphasises that a structured innovation funnel might be good, but it is important to not over-engineer it, that too many gates kill creativity, creativity over administration and the right people over the right processes.

When asked at **SKF** about challenges of implementation, interviewee (1) responded that generally for suppliers it is much harder to have future visions. Interviewee (2) responded here that the greatest challenge in industry like theirs is to interpret the voice of the customers, further than the customers express themselves. The challenge is she says, that if we only listen to the problem today or in 5 years, we won't do something that is very innovative. She also adds that much of the company is currently very short-term viewed, and forced from the market. Interviewee (3) mentioned resources as a challenge, because it is not an obvious justification to have a specific team, given what companies already have in place, i.e. informed managers, gate keeping, etc. He also adds that he is not sure they need more people to look into the future, but maybe more efficient methods and structures. He says that in the end it is difficult to do foresight for 30 years, because no one will be interested, because it will change again. Moreover, another challenge is the product focus SKF has, which is a general limitation of engineering companies.

For **Siemens** the challenge is that the communication is always really hard, because on the one side you want to communicate things you want to achieve, on the other hand, if you're disrupting your own business people get scared, maybe you need new people working there or new expertise. This could be really tricky and is not easy for decision makers, according to interviewee (1). She adds that what is also hard is that when they have visions and new opportunities to derive what the business unit should really do, what does it mean for their strategy. They need people that are trained in transferring future opportunities, into roadmaps and doable things and understandable stories. Related to the communication of insights, she explained that the emotional part of it is very large, so people are excited or scared when talking about the future. But part of the story is to be emotional because you want to provoke people to

think in new ways. "Master Plan" they have at Siemens, which is a very strictly organised part, regarding the big goals and the big budget. If you get something in here, then it will be done, and everything will be sponsored and monitored. However, it is difficult to get things in there with more disruptive or explorative ideas.

Interviewee (1) at **Novozymes** spoke of the challenge of how to predict the black swans that can be very good for you or change the whole game of your industry and you can never know if positive or negative for your business, difficult to predict and assess. Moreover he adds that for the scouting team it is hard to know what to search for, they want to find next big thing but really it is a needle in a haystack and often only low hanging fruits detected. Lastly he pointed out that we cannot change the problems we have with the same mindset that created them, we need to have input from outside, otherwise we get stuck in what we are doing today.
Interviewee (2) at Novozymes emphasizes that the point really is the culture, and not the system, because the technology is often widely available, but people will not engage unless the cultural conditions are right. He talks about that there is a disconnect between the real cultures when it comes to innovation, knowledge, collaboration which you can observe to the "narrative" official story of what the culture is like, or what they would like it to be like. He continues that is interesting that not many companies, especially at C-level, are aware that culture is a major driving force for innovation and strategy. And these cultures can even be different within the same company, in different departments for example. He says that we all know foresight and the good practices, but to really harvest and seize opportunities in the future, the biggest success factor is the culture.

Another challenge is for example concerning the enterprise social media, to get a cross-functional establishment, because that's where the value lies. But the C-level would need to approve such an investment, and it is too hard to accept something you don't understand. This needs to be initiated by middle management, who still has 20 years ahead of them in the company.