Master Degree Project in Innovation and Industrial Management

Improving Internal Idea Generation
-Exploring the first phase of the innovation process in Engineering Contractor Inc.

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IMPROVING INTERNAL IDEA GENERATION
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ABSTRACT

Studies have shown that companies, which are skilful in managing the initial phase of the innovation process – the search of promising ideas – are more likely to succeed in the rest of the innovation journey. Nevertheless, this first phase is often given limited attention. The main purpose of this mixed-method case study of Engineering Contractor Inc. (ECI) is to examine the process of internal idea generation and in this way help the company improve their own process for generating new ideas internally. Theoretical results indicate that tools, methods and techniques that enable teams and groups to contribute to the generation of ideas have to be in place, as well as a supportive innovative environment. Empirical findings demonstrate that ECI has some tools, methods and techniques that can be used for idea generation, but in most cases they are not exclusively established with this aim. Additionally, improvement potentials appear to be connected to time allocation, sufficient processes and management support. The final recommendation declares that ECI has to focus on establishing routines specifically aimed at generating new ideas.

Keywords: *Innovation process, idea generation, search strategies, innovative environment*

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1. Introduction

This chapter aims to provide the background for writing this thesis and introduce our company of interest – Engineering Contractor Inc. (ECI)[*] – and its innovation strategy in brief, subsequently leading to our objective and research question.

1.1 BACKGROUND

The ability and need to crack the code of innovation is more important in today´s turbulent and complex environment than ever before (Bessant & von Stamm, 2007). Frequent technological changes and increased competition worldwide require companies to innovate; otherwise they risk falling behind both in terms of product and service innovation as well as process innovation (Rabes, 2010). Consistently, innovation is seen as the lifeblood of organisations and according to Porter (1990) it is one key element of competitive advantage. Bessant & von Stamm (2007, p.5) put it this way: *"For an organisation to be truly successful and sustain* [its] *success over many years it needs to be good at both steady state, conventional innovation, and to be able to sense a radical new discontinuous innovation on the horizon, and, preferably, come up with one itself"*.

Innovation is not something that happens overnight. Rather, innovation is a long-term journey that involves a constant balance between risks and rewards, especially when it comes to radical and discontinuous innovations. The more experience companies gain the faster this journey becomes (O'Connor et al., 2008). In today's changing economic climate, organisations are experiencing the effects of fast growing upswings but also harsh downfalls (Dodgson et al., 2008). The concept of innovation plays an important role when it comes to surviving these downfalls, turning problems into opportunities and conquering new markets. On the other hand, uncertainty and market pressure escalates with innovation (Assink, 2006). To an increasing extent companies nowadays therefore see an added value in investing time and effort into developing structures, systems and procedures that safeguard a constant flow of innovation (Bessant & von Stamm, 2007). In this respect, innovation could be seen as a process that needs to be managed (Tidd & Bessant, 2009).

A challenge for organisations continuously embarking on the innovation journey is to be able to repeatedly generate new ideas (Bessant & von Stamm, 2007). Research by Katilia & Ahuja (2002) confirms this challenge, demonstrating that the methods that organisations use when searching for new ideas can influence their overall innovation potential. Due to resource constraints, no organisation can search for ideas everywhere; they have to make a choice of where to conduct their search. The generation of new ideas thus requires well-developed mechanisms for recognising, administering, and selecting information among a wide range of signals in a changing environment (Tidd & Bessant, 2009). In other words, to detect the ways in which the innovation process can be triggered organisations need to focus on developing an integrated set of success routines that are learned over time and through experience (Tidd & Bessant, 2009). More precisely, this involves the development of search strategies, which can help an organisation scan the environment for new ideas. However, while companies usually are eager to develop a selection system that captures the ideas with potential for future growth, the initial phase of the innovation process – the search for promising ideas – is often given less attention (Matthaei & Andreas, 2007). This has been the case in ECI, a worldwide provider of oilfield products, systems and services with about 25,000 employees in 35 countries.

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[*] *Engineering Contractor Inc. is a fictive name*

In the last few years ECI has, as many other companies these days, devoted time and money on further developing their innovation processes. In connection to this work the TRAC^{2}E-model has been developed; a companywide framework for reducing risk and managing development projects from an idea is selected until a finished commercial product or service exists (CTO, 2012). In the longer perspective, ECI aims at developing an innovation culture. Yet, to start with, ECI´s intention is to move away from innovation as random incidents performed by individuals or small groups, towards innovation as a *"systematic, structured and managed approach"* pervading the whole company (CTO, 2012, p.4). The main focus has up until recently been on managing the execution part of the innovation process, and less effort has been devoted to structuring the idea generation phase.

In line with the company's desire to continuously improve their way of working, this is now changing. For the innovation process to become more effective, a constant flow of new ideas from various sources is required (CTO, 2012). In the CTO strategy document from October 2012, the initial phase of the innovation process is therefore addressed in detail. Here it becomes clear that in order to intensify the innovation pace and subsequently increase the number of successful innovations, more ideas need to be fed into the innovation process. In other words, the challenge for ECI is to increase the total amount of ideas aspiring to be selected and fed into the TRAC^{2}E-model.

1.2 THEORETICAL STARTING POINT

Bessant & Tidd (2011) emphasise the integration of three different perspectives relevant for the successful practice of innovation:

1. *Personal* or *individual*, which includes attributes such as the ability to identify, assess and develop new ideas and concepts.
2. The *collective* or *social* point of view, which refers to the contributions made by teams, groups and processes.
3. The *contextual* perspective, emphasising the climate and resources required to support innovative activities in an organisation.

A strong belief among the top management in ECI is that the company internally is *"sitting on a gold mine of good ideas that if captured and properly exploited can be used to create new and prosperous business opportunities"* (CTO, 2012, p.4). In other words, ECI assumes that their employees possess the individual attributes needed for succeeding with innovative activities. Yet, if employees are to disclose their ideas to the rest of the organisation the interaction and integration of the collective and the contextual perspectives also requires attention. This is based on the reasoning that while individuals can possess the right attributes to identify innovations, they still need to be part of an environment facilitating innovative thinking, and they need the collective tools, methods and techniques to be able to get out their full potentials. This is the theoretical starting point for our thesis. Accordingly, to be able to increase the amount of ideas ECI has to develop search strategies that enable teams and groups to contribute to the generation of ideas. In addition, to seize the full potential of ECI's employees and make the most out of the available searching activities, a supportive innovative environment has to be in place.

Based on the importance of and the organisational challenges connected to the initial search stage of the innovation process, the topic of our thesis is "idea generation". More specifically we will further investigate and develop the first stage of ECI's innovation process. The sources and challenges involved in searching for new ideas, the tools, methods and techniques used for idea generation, and elements of an innovative organisational environment are all features that will be addressed in this thesis.

1.3 CONCEPT CLARIFICATIONS

To minimise the risk of misunderstandings a clarification of certain terms will be presented in this section. The *search stage* is considered to be the first step in the innovation process and the main focus in this

stage is *"how to find opportunities for innovation"* (Tidd & Bessant, 2009, p.228)*. The search for innovation opportunities results in the *generation* of new ideas by the use of different tools, methods and techniques. The new ideas that are generated can be good or bad. Thus, a *selection* of ideas is needed to sort out the ideas with future potential. When an idea is selected, you can also say that the idea is *captured.*

1.4 OBJECTIVE

Our objective is to study internal idea generation practices and in this way help ECI improve their own ways of generating new ideas internally. In doing this we will determine which tools, methods and techniques that are appropriate to enable internal idea generation in ECI's specific situation. To be able to come up with this recommendation the innovative environment in ECI has to be explored. A sub-objective is thus to specify the strengths and weaknesses of ECI's innovative environment with regard to the potential for internal idea generation.

1.5 RESEARCH QUESTION

With the above problem description and objective we have arrived at the following research question:

How can ECI improve their ways of generating new ideas internally?

This question will be answered by examining the tools, methods and techniques enabling internal idea generation. In order to reveal a deeper understanding of ECI´s specific situation, a sub-question addressing the company´s innovative environment will guide our research:

What are the strengths and weaknesses in ECI's innovative environment?

1.6 DELIMITATIONS

Since our main objective is to investigate idea generation, it is only the search stage of the innovation process that will be included in our research. As can be seen in Figure 1, no attention will be paid to the select-, implement- or capture stage of the innovation process.
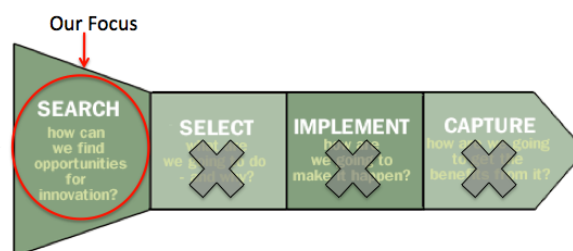
Figure 1: The Innovation Process (Tidd & Bessant, 2009)

Due to time and resource constraints, our focus will further be limited to *internal* idea generation. External search strategies, or the concept of open innovation, will not be addressed in this thesis. Moreover, we will focus on the strengths and weaknesses of the innovative environment in ECI, rather than performing a full-scale analysis of the organisational culture. In addition, the *personal* or *individual perspective* of the successful practice of innovation will not be investigated further since ECI is confident that their employees possess the attributes for succeeding with innovative activities. Our focus within the search phase will therefore be on the *collective* and *contextual* perspectives of successful innovation practices (Figure 2).

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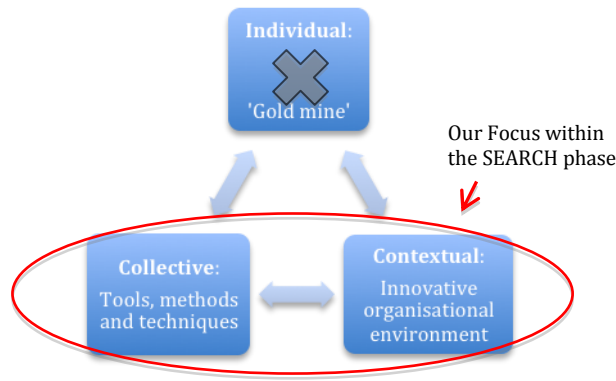
Figure 2: The focus areas of this thesis are the collective and contextual perspectives of successful innovation practise

Although the study addresses ECI as one organisation, our empirical research will for practical reasons primarily be limited to the Corporate Centre and the Engineering business area (Appendix A).

1.7 THESIS DISPOSITION

This study proceeds as follows. First, the *Theoretical Framework* will be presented containing an overview of the relevant theories and frameworks. Starting out broad, the innovation process will be defined before narrowing down the focus to its initial phase, i.e. the ways in which the innovation process can be triggered internally in a company. The sources and challenges involved in the search for new ideas; the tools, methods and techniques used for idea generation; and the environment beneficial for organisations to be innovative will be addressed.

Next, the use of *Methodology* will be reflected upon. Here the focus will be on how the research in this study has been carried out and the reasons for conducting it in this way*.*

In the subsequent chapter, the *Empirical Data* will be presented. The main part of this section will be devoted to ECI, yet complemented with empirical findings from two other companies actively focusing on their tools, methods and techniques used for idea generation.

In the successive *Analysis*, the theoretical framework will be compared to the empirical findings and a discussion will follow, examining how well the theory complies with the empirical findings and vice versa. In general this chapter will lay the basis for answering our research questions and concluding the study.

The *Conclusion* will summarise and discuss the conclusions drawn from the research, it will provide a recommendation for ECI connected to the research question, and it will explore the implications of our study for future research.

2. Theoretical framework

The purpose of this chapter is to present the different theories that constitute the theoretical framework of this thesis. We will start out broad by defining innovation and the implications of the innovation process. Next, our focus will be narrowed down to the initial phase of the innovation process, i.e. the ways in which the innovation process can be triggered internally in a company. The sources and challenges involved in the search for new ideas; the tools, methods and techniques used for idea generation; and the organisational environment supporting innovation will be addressed and elaborated upon.

2.1 THE INNOVATION PROCESS

The term "innovation" can be understood in different ways and is often confused with "invention" (Tidd & Bessant, 2009). In general, good ideas can be turned into inventions but this is simply the first step in a long innovation process that turns ideas into practical use. The most challenging part of innovation is to exploit the inventions and make them work both technically and commercially (Tidd & Bessant, 2009). Rather than solely including the "technological" fields, decisions in areas such as finance, strategy, organisation, and marketing are necessary to make the commercialisation of a new or improved product or service possible (Dodgson et al., 2008). In this respect, innovation is a lot more than invention and can be defined as *"the successful commercial exploitation of new ideas"* (Dodgson et al., 2008, p.2).

Rather than being a single event, innovation can thus be understood as a process of developing ideas into commonly used practices (Tidd & Bessant, 2009). Although an innovation according to the definition is considered a successful event, the actual innovation *process* can fail in its attempt to encourage the successful commercial exploitation of new ideas (Dodgson et al., 2008).

The challenge encountering most organisations is thus to meet the problem of renewal by managing the innovation process in a structured way and come up with good solutions to the dilemmas facing them (Tidd & Bessant, 2009). These managerial capabilities have to be learned over time. Accordingly, building and improving effective routines are a prerequisite for successful innovation management. It is not enough for managers to simply understand what is meant by innovation. They have to actively manage the innovation process and understand the changes of this process; only in this way is it possible to use innovation as a powerful source of competitive advantage and as a way to defend a company's strategic position (Dodgson et al., 2008; Tidd & Bessant, 2009).

2.2 SOURCES AND CHALLENGES INVOLVED IN THE INTERNAL SEARCH FOR IDEAS

Having defined innovation as a process opens up for the question of how an organisation should operate to be successful in each of the stages of the innovation process. Studies have shown that companies that are skilful in managing the very first phase of the innovation process are more likely to succeed in the rest of the innovation journey (Kim & Wilemon, 2002). Being successful in this phase however involves the ability of management to identify and maintain the sources of promising ideas in a sea of possibilities – and often with limited resources at hand. According to Bessant & Tidd (2011) this is the key challenge in innovation management. As indicated in the introduction, employees are in general a valuable source of new ideas but they need inspiration from somewhere. Tidd & Bessant (2009) have provided the following overview of sources of innovation (Figure 3):
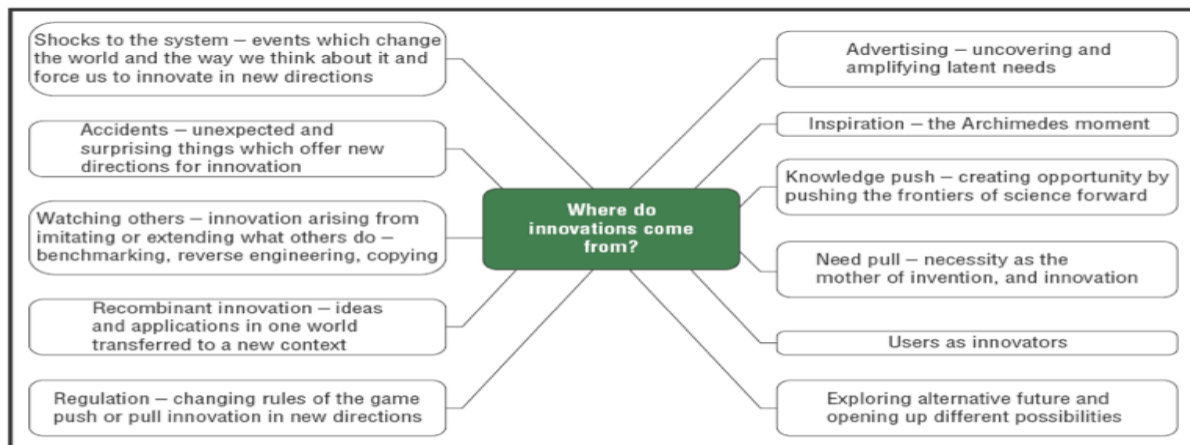
Figure 3: Where do innovations come from? (Tidd & Bessant, 2009, p.230)

The triggering of the innovation process is thus not just a result of random and spontaneous brainstorming (Tidd & Bessant, 2009). Although this is one important source of ideas, good ideas can come from a wide range of directions. At the same time, management has to acknowledge the challenges involved in the internal search for new ideas. Birkinshaw et al. (2011) have identified the following issues as typical challenges among employees:

- Capacity, time and motivation
- Detachment between top-management priorities and the efforts of the ones lower down in the organisation
- Lack of follow-through in idea generation programmes that from the beginning have good intentions

Björk et al. (2010, p. 38) have further recognised three paradoxes involved in the management of idea generation, which have to be dealt with in order to successfully generate new ideas (Table 1):

Table 1: Paradoxes of managing idea generation [*] **(Björk et al., 2010)**

Paradoxes	Explanations
The reliance on formal and informal structuring and processes	- Points out the difficulty in balancing the level of formalisation. - Companies with too formalised processes have negative effect on idea generation, while companies with informal processes risk to be inefficient or lose control. - Solution: develop organisational capabilities that both can formalise the informal and manage informal structures in new ways.
Direction of freedom in the search for new ideas	- Addresses the importance of striking the balance between direction and freedom when it comes to searching for ideas. - Too much direction: the search becomes very narrow and opportunities that lie outside the focus area may be lost. - Too much freedom: often results in a shallow search and useful ideas can be hard to find.
The level of involvement of all parts in the company	- To make an idea generation system across the whole company work, time needs to be put aside for idea generating activities. This is not easy to prioritise for management. - A company-wide system often becomes too formalised, which have negative effect on the idea generation outcomes. - Hierarchical power is hard to use when it comes to generating ideas so other types of incentives are needed.

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[*] *In Björk et al. (2010) idea generation is referred to as ideation*

In the two next sections of this chapter, the tools, methods and techniques used for idea searching, and the elements of an innovative organisational environment will be presented and explained. The former is given attention because we want to cover the *collective* or *social* point of view relevant for the successful practice of innovation. In doing this we are laying the basis for answering our main research question: *How can ECI improve their ways of generating new ideas internally?* The latter, on the other hand, is incorporated for the sake of the *contextual* perspective significant for successful innovation practice. Based on this section we will have a starting point for answering our sub-question: *What are the strengths and weaknesses in ECI's innovative environment?* which eventually will be integrated in the answer to our main research question.

2.3 TOOLS, METHODS AND TECHNIQUES USED FOR INTERNAL IDEA SEARCH

In this section we will present the tools, methods and techniques, which can be used to trigger innovation opportunities and hence generate ideas internally in an organisation. The contributions required by teams, groups and processes are in other words the focus of this section, representing the *collective* or *social* perspective of successful innovation (Figure 4). To give a quick overview, these tools, methods and techniques are summarised in Table 2 below, and will be further described in the succeeding text. In the examination of each of them, emphasise will be put on their

Figure 4: The focus of this section is the *collective* or *social* perspective of successful innovation

organisational challenges and success factors because we find these aspects highly relevant for our later assessment of how ECI can improve their ways of generation ideas internally in the company.

Table 2: Tools, methods, and techniques used for internal idea search

Tool/Method/Technique	Addressed Examples	Main Characteristics
Internal Innovation Networks	• Cross-functional teams • Communities of Practice	• Both formal and informal • Enabling multiple connections and collective efficiency • Continuous, part of daily working life
Innovation Workshops	• Workshops	• Face-to-face brainstorming session for invited participant only • Specific topic • Specific time period
Innovation Jams	• Jams	• Online brainstorming session including the whole organisation • Specific topic • Specific time period
Technology Roadmaps	• Support virtual innovation • Technology roadmap integration	• Graphical tools for managing and planning the future of technology • Should be updated at least once a year
Corporate Entrepreneurship	• Skunk work • Organisational slack	• Employees are given the freedom to investigate and develop their ideas • Managers have less control • Continuous, part of daily working life

There is no doubt that the management of innovation involves a combination of trial and error, imitation and borrowing of best practices, and not least improvisation (Bessant & Tidd, 2011). Over time however organisations gain experience and figure out what works best for them, i.e. the idea of routines becomes important, and especially in the area of search tools this concept applies. The tools, methods and techniques that can be used to generate ideas have to be tested and refined by organisations in order for them to develop highly specific approaches, which works in their specific situation. At the same time it is important to keep in mind that the management of innovation is a dynamic capability, meaning that tools, methods and techniques have to be updated and extended on a continuous basis as the complex environment changes. (Bessant & Tidd, 2011)

2.3.1 INTERNAL INNOVATION NETWORKS

The innovation process (illustrated in Figure 1) can be thought of as a simple map containing clear stages that help manage the process successfully. However, in reality the process is much more complex. The expression "the spaghetti model of innovation" (Figure 5) has been used to denote the close-up picture of how innovation actually happens (Tidd & Bessant, 2009). In this view, various people talk and interact with each other in different ways, and at different times – consequently weaving together different strands of knowledge in some kind of "social spaghetti" that eventually leads to useful innovations (Tidd & Bessant, 2009).
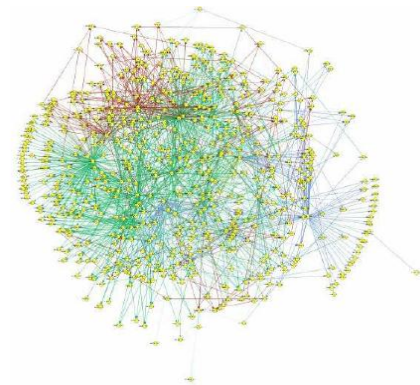
Figure 5: The spaghetti model of innovation (Bessant, 2009)

 "When working together people spark each other off, jump on and develop each other´s ideas, encourage and support each other through positive emotional mechanisms like laughter and agreement – and in a variety of ways stimulate a high level of shared creativity" (Tidd & Bessant, 2009, p.281) .According to Nonaka (1994) ideas are created in an individual´s mind, but usually they need to be developed in interaction with others. Making innovations happen thus depends on knowledge inputs from different people with various backgrounds. In fact, in today´s fast changing and global environment building and managing networks have become a prerequisite for innovation (Tidd & Bessant, 2009). Consequently, knowledge is considered a key factor in the innovation process and a requirement to enable idea generation (Kim & Wilemon, 2002). In the networks the focus is on the *flow* of knowledge rather than the creation of knowledge.

The networks especially created to enable innovation have been termed "engineered" networks. In contrast to "emergent" networks, which are essentially informal networks formed through common interests, the engineered networks have actively recruited members to specifically contribute to the innovation process (Tidd & Bessant, 2009). In order to generate new ideas, the importance of both engineered and emergent networks have been emphasised. Nonaka (1994) argues that social interaction in an informal setting is essential for the forming of new ideas, yet the contributions of these communities should be connected to the formal hierarchal structure of the organisation. Tidd and Bessant (2009) are of similar opinion, claiming that people as a result of informal interactions e.g. at work, are more likely to share ideas, but at the same time the opportunities for innovation offered by more structured networks have been identified. In the succeeding text, both engineered and emerging networks will be examined with regard to how they can be used for internal idea generation.

2.3.1.1 CROSS-FUNCTIONAL TEAMS

Cross-functional teams consist of members from numerous functional areas within a company, e.g. R&D, Manufacturing, Marketing and Engineering (Kim & Wilemon, 2002). According to Kim & Wilemon (2002) a cross-functional team is recommended in the early phases of the innovation process because the team

members are able to access diverse information and thus they have better possibilities to incorporate both internal and external best practices into the search process. Furthermore, when the team members can share knowledge and ideas in the initial stage of the innovation process they are more likely to come up with sound solutions to problems faster and at a lower cost. In this way the chances of ending up with the most promising concepts early are high (Kim & Wilemon, 2002).

Sapsed et al. (2002) emphasise the value of heterogeneity in cross-functional teams as well. In their view, contrasting viewpoints among the team members will give the individuals involved a "bigger picture" of the situation. At the same time, the "creative abrasion" as a result of these conflicting viewpoints will open up for discussion and can lead to the generation of new ideas (Sapsed et al., 2002). In line with this reasoning, Leonard & Sensiper (1998, p. 118) have suggested, *"intellectually heterogeneous groups are more innovative than homogeneous groups".* Diversity is in other words regarded to heighten the performance of the team, besides preserving the necessary tension and challenge in the team (Sapsed et al., 2002).

On the one hand, tension and challenge is argued to be necessary in the team because too much comfort and attachment among the team members is said to affect productivity negatively. On the other hand, job-satisfaction and group cohesiveness seem to be lower in cross-functional teams, mainly due to higher turnover and stress (Sapsed et al., 2002). In fact, research shows that the heterogeneity within these networks increases the level of conflict (Kim & Wilemon, 2002). A huge challenge attached to cross-functional teams is thus to coordinate the various areas of expertise represented in the network successfully (Sapsed et al., 2002). Accordingly, Kim & Wilemon (2002) suggest that the key to triggering opportunities for innovation is not to avoid the internal conflicts in the first place, but to learn how to overcome the conflicts once they are there. Additionally, the organisation should focus on how it best can guide its cross-functional teams. Here the role of project leaders is crucial because they can positively affect the innovativeness and performance of the rest of the team.

2.3.1.2 COMMUNITIES OF PRACTICE

"A community of practice is a group of people informally bound together by shared expertise and passion for a joint enterprise" (Wenger & Snyder, 2000, p.139). A group of engineers engaged in deep-water drilling is but one example. According to Lave & Wenger (1991) who introduced the concept to the business world in the early 1990s, this type of network can be seen as a complement to existing networks, encouraging knowledge sharing, learning and change in a free-flowing and creative environment. Accordingly, problems can be solved in new ways, ideas and knowhow can be spread, and hence opportunities for innovation can be spotted (Wenger & Snyder, 2000). In addition there is room for personal and professional development among the members in the community. In recent years it has become more and more normal to create communities of practice within large organisations. Not all organisations actually call these networks "communities of practice" though; they are known under different names like e.g. learning networks, thematic groups, or tech clubs (Wenger, 2006).

Most often communities of practice develop naturally as a result of a common interest in a specific area among the employees in an organisation (Wenger & Snyder, 2000). For this reason, communities of practice are known for their organic, spontaneous, and informal nature. At the same time, communities of practice can be established with the aim of obtaining knowledge in a specific field, and then people with particular knowledge can be invited to join. This should not affect the informal setting, however; the members of the network should create their own leadership, set their own agendas and different levels of participation should be welcomed (Wenger & Snyder, 2000). Some communities of practice meet regularly face-to-face (e.g. over lunch), while others are connected primarily online. E-mail network is one way to keep in touch, but with the growing Information and Communication Technologies (ICT) online discussion forums have become more and more common (Wenger & Snyder, 2000; Cook, 2008).

According to Wenger & Snyder (2000) there are three initial steps for managers to learn in order to make communities of practice part of the organisation´s success:

1. Understand what communities of practice are and how they work.
2. Recognise that these communities are the hidden source of knowledge development and therefore crucial when facing the challenges of the knowledge economy.
3. Realise the need for managerial support in order for the informal structures to develop and integrate into the company, leveraging their full potentials.

On the one hand, managers cannot make communities of practice mandatory, but they can cultivate and facilitate them. On the other hand, communities of practice are difficult to establish and maintain over time. One reason for this is the difficulty in integrating the informal networks with the rest of the company. To maintain the communities of practice over time, managers should: Identify which communities will strengthen the strategic capabilities of the organisation, provide the infrastructure needed for the communities to prosper, establish a proper reward system, and make use of non-traditional methods to examine the value of the communities (Wenger & Snyder, 2000).

2.3.1.3 ORGANISATIONAL CHALLENGES

The management of innovation networks is a challenging task. Although some challenges related to cross-functional teams and communities of practice have already been touched upon in this chapter, this part will emphasise briefly some of the more general challenges of managing innovation networks. Table 3 is based on Tidd & Bessant (2009, p. 305).

Table 3: Challenges in managing innovation networks (Tidd & Bessant, 2009, p.305)

Challenges	Explanations
Providing the momentum for bringing the network together	- The purpose of the network has to be clearly defined. - Third parties often play key roles here, e.g. network brokers, gatekeepers, policy agents and facilitators.
Create core-operating processes about which there is support and agreement	Important to specify: - Membership boundaries - Where/when/who in relation to decision making - Conflict resolution routines - Information processing and management - Knowledge management - How to motivate new and existing members - Risk/reward allocation within the network - The integration and coordination of the operations of the network
Sustaining or disbanding the network	- Networks do not have to last forever. If set up to achieve a specific aim they can be dissolved once this has been done. - Other times there is an argument for maintaining the networks for as long as members see benefits. This could demand regular review and "retargeting" to keep up the motivation.

2.3.1.4 ORGANISATIONAL SUCCESS FACTORS

The successful operation of internal innovation networks requires a specific set of management skills. Common for all of them is that they should be ***proactively managed*** in order to realise the benefits of innovation. Even so, management must be adjusted to the type of innovation network and the intentions behind setting it up (Tidd & Bessant, 2009). The emergent network (such as Communities of Practice)

should be actively managed by its participants, while in the more formal network research shows that project leaders can influence the speed and innovativeness of the search phase by (Kim & Wilemon, 2002):

- Setting the goals and constructing prioritised plans
- Handling interpersonal issues
- Being able to promote ideas internally
- Serving as a link between top management, functional groups and the team itself

To enable the successful generation of new ideas through networks, management also has to **facilitate the use of "Enterprise 2.0" technologies.** In the last few years, development of second-generation internet technologies, the so-called "Web 2.0", has opened up for considerable changes in the way we share, collect and interpret information (Birkinshaw et al., 2011). Most importantly, the Web 2.0 technologies encourage interaction between the people involved, resulting in network-effects. The term "Enterprise 2.0" is used when organisations adopt the tools and approaches of Web 2.0, and has been defined as *"the use of emergent social software platforms by organisations in pursuit of their goals"* (McAfee, 2009, p.73).

Facilitating Enterprise 2.0 technologies is crucial to enable the creation and persistence of networks in today's society. Consequently, they are also relevant for the successful triggering of new ideas, and can be used to consolidate and evaluate ideas (Birkinshaw et al., 2011). Blogs are one example of an Enterprise 2.0 technology that allows for communication of new ideas, while discussion forums are used a lot to trigger and assess opportunities for innovation. Accordingly, McAfee (2009) argues that the Enterprise 2.0 technologies should be applied in order for employees to create, gather and share knowledge, which eventually can increase the rate of successful innovations. In sum, the establishment of Enterprise 2.0 is an opportunity for employees to interact without anyone specifying exactly how they should do so. In this way, Enterprise 2.0 opens up for a new way of facilitating knowledge work (McAfee, 2006).

There are various ways of presenting the Web 2.0 tools that can be employed in a business context. The simple four-category classification model developed by Cook (2008) is one way of displaying them (Figure 6).
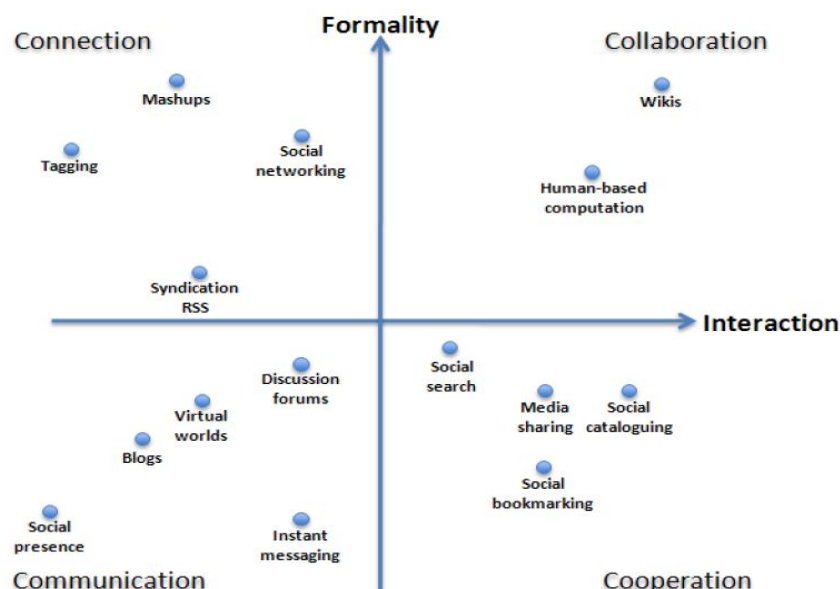
Figure 6: Overview of different Web 2.0 platforms, which can be used in the company context referred to as Enterprise 2.0. The two axes of interaction and formality form four quadrants, each linked to one of the 4Cs (Cook, 2008).

Facilitating Enterprise 2.0 technologies are necessary but not sufficient for enabling an interactive innovation process through networks. Another important success factor is thus for management to

balance the use of Enterprise 2.0 technologies with face-to-face interaction (Swan et al., 1999; Tidd & Bessant, 2009). There is no doubt the development of ICT, and especially the Enterprise 2.0 technologies, have had huge impact on the innovation process in the last few years. In order to manage innovation networks successfully however, emphasise should be put on active and personal face-to-face networking as well, in particular to allow for the sharing of tacit knowledge (Swan et al., 1999; Tidd & Bessant, 2009).

2.3.2 INNOVATION WORKSHOPS

An innovation or creativity workshop is a face-to face tool that aims at solving a complex problem through collective group efforts (Geschka, 1986). Although innovation workshops can be used to move forward in all the stages of the innovation process, they are particularly helpful in the initial stage of the innovation process to kick-start the search for new ideas (Geschka, 1986).

Innovation workshops are not set up to facilitate open-ended, free wheeling group work. As such, it should not be understood as a team building session or as an opportunity to solve relationship problems within a department. Rather, in an innovation workshop there should be a well-defined goal and a carefully structured agenda including a detailed time schedule. Normally however, there is some integrated flexibility in the time schedule, in case of unforeseen situations (Geschka, 1986). The precise goal and detailed structure of the innovation workshop is important in order *"to maximize the generation of ideas, the relevance and adequacy of information and the quality of judgement"* (Rhodes & Thame, 1988, p.42). At the same time, special rules that are not available at work should be made, which widen the freedom and willingness to share among the participants.

After a workshop is finished it is fair to expect the following (Rhodes & Thame, 1988, p.43):

- Answers to questions facing management
- Actions to be taken (a rough plan), at least a scenario
- Further questions that must be answered outside the workshop based on information identified as relevant but missing, not yet known or available
- Commitment to act, and to be involved in bringing about the change/recommendations

2.3.2.1 ORGANISATIONAL CHALLENGES

The organisation of innovation workshops involves challenges, which are presented in Table 4 below:

Table 4: Challenges in Managing Innovation Workshops (Rhodes & Thame, 1988; Geschka, 1986; Anderson, 2011):

Challenges	Explanations
Avoid group euphoria that leads to unrealistic judgements and decisions.	- To enable the prospering of realistic ideas management must provide enough information and details before and during the workshop. - If necessary, external speakers should be invited to inform and educate the participants.
Avoid taking decisions too fast.	- Innovation workshops are not aimed at final decision-making. - If decisions are taken too fast, participants might step back psychologically from the results of the workshop. - Proposals, recommendations, and numerous ideas for later evaluation are likely outcomes, and should be encouraged.

2.3.2.2 ORGANISATIONAL SUCCESS FACTORS

An innovation workshop with **top management support** is more likely to produce efficient and quick results at a relatively low cost. Commitment from top management to organise an innovation workshop sends out signals to the rest of the company, increasing the importance of the workshop (Geschka, 1986).

To **select the workshop participants with care** is another key success factor when organising an innovation workshop. This is important for two reasons (Rhodes & Thame, 1988; Geschka, 1986; Anderson, 2011):

1. Management has to make sure that the participants have enough competence to deal with the issues discussed, and that they have an interest in discussing them.
2. The participants should be a heterogeneous mix of employees, e.g. with different backgrounds, experiences and positions in the company. However, there should not be clear strained relations between the contributors, as this will affect the constructive communication in the group negatively.

Next, the success of an innovation workshop is highly dependent on **the skill of the facilitator**. This person is responsible for getting the desired results from the workshop and could be either internal or hired in for the workshop only. As such, the facilitator should possess specific know-how in the management of the workshop *process*, not in the particular data or content of the workshop. Without a skilled facilitator, the results could be disappointing and the discussions during the workshop could move into wrong directions and lead to distracting behaviour by some of the participants, wasting the time of the others. (Rhodes & Thame, 1988; Geschka, 1986).

The **optimal duration** of the innovation workshop is an additional factor of success. According to Geschka (1986) and Rhodes & Thames (1988), a workshop should ideally run for 1-2 days, and maximum 4 days. During this period the group has time to deal with a series of cycles, rather than having to rush through short and stressing sessions of creative problem solving which is often the case if only one or two hours are put aside for an innovation workshop. Geschka (1986) argues that each workshop involves set-up costs like e.g. learning about the topic, gaining commitment to deal with it from top management, developing the right atmosphere, learning how to use creative techniques, and becoming effective as a group. Accordingly, a workshop lasting 1-4 days is more cost effective and thus gives a better payoff in relation to the initial investment in time. To get the most out of the workshop and avoid job-distraction, Rhodes & Thames (1988) moreover suggest organising the workshop residential.

2.3.3 INNOVATION JAMS

IBM introduced the 'jam' concept in 2001 but it was not until 2006 they organised a jam that specifically focused on innovation. This particular 'Innovation Jam' has in terms of idea generation served as inspiration for many companies. The theoretical covering of this concept is however limited and therefore Bjelland & Chapman Wood´s case study on IBM from 2008 will serve as the main source of theory in this section. Some generalisations are made based upon the study of IBM and their 'Innovation Jam'.

Bjelland & Chapman Wood (2008) consider a jam as a massive online conference, which can involve tens of thousands of people who interact with each other in parallel. The set-up and execution of a jam differs and is constantly evolving depending on its context and aim: each jam can have a different context and a jam should address a specific topic or problem in order to guide the employees in their creative thinking. In IBM's case, the jam was executed during two separate 72-houer sessions, which involved more than 150,000 people, including employees, university researchers, clients, business partners, and family members. The jam resulted in 46,000 ideas and the creation of ten new business units, which represented an overall investment of $100 million.

2.3.3.1 ORGANISATIONAL CHALLENGES

To engage in jam activities entitles some challenges that are presented in Table 5:

Table 5: Challenges in managing innovation jams (Bjelland & Chapman Wood, 2008; Dearstyne, 2007)

Challenges	Explanations
Put aside enough time and resources for the time-consuming task of reviewing and categorising the posts after a jam is over.	• The true value of organising a jam lies in bringing ideas together; small ideas can compliment a big one and improve an innovation. • At IBM this work took several weeks. IBM's new visions did not develop through a continual process during the jam; they emerged after the jam was finished thanks to senior executives spending time on searching through the material.
The role of the facilitators needs to be developed and fitted to the online format.	• Facilitators can find it more difficult to guide and influence an online brainstorming session than a face-to-face brainstorming. • One obvious challenge in the 24-hours-a-day conversations in IBM was how the facilitators should keep track of the ideas while asleep.
The issue of intellectual properties need to be discussed before the jam session starts.	• The online format involves the publication of ideas, which could challenge potential future intellectual properties and the protection of an organisation's secrets.
Actions need to be taken to inspire and encourage the participants to contribute in the jam activity.	• Even though management is supportive, the activity among the participants differs.

2.3.3.2 ORGANISATIONAL SUCCESS FACTORS

Top management support is essential for making the outcome of the jam successful:

- There have to be a belief in that employees can make contributions to the area being investigated and a willingness to involve staff in the process of innovation. Often the participants have strategic ideas that can be important to the company, which could contribute to the development of new organisational visions (Bjelland & Chapman Wood, 2008).
- The commitment from top management needs to be of long-term character (Birkinshaw et al., 2011). IBM had engaged in jam activities for several years, which of course contributed to the success of the innovation jam (Bjelland & Chapman Wood, 2008). Proctor & Gamble and Shell are two other companies that have used the jam concept and it took five respectively ten years before they experienced benefits from their jam activities (Birkinshaw et al., 2011).
- The mind-set "every idea counts" at management level is important to inspire the employees to share their ideas freely. This gives the opportunity for people with big ideas to present them to a wider audience while people with incremental ideas have the possibility to reach out to executive managers. (Bjelland & Chapman Wood, 2008)

To have ***suitable software platform*** is also considered a success factor. The software platform should have the capability to sort and review a huge number of posts in order to support the analysis of the jam

sessions. By using a combination of online conversation and sophisticated technology, grouping and matching of ideas is possible (Bjelland & Chapman Wood, 2008).

2.3.4 TECHNOLOGY ROADMAPS

Technology roadmaps are considered flexible tools for managing and planning the future of technology while simultaneously supporting the overall strategy of the organisation (Rinne, 2004; Phaal et al., 2004). This is done by recognising and communicating the dynamic connections between technological developments, the strategic aims of the organisation, and the drivers of the external environment over time (Phaal et al., 2004). As Phaal et al. (2004, p.5) put it: "*the roadmapping technique can help companies survive in turbulent environments by providing a focus for scanning the environment and a means of tracking the performance of individual, including potentially disruptive, technologies*". Motorola developed the concept in the mid-1970s and already back then Robert Galvin, the former CEO of Motorola, considered technology roadmapping primarily as a tool for innovation. Galvin argued that by using roadmaps a particular field could be searched, the main drivers of change could be explored, and the roadmaps could thus serve as lists of future opportunities (Rinne, 2004). After Motorola's introduction of the concept the technique has been widely used within different industries (Dodgson et al., 2008).

Technology roadmaps have in recent years been used mostly for discovery and consensus building rather than to spot opportunities for innovation and potential market limitations. According to Rinne (2004), there are great possibilities to do something about this. In his view, technology roadmaps can become important drivers of innovation by supporting so-called "virtual innovation" and by integrating different technology roadmaps. In general, the idea is that roadmaps can propose ideas about new technologies and products based on the development and mix of existing technologies and products. The two next sections will explain briefly how technology roadmaps can help an organisation generate new ideas.

2.3.4.1 TECHNOLOGY ROADMAPS AND VIRTUAL INNOVATION

- *Aim of virtual innovation:* be able to innovate without producing tangible prototypes or products; instead develop prototypes virtually.
- Technological roadmaps play a vital role in terms of persisting the virtual innovations and hence contributing to the triggering of new ideas.
- *Example:* the decision to shelf a product idea usually means that the idea gets forgotten. A virtual prototype however, can be kept on the technology roadmap instead of being lost.

  Eventually, the virtual product idea might support and speed up the development of another product idea that could be successful on the market (Figure7).

Figure 7: The virtual innovation P7 would not have been created without the existence of P6, which is a previous virtual innovation (Rinne, 2004).

- *In sum:* ideas or products can be saved virtually on a technology roadmap and prove useful for the generation of new ideas. (Rinne, 2004)

2.3.4.2 TECHNOLOGY ROADMAP INTEGRATION

- *Aim of technology roadmap integration:* Facilitate the broadest possible context for innovation by linking elements from various roadmaps together, and in this way yield new innovations.

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- This intention is based on the fact that innovations can arise by rearranging existing components. It is often the case that an idea that is circulating in the periphery of one roadmap can be valuable to the development of a product or technology on another roadmap (Figure 8). Ideas that are kept alive on roadmaps can lead to the generation of new ideas by actively finding their way to other roadmaps or by being discovered through search for relevant technologies.
- *In sum:* By integrating roadmaps, otherwise unrelated technologies are connected and the context for innovation is widened. This enables the search for and generation of new and possibly disruptive technologies. (Rinne, 2004)
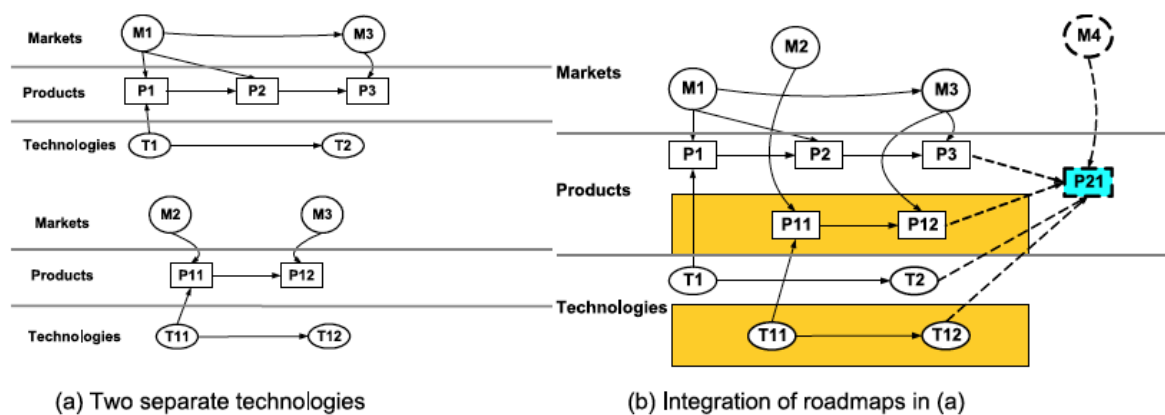
Figure 8: By integrating roadmap (b) in roadmap (a) a new opportunity has arisen in P21 (Rinne, 2004).

2.3.4.3 ORGANISATIONAL CHALLENGES

Rinne (2004) and Phaal et al. (2004) have emphasised a few challenges involved in managing technology roadmaps. These are presented in Table 6:

Table 6: Challenges in managing technology roadmaps (Rinne, 2004; Phaal et al., 2004)

Challenges	Explanations
Starting up and developing a robust technology roadmap process	- Creating the actual roadmap is not the challenge; the challenge is to take advantage of the process of putting it together. - *"The process brings together people from different parts of the business, providing an opportunity for sharing information and perspectives and providing a vehicle for holistic consideration of problems, opportunities and new ideas"* (Phaal et al., 2004, p.23)
Keeping the roadmap alive	- Not enough to develop a roadmap and stick to it over a long period of time. - The value of the roadmapping activity can only be extracted if the roadmap is updated on a regular basis, at least once a year.

2.3.4.4 ORGANISATIONAL SUCCESS FACTORS

According to Phaal et al. (2004) ***top management commitment*** is crucial when it comes to executing technological roadmaps in a successful way. There have to be a belief and enthusiasm regarding the concept of roadmapping and its potential benefits to the organisation among top management. Top management support is also important when it comes to securing the resources needed to go through

with the roadmapping process, e.g. in terms of budget, time and facilitation.

In order to reap the key benefit of technology roadmapping, i.e. creating a shared vision of where the organisation is moving, **communication and knowledge sharing** is required. Connected to this is the importance of having a common understanding of what signifies an iterative and exploratory roadmapping process. Time should put aside to ensure proper planning and clarification of e.g. the question of roadmap ownership. (Phaal et al., 2004)

Another factor of success is the **application of software** that sufficiently supports the roadmapping activities. In the initial development of a roadmap, simple word processing, spreadsheets, and graphic software are appropriate. In order to further develop the roadmaps however, more advanced software is needed. At this stage software systems that enable development, storage, dissemination and updating mechanisms of roadmaps are essential to benefit the most from the tool. (Phaal et al., 2004; Rinne, 2004)

2.3.5 CORPORATE ENTREPRENEURSHIP

Corporate entrepreneurship is all about being able to act in an entrepreneurial way as a company and to create new business opportunities within the existing organisation (Van de Ven & Engleman, 2004). It has become increasingly popular to encourage internal entrepreneurship by supporting employees in different ways to exploit their entrepreneurial skills (Tidd & Bessant, 2009). This is also referred to as *intrapreneuring* and is closely connected to the organisational culture and how the organisation deals with the entrepreneurial spirit of the employees. Intrepreneurs are very important to organisations since they contribute and involve in idea generation but also make sure that promising ideas are taken forward and developed further (Bessant & von Stamm, 2007). In terms of search practices, there are some techniques that are used in connection to corporate entrepreneurship and they will be described further in the next two sections.

2.3.5.1 SKUNK WORK

The term "skunk work" has its origin from Lockheed Corporation, which used the term in 1943 to nickname their department LM Aero-Palmdale. Skunk Works created America's first jet fighter and several other revolutionary aircraft models (Augsdorfer, 2005). Other examples of firms that use skunk work are IBM, Ericsson, Intel, HP and Apple (Fosfuri & Rönde, 2009). The term skunk work often gets mixed up with bootlegging and is falsely used as a synonym for undercover activity. In fact, skunk work is supported by top management and can be compared to an elite department working alongside the organisation on designated challenges or projects of more radical type (Augsdorfer, 2005). Often the skunk work unit is separated from the organisation in order to create an open, creative climate with few stop-mechanisms for the ideas that arise (Fosfuri & Rönde, 2009). Skunk work enables the innovation process to be more efficient and effective when investigating certain focus areas that can be integrated in the organisation (Single & Spurgeon, 1996). Researchers get the opportunity to produce novel ideas in a creative environment and escape corporate control, lines of thoughts and bureaucracy. It can also reduce the resistance that a radical idea often meets inside the organisation (Fosfuri & Rönde, 2009).

2.3.5.2 ORGANISATIONAL SLACK: ALLOCATION OF FREE RESEARCH TIME

It is common among creative organisations that a certain amount of time is dedicated for researchers to create and investigate their own ideas (Dodgson et al., 2008). Researchers at Google spends 25 percent of their time on projects they initiated themselves (Bel, 2013), 3M allows for 15 percent free research time while employees at Nippon Steel spends 10 percent on self-selected research projects. The time can be spent on own projects or to help out colleagues with their work (Dodgson et al., 2008).

The free research time can be considered as *organisational slack,* i.e. resources within a company that is not exploited to 100 percent to achieve a given level of organisational output, and there has been a wide debate among researchers whether or not organisational slack is good for innovation (Nohria & Gulati, 1996). The outcome of this discussion is that organisational slack has an inverse U-shaped effect on innovation, which means that slack should not be thought of as uniformly good or bad. Instead, the right question to ask is "what amount of slack is optimal for the specific situation?" (Nohria & Gulati, 1996). All the three companies mentioned above are considered to be innovative but still they allow for different amount of slack connected to innovation (Dodgson et al., 2008). With little slack, less time for experimenting is given and it will be hard for innovation to take off. Too much slack on the other hand leads to a loose control over what ideas are taken forward and the result will be that too much resources are put on developing bad ideas, shadowing the good ones (Nohria & Gulati, 1996).

2.3.5.3 ORGANISATIONAL CHALLENGES

The management of successful corporate entrepreneurship entails several challenges. These are presented in Table 7 below:

Table 7: Challenges in Managing Corporate Entrepreneurship (Van de Ven & Engleman, 2004)

Challenges	Explanations
The human problem of managing attention	• Addresses the dilemma of how organisations handle the balance between exploiting their existing capabilities and exploring new capabilities. • Existing structures and systems in the organisation can discourage innovative and entrepreneurial activities.
The process problem of managing ideas into good currency	• Points out the challenge of legitimising and implementing ideas that intrapreneurs have come up with into the organisation.
The leadership problem of managing the context for entrepreneurship	• Boils down to whether leadership is seen as a one-man task or as a function shared by many people. • The intrapreneurs need to be given the freedom to investigate and develop their ideas, which leaves managers with less control.

2.3.5.4 ORGANISATIONAL SUCCESS FACTORS

In order to cope with risks and uncertainties involved in these activities, ***top management support and leadership*** is vital (Bel, 2013). The key issue that should concern these leaders of innovation is to create a climate that supports entrepreneurial and innovative activities. Innovative companies like Google, 3M and Apple stimulate innovation by giving employees the opportunity of developing and diffusing their own ideas within the existing company. Managers make this happen through:

- Quick adoption of employee ideas
- Support to experimental projects
- Funding in the initial stages of the process
- Reward systems related to innovative activities

Additionally, there have to be a tolerance for failure in the organisation and a safety net for the employees that set out to try entrepreneurial endeavours. At 3M for example, intrapreneurs who engage in innovative projects are given their job back in case of project failure (Bel, 2013).

2.4 THE INNOVATIVE ENVIRONMENT

As stated in the introduction, three perspectives are relevant when it comes to successful innovation. After having investigated the *collective* perspective in the previous section, it is now time to address the *contextual* view (Figure 9). Bessant & Tidd (2011) consider the innovative environment as part of the contextual perspective, which focuses on the resources and climate needed to support innovative and entrepreneurial activities in an organisation.

The innovative environment constitutes a number of different elements, which address how the organisation handles the question of innovation. Simply put, the innovative environment is related to the management of innovation and is all about "how we do things around here" (Tidd & Bessant, 2009). To

Figure 9: The focus of this section is the *contextual* perspective of successful innovation.

create or change the innovative environment in an organisation and to develop routines are not easy and can take a long time. Yet, in order to improve the overall innovation capability of the organisation management need to take an active role in supporting the innovative environment. Tidd & Bessant (2009) have identified five key areas that need to be addressed by management in order to support the development of an innovative environment and improve the company's overall innovativeness. These are presented in Table 8 below.

Table 8: The five key managerial areas that affects the innovative environment and overall innovativeness of an organisation

Key Areas	Questions that should be addressed in the organisation	Level of focus in this thesis
Innovative Organisation	Do we have an innovative organisation, one that provides a supportive climate for innovation?	Main focus
Innovation Strategy	Do we have a clear innovation strategy and is it communicated and deployed effectively?	General focus
Innovation Process	Do we have effective enabling mechanisms for the innovation process- to search, select, implement and to capture?	General focus
Learning	Do we capture learning to help us develop improved innovation management capability?	General focus
Linkages	Do we build and manage rich external linkages to enable 'open innovation'?	Excluded

This thesis will mainly address the area of *Innovative Organisation*, since it heavily affects the success of the activities connected to idea generation. The innovative organisation can be described by five elements, which will be further elaborated upon (Tidd & Bessant, 2009):

- Top management commitment
- Organisational structure
- Creativity
- Employee involvement
- Key individuals

Even though the innovative organisation will be the central part in our investigation, the *Innovation Strategy, Innovation Process* and *Learning* are still essential in the innovative environment. These areas will also be elaborated upon but on a more general level. Thus no specific elements will be addressed.

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Linkages are mainly addressing how the organisation connects and cooperates with the external environment and will therefore be excluded since it lies outside the scope of this research.

2.4.1 INNOVATIVE ORGANISATION

In the field of innovation the area of innovative organisation is of central importance. This area mainly addresses the importance of *people* and how to create a climate that inspires and encourages the employees to take part in idea generation and further development of ideas (Tidd & Bessant, 2009). Even though there are examples of individuals who have developed new innovative concepts on their own, innovation nowadays is considered to be a team effort. Extraordinary things can be done when people with different perspectives and skills work together as a team. In an innovative organisation, team working and collaboration across the organisation are thus supported. According to Tidd & Bessant (2009, p. 123), "*groups have more to offer than individuals in terms of both fluency of idea generation and in flexibility of solutions developed*".

The innovative context is built upon the values and believes that thrive in an organisation, which can either support or stifle innovative activities. There is no such thing as 'one size fits all' in terms of innovative organisation set up, rather there has to be a match between the climate and the operating contingencies (Tidd & Bessant, 2009). Elements that affect the innovative organisation are presented in the succeeding sections.

2.4.1.1 TOP MANAGEMENT COMMITMENT

A prerequisite for engaging in successful innovation activities is *commitment from top management*. The main challenge is to translate management's innovative visions into something real, such as mechanisms or processes that reinforce the sense of management support, commitment and enthusiasm. Long-term commitment is especially important since innovative endeavours involve high levels of uncertainty but usually do not yield quick returns. This can be hard to accomplish since the high pressure from shareholders to generate short-term gains have to be combined with long-term technology development plans (Tidd & Bessant, 2009).

Another aspect is the acceptance of risk and failure among top management. As mentioned earlier, innovation involves high levels of uncertainty. In order to be successful in innovation management some risks need to be taken by the organisation and failure should be thought of as an opportunity for learning and development, rather than something negative. In an organisation with low acceptance of risk and failure, the employees find e.g. experimentation activities hard to take on. This said, organisations should not go overboard and take unnecessary risks. Emphasis should be put on reducing risk where it is possible. Thus organisations should engage in sufficient research and collection of information activities (Tidd & Bessant, 2009).

2.4.1.2 ORGANISATIONAL STRUCTURE

As we have touched upon earlier in this report, cross-functional cooperation and smooth information flow have been identified as important factors when it comes to idea generation and innovation. The *organisational structure* plays an important role and should be designed in a way that enables creativity, learning and interaction among the employees. Organisations that for example have high hierarchical ordering, information flows that are one-way and of a top-down character, as well as little cooperation between functions is probably not going to be very successful in their quest for innovation. Since innovation basically is about integrating different perspectives in solving a problem, the structure should support organisational team-working capabilities. (Tidd & Bessant, 2009)

There is not a single best structure that can be applied in all organisations. In order to be successful there has to be a fit between the organisational structure and the operating contingencies. For instance, Google and McDonalds have different ways of organising their operations, which need to be supported by the organisational structure. Therefore, the optimal structure is not the same in the two companies. (Tidd & Bessant, 2009)

2.4.1.3 CREATIVITY

Facilitating creativity is important when creating an innovative organisation. If people feel that they can be creative there are higher probability of generating new ideas as well as further developing these ideas. It should be noticed that everyone owns the capability of being creative, but it is expressed in different ways (Tidd & Bessant, 2009). Some people like to engage in the process of continuous improvements, so called incremental innovation, of already existing processes or products while other take on radical solutions, which can create completely new concepts or change whole industries. The challenge for organisations is however to manage activities that allow all employees to take part and be creative. Basically, both small incremental ideas and 'outside the box' ideas are important to the organisation (Tidd & Bessant, 2009).

The level of creativity among employees is connected to the *organisational climate*. To develop an innovative climate is not an easy task since it builds upon complex relations of behaviours and other social settings (Tidd & Bessant, 2009). According to Tidd & Bessant (2009, p. 131), the creation of an innovative climate that supports creativity involves "*systematic development of organisational structures, communication policies and procedures, reward and recognition systems, training policy, accounting and measurements systems and development of strategy*". Out of these different systems and structures, the reward and recognition systems are of special importance when it comes to idea generation (Tidd & Bessant, 2009).

The *reward and recognition system* in many companies mainly focuses on the performance of repeated tasks rather than inspiring to think 'outside the box' or encourage coming up with new ideas. In contrast, an innovative organisation has a reward system that supports and encourages creative behaviour in different ways. One example of this concerns the concept of intrapreneurship, which allows employees with bright ideas to develop them within the organisation. If the employees think they can build a business case from an idea, the organisation can back it up and give the employees the responsibility and mandate to run it. This kind of recognition and non-monetary reward has proven to be more successful than solely monetary ones. Organisations without a reward system that support creative behaviour run the risk of forcing entrepreneurial employees to leave the business to pursue the ideas that they believe in (Tidd & Bessant, 2009).

Another important aspect of creativity is the *time and space* given for ideas. When the amount of idea-time is high, there is a possibility for the employees to discuss and elaborate around their ideas that are not included in their everyday task assignments. When the idea-time is low, it is impossible for the employees to involve in other things than instructions and planned routines. In addition, individuals under time pressure are less creative and managers may avoid new ideas because they will take time away from completing the planned day-to-day projects or schedules. Too much idea-time is not ideal either; signs of boredom can be found among the employees and decisions are taken slowly because there are too many ideas to evaluate. Therefore, the right balance of idea-time and space has to be found in the organisation in order to be successful in innovation (Tidd & Bessant, 2009).

2.4.1.4 EMPLOYEE INVOLVEMENT

Tidd & Bessant (2009, p. 99) state "*every human being comes with the capability to find and solve complex problems*" and similar to creativity, people are involved in this in different ways. Most of the employees

contribute with incremental improvements or ideas related to existing products or services while others tend to come up with solutions of the more radical type. When it comes to innovation, the search for the big breakthrough solutions often gets much attention since it is obvious how this contribute to an organisation's future success. It should however not be forgotten that the incremental improvements can have significant effect on the business. Examples of concepts that involve the employees in the organisation's everyday activities are quality management, lean and kaizen. Another important aspect of involving every employee in the quest for innovation is that people who are involved in change often are more receptive for change itself. In an innovative organisation, everyone should take part in the improvement process in order to make it easier to implement innovative changes. (Tidd & Bessant, 2009)

2.4.1.5 KEY INDIVIDUALS

Due to the risks and uncertainties involved in the innovation process, ideas often get discarded or killed at an early stage. Ideas can meet a lot of resistance inside an organisation for different reasons. E.g., managers at different levels can reject an idea because of heavy workload or poor understanding of the implications of the idea. To challenge and go around the obstacles in the organisation, *key individuals* are important. If they believe in an idea, they will bring it forward no matter what management says. The use of "guerrilla tactics" has resulted in successful innovations in companies like 3M and BMW. The key individuals support innovation in different ways and can be referred to as *technological champions, organisational sponsors, technological gatekeepers* or *business innovators*. It should be noted that these roles cannot be assigned to an employee by the company. Rather, it is a way to describe an employee. While key individuals help push potential innovations forward in the organisation, there are also people who mobilise resources to stifle the process. These project assassins, or *negative champions,* have different reasons for their behaviour, e.g. political reasons or other pet projects in the organisation. This can lead to the organisation ending up in a blind alley (Tidd & Bessant, 2009).

2.4.2 INNOVATION STRATEGY

In order to develop a truly innovative environment in an organisation, the efforts should be company wide (Tidd & Bessant, 2009). There has to be some kind of overall plan made by top management that sets out the direction of how the organisation wants to handle innovation. Thus, it is important to have an innovation strategy. In order to be successful in this area the innovation strategy and corporate strategy have to be aligned, otherwise the attempts of being innovative is likely to fail. It should be noticed that there is no single best innovation strategy; it is all about finding the right strategy for the organisation's specific situation (Tidd & Bessant, 2009).

Based on the organisations specific situation, the innovation strategy will focus on different areas. A large organisation operating in a mature industry has different needs than e.g. a small start-up firm. For organisations operating in the early phases in an industry, focus needs to be put on 'probe-and-learn' capabilities. In this stage there is a high failure rate and it is important to be able to learn fast and improve or change the way of working in the organisation. One example of this can be when the dominant design is not set and the circumstances are non-static. The reverse situation is organisations that operate in mature industries, where the settings are more static and focus is on "doing what you do better". Here it is important to involve everyone in the innovation quest, e.g. by implementing quality management or lean processes (Tidd & Bessant, 2009). Large firms often have what is called an "ambidextrous challenge" where they have to balance the two "do different/do better" aspects described above. This means that they have to have strategies for how to improve the existing products and services, but also how they should renew the company and e.g. enter new markets. This is not an easy task for management, whose main goal is to find the right balance between these different strategies (Tidd & Bessant, 2009).

2.4.3 INNOVATION PROCESS

As have been expressed earlier in this thesis, innovation can be seen as a process. In terms of the innovative environment, the innovation process is an important managerial area. To constantly evolve and renew the business, organisations need to figure out how to manage the innovation process in a beneficial way (Tidd & Bessant, 2009). Although the main focus in this thesis is put on the search stage, all the stages in the innovation process need to be supported and developed. This comes down to whether the organisation has effective enabling mechanisms for the innovation process- to search, select, implement and to capture innovation. Basically, there should be sufficient support in the organisation from the point when an idea is generated to the point when it is launched on the market (Tidd & Bessant, 2009).

The structures, procedures and processes used to support the different stages in the innovation process can be of both formal and informal character. Further, they can vary in level of involvement, duration and what type of innovation they foster. A mix of the different structures, procedures and processes can be used in order to solve the issue of renewal. There are many different solutions and the most important thing is to find an approach that suits the organisations specific situation (Tidd & Bessant, 2009).

2.4.4 LEARNING

Inherent in the concept of innovation is the notion of change (Tidd & Bessant, 2009). Dependent on the characteristics of the innovation the changes can be either of minor or major character. Regardless of size, organisations are required to be able to learn new things. According to Tidd & Bessant (2009) innovation management can be seen as a learned capability. There is no organisation that has perfectly developed approaches around innovation from the start; the capability of organising and managing innovation is learnt through a process of trial and error over time. Therefore the organisation has to be able to learn from their mistakes as well as transfer successful settings to the rest of the company (Tidd & Bessant, 2009).

Learning is also important on the individual level to support innovation. Individuals that are willing to learn new things develop own capabilities and can through training get better at e.g. thinking and working "outside the box". This particular skill can be very valuable in organisations that engage in innovation. Sharing of information within an organisation is also important when it comes to learning. When information easily can be spread within the organisation, there is a good base for both organisational and individual learning (Tidd & Bessant, 2009).

3. Methodology

The aim of this chapter is to provide an understanding of how the research in this study has been carried out and the reasons for conducting it in this way.

3.1 RESEARCH STRATEGY

In order to answer our research questions we used a mixed method research strategy, which combined qualitative and quantitative research. We did this in order to cover different aspects of the phenomenon and hence end up with a more comprehensive result (Bryman & Bell, 2011). The technical rather than the epistemological version of the debate about the nature of quantitative and qualitative research was in other words applied, which finds mixed methods studies both feasible and desirable (ibid).

Due to the choice of research strategy, we applied a mix between the inductive and the deductive approach to the relationship between theory and research. This means that we both focused on the understanding of a subject and to a certain extent on the testing of theories. There are more reasons for this: Firstly, induction often entails an element of deduction. In our qualitative analysis we primarily made use of grounded theory (explained below), and this method often includes an iterative strategy, i.e. it entails moving back an forth between theory and data. In our case we reflected upon theory while simultaneously collecting data at ECI. Secondly, although a quantitative research strategy often entails a deductive approach, quantitative social surveys like the one we conducted on the innovative environment in ECI, are often not solely about hypothesis testing but could also offer possibilities for the creation of theories. In our situation, the interpretation of the quantitative findings was quite exploratory and hence not explicitly deductive. Thus, induction was our underlying approach, yet elements of deduction were evident in our study. (Bryman & Bell, 2011)

By combining qualitative and quantitative research we were able to reveal more about ECI's specific situation than through one research strategy alone. The use of a qualitative research strategy opened up for flexibility in our research. There were in other words room for adjustments along the way, e.g. with regards to the people interviewed and the questions asked. We also believe that the qualitative research strategy and its rich, deep data provided us with a broad and holistic picture of ECI's particular setting. Since a qualitative research strategy is highly dependant on interpretations of results by the researchers, a potential drawback of this research strategy is the risk of bias. The difficulty in generalising results is considered another disadvantage. As such, it was not our aim to generalise across organisations by using the qualitative research strategy. Rather, we wanted to make an in-depth and context specific interpretation of ECI's situation in order to help them develop their own process for generating new ideas within the company. (Bryman & Bell, 2011; Saunders et al., 2007)

The quantitative research strategy on the other hand provided us with a more general understanding of the innovative environment in ECI. Rather than focusing attention on words, this research strategy emphasises numbers and quantification of collected data. Compared to the flexible nature of the qualitative research strategy, the data collected in our innovation survey was mostly locked into pre-set categories. Basically, by using a survey we obtained a more quantiative description of the social life aspects in ECI.

3.2 RESEARCH DESIGN

The overall research design chosen in this thesis was a single case study of ECI (Yin, 2009). Case studies are often associated with qualitative methods and hence allows for the combination of different qualitative methods rather than relying on one single approach. However, it should be noted that a case study could also be employed to quantitative methods, which was the case in our study. By applying a

single case study to a mixed methods study, we had the opportunity to focus on a specific organisation – ECI – and their bounded situation. Further, we were able to obtain an in-depth understanding of a real-life phenomenon through thorough empirical investigation. The fact that we had the possibility to physically write our thesis at ECI's head office helped us in this respect. (Bryman & Bell, 2011; Saunders et al., 2007)

With the single case study as a starting point, we carried out multiple case studies in order to complement our findings (Yin, 2009). These case studies were conducted on two large corporations that have a special focus on their tools, methods and techniques used for the generation of new ideas. On purpose we selected large companies, which are not operating in the oil and gas industry. This was because we wanted to detect and draw upon experiences from other sectors. Beforehand, our aim with the multiple case studies was to identify "best practices" or "common mistakes" that ECI should be aware of. Afterwards we can conclude that the multiple case studies added value to our research in terms of passing on "real-life-experiences". It is important to bear in mind that ECI was studied in detail over several months, while the information gathered about the two companies was collected through one interview with each of them. The focus in the multiple case studies was thus on the companies' *main* tools, methods and techniques on a company-wide level, and the information disclosed was not exhaustive. In other words, they emphasised some important aspects and complemented our research, but they were not the main focus of our thesis. (Bryman & Bell, 2011; Saunders et al., 2007)

3.3 RESEARCH METHOD

In order to gather qualitative evidence we primarily conducted interviews. More specifically, we conducted semi-structured and unstructured interviews with key persons in ECI, and semi-structured interviews with key persons in the companies, which were part of the multiple case studies. One advantage with semi-structured and unstructured interviews is their iterative nature. Compared to the structured interview, it was possible for us to re-interview and ask follow up questions as the interviews proceeded. This opened up for more flexibility in our research and we were able to obtain rich and detailed answers from the respondents, which contributed to a more complete picture of our research topic. (Bryman & Bell, 2011; Saunders et al., 2007).

When conducting the semi-structured interviews we made interview guidelines with our pre-set main focus, i.e. the research question, in mind. The interview guidelines included a list of themes and questions to be answered. In this way we made sure that we would stay on topic and cover certain issues within our focus area, but at the same time we were able to ask different questions to different interview objects and we could ask further questions in response to the answers we got whenever we found it relevant. On the other hand, we had to watch out for asking leading questions as this could bias the interviewees' answers. We recorded all the semi-structured interviews and took notes along the way. Afterwards we made detailed transcripts to ensure a thorough assessment of the interviewees' answers and correct for the natural limitations in our memories. All in all, we think the semi-structured interviews and hence the interview guidelines were a good way of collecting qualitative evidence to answer our research question (Bryman & Bell, 2011; Saunders et al., 2007).

The unstructured interviews on the other hand were more flexible in nature and allowed us to do more informal research. Especially while we were present at ECI this interview form was a good additional information source to the semi-structured interviews. Rather than setting up an interview guideline we could ask just a single question, maybe over a coffee break, and try to get valuable information out of it. In this way the interviewees was encouraged to answer extensively and as they wished in an informal setting. During or right after the unstructured interviews we made sure to make transcripts of what was/had been said. This was important in order to safeguard high reliability. However, we figured out that this interview form was not as useful when conducting the multiple case studies. Since we were not present in those companies on a daily basis the informal setting was not as natural as was the case at ECI.

For this reason we relied solely on semi-structured interviews in these companies. (Bryman & Bell, 2011; Saunders et al., 2007)

Table 9 below presents an overview of the semi-structured interviews conducted and their settings. The interview guideline used is provided in Appendix B.

Table 9: Overview of the semi-structured interviews that has been conducted

Company	Respondent Position	Location	Date	Type	Duration	Language
Company A	Innovation Manager	Gothenburg	12.04.13	Face-to-face	60 minutes	Swedish
Company B	Director, Corporate Innovation Office	Gothenburg	15.04.13	Face-to-face	60 minutes	Swedish
ECI	Advisory, Research & Innovation, Corporate Technology	Oslo	16.04.13	Face-to-face	50 minutes	Norwegian
ECI	Vice President, Technology Development	Oslo	16.04.13	Face-to-face	30 minutes	Norwegian
ECI	Knowledge Manager, Specialist Engineer	Oslo	11.04.13	Face-to-face	45 minutes	Norwegian/ Swedish
ECI	Department Manager, Senior Engineer	Oslo	19.04.13	Face-to-face	30 minutes	Norwegian/ Swedish

All the interviews were done face-to-face since we regarded this as an advantage in terms of the question of trust. At ECI, we called for meetings and organised meeting rooms where the interviews took place. The interview at Company A was conducted in its canteen, while at Company B it took place in one of its meeting rooms. All interviews were conducted in Swedish and/or Norwegian to decrease language obstacles.

In order to collect quantitative data we organised an online self-completion questionnaire through SurveyMonkey.com©. In total we asked the respondents 32 questions (Appendix C). First, seven background questions were asked, followed by 22 closed questions before three open-ended questions ended the survey. The closed questions were based on two questionnaires addressing innovation management developed by Tidd & Bessant (2009) while the demographic and open-ended questions were designed according to the specific requirements of our research. In the closed questions, the respondents could choose between eight different answer options: either 1-7, which represented a Likert scale ranging from *Not true at all* to *Very true,* or the option "I don't know". We were aware of the drawbacks of asking closed questions, e.g. the difficulty in making forced-choice answers mutually exclusive, and the fact that a question may be interpreted differently by respondents and hence can affect the validity of the answers (Bryman & Bell, 2011).

The questionnaire was distributed to the sample through email. We constructed an inspiring cover letter containing the link to the questionnaire, which was further distributed by managers connected to our sample. This procedure was applied due to technical reasons but also in order to increase the chances of a high response rate; it was assumed that the employees were more likely to answer if their managers supported the audit participation. In addition, the respondents were promised anonymity. Two reminders where sent in this manner. The time horizon for the audit can be seen in Table 10 below:

Table 10: Time horizon for the Innovation Audit

Audit Start	1st Reminder	2nd Reminder	Audit Closed
2nd of April 2013	8th of April 2013	10th of April 2013	12th of April 2013

In order to be able to generalise our audit results and minimise bias in our research, we focused on reaching out to a representative sample (Bryman & Bell, 2011). The total population equals 782 employees and based on the amount of available resources, the sample size was determined to 300 employees. To define the wanted sample, we used the method of stratified random sampling. For the population the following characteristics are presented in Table 11:

Table 11: Demographics for the investigated population

Gender			
72% Males		28% Females	
Educational Level			
28% Bachelor Degree	56% Master Degree	3% PhD	13% Other
Number of years in ECI			
36% 0-5 years	20% 5-10 years	24% 10-20 years	20% 20-40 years

These characteristics were used as strata for our sample. For the sample to be representative, the aim was to target a composition of employees that mirror the proportions of the above-mentioned strata. This was done with help from the HR department in ECI. Out of the 300 encountered employees, 168 answers were collected and a response rate of 56% was achieved. The respondents' characteristics are presented in Table 12:

Table 12: Demographics for the respondents in the sample

Gender			
73% Males		27 % Females	
Educational Level			
24% University 1-3 years	47% University 4-5 years	18% University more than 5 years	11% Other or upper secondary school education
Number of years in ECI			
36,5% 0-5 years	17% 5-10 years	12,5% 10-20 years	34% >20 years

When comparing the numbers in Table 11 and Table 12, it became evident that:
- The sample is representative in terms of gender
- The sample accommodates a lower level of *Mater Degrees* and a higher level of *PhDs* than the population
- The sample accommodates a lower level of number of years in the organisation in the category *10-20 years* and a higher level in the category *>20 years*

To sum up, the sample is representative in some areas but there are also certain sampling errors. By using a probability sampling method, we have tried to minimise the errors but it is hard to eliminate them completely (Bryman & Bell, 2011). A drawback with the chosen distribution method of the audit is that we have limited information about the employees that did not take part in the audit. This information could have helped us to investigate the representativeness. All in all, we have tried to minimise the sampling errors, and we consider our sample to be as representative as possible.

3.4 DATA COLLECTION

The data in our research were collected from both primary and secondary data. The semi-structured and unstructured interviews, survey results, annual reports, emails, company reports, presentations, observations, and information from ECI's intranet, are all considered primary data. The secondary data

were collected from books, academic journals, newspapers, and from the internet in general. Sufficient secondary sources made it possible for us to rely on the work of others. Especially in our theoretical framework this was done in order to understand and give an overview of the current literature concerning our research topic. Needless to say, source criticism was an important aspect when making use of secondary sources. (Bryman & Bell, 2011; Saunders et al., 2007)

3.5 DATA ANALYSIS

In order to analyse the complex situation of ECI we relied on grounded theory. The idea behind this qualitative analysis approach is to generate theory out of data, indicating an iterative approach where data collection and analysis can develop in tandem. In light of this, we did theoretical reflections while at the same time conducting a case study of ECI. The evolving data was interpreted and coded as we collected it, which enabled us to generate theory derived from data throughout the research process. To make this happen however, it was essential that we took notes and made brief transcripts during or straight after the collection of data (e.g. during a semi-structured interview or immediately after an unstructured interview). Additionally, we recorded the semi-structured interviews so that it was always possible to listen to them again and double-check information. This resulted in detailed transcriptions. Only in this way was it possible to make the coding as accurate as possible, indicating higher reliability. (Bryman & Bell, 2011)

In terms of the Innovation Audit, both the open-ended and closed questions were analysed. The open-ended questions were post-coded by two observers, which resulted in the data being grouped into different themes. The closed questions provided us with quantitative data and in order to assure that the information used in the audit analysis was valid and accurate, the collected answers were investigated through a data examination process. First, the data were cleaned and statistically tested; "I don't know" answers were treated as missing data (Hair et al., 2010). Secondly, based on our theoretical studies we believed that an underlying structure existed among the questions in the audit. According to Tidd & Bessant (2009), the questions could be divided in to four managerial areas of an innovative environment. To explore whether or not our empirical data corresponded to these, a reliability analysis was conducted in IBM's SPSS. Question 11 was excluded in this analysis since the missing data level equalled 50%. Out of the 168 individual cases, 19 had above 50% of missing data. It was decided to keep these cases in the analysis since excluding the cases would affect our analysis more due to a decrease in sample size. The result of the reliability analysis indicated that the questions in each area correlate in a conceptual manner (Hair et al., 2010). The full set of results can be found in Appendix D. Finally, the data were analysed question by question in terms of finding strengths and weaknesses in ECI´s innovative climate. The mean value was the main measurement in this stage of analysis and Question 11 was therefore included again. In connection to this, the "I don't know" answers were analysed separately.

3.6 RESEARCH QUALITY

In this thesis we looked at the unique case of ECI and tried to understand the complexity of their situation. There were therefore many factors to take into account along the way. Our overall challenge was to conduct a research with high reliability and thereby also achieve high validity.

3.6.1 RELIABILITY

Qualitative studies are in general hard to replicate by other researchers due to the difficulties of changing settings in the environment investigated (Bryman & Bell, 2011). This is also, to some extent, the case for our study of ECI's specific situation. We tried to increase the replicability of our qualitative research by providing a clear documentation of our procedures, such as an interview guideline, a framework for our analysis, and a constant focus on minimising biases and false interpretations in the study. In terms of the quantitative innovation audit, the internal reliability can be considered high. The sample was considered

to be representative and the reliability test showed that Cronbach's Alpha exceeded the level of 0.6 (Hair et al., 2010). For the open-ended questions, the lack of consistency was minimised by including more than one observer in the coding process. Based upon these arguments we believe that if other researchers would engage in replicating our study, they would come up with similar results.

3.6.2 VALIDITY

The concept of validity expresses at what level you are measuring what you are claiming to measure, and is considered important in order to be able to generalise and apply the research in other cases (Bryman & Bell, 2011). This can be problematic in a qualitative study and even if our aim was not to draw general conclusions about organisations, two factors help to increase the validity of our study: (1) the research questions were well formulated and supported a clear direction in our research, and (2) the interviewees were all persons with good insight in the specific topic that was investigated. In addition, our quantitative investigation possessed internal reliability so that we could be sure that we were measuring what we wanted to measure. The fact that two observers agreed on their observations minimised the lack of inter-observer consistency, and indicated that the measurement was valid. Based on the arguments presented above, we consider our research to have high validity.

4. Empirical Data

This chapter aims to present the collected empirical data in a transparent way. Based on our primary data, the elicited thoughts, results, and obtained information will be displayed, laying the foundation for a fruitful analysis and discussion. The findings have been divided into two headings following the logic of the main part of our theoretical framework. The first part regarding tools, methods, and techniques used for internal idea search, is based solely on qualitative data, while the second part concerning the innovative environment encompasses both qualitative and quantitative data.

4.1 TOOLS, METHODS AND TECHNIQUES USED FOR INTERNAL IDEA SEARCH

In the previous chapter, the tools, methods and techniques that ECI can use – from a theoretical point of view – to generate new ideas internally, were revealed. In order to understand how ECI can improve their ways of coming up with new ideas internally it is essential to get an overview of the idea generating tools, method and techniques currently used in the company. ECI is in other words our main focus area in this part. Yet, to complement our findings at ECI and obtain some practical knowledge about tools, methods and techniques used for idea generation by others, empirical data from two companies have been included. Upon request we have decided to keep these companies anonymous. In both Company A and B the focus is put on their main tools, methods and techniques on a company-wide level i.e. innovation networks respectively innovation jams. Innovation workshops have been addressed to a smaller extent while the remaining tools, methods and techniques that are used in these companies have not been investigated.

Company A is a leading global hygiene and forest products company that develops and produces personal care, tissue and forest products. The company has approximately 36,000 employees and sales in about 100 countries. Company B is a manufacturing company within the automotive sector with around 23,000 employees and sales in about 100 countries.

Below, the tools, methods and techniques currently applied in ECI, Company A and Company B will be presented. The findings will be grouped according to the relevant tool, method or technique, and include the experiences from the three companies when applicable. Success factors and challenges identified will also be incorporated here, and in some instances future plans for the specific tool in question will be revealed. In ECI, some of the interviewees replied negatively on whether they have tools, methods and techniques for generating new ideas or not: *"My experience is that we don't have any methods for idea generation at all"* (Specialist Engineer, ECI), and *"when you say methods and tools, we don't have very institutionalised things"* (Advisory, ECI). However, after having asked them more specific questions it turned out that they do have tools, methods and techniques for generating ideas, although most of them are not solely put up to search for new ideas and often they are not formally structured.

4.1.1. INTERNAL INNOVATION NETWORKS

In January 2013 ECI launched a social network for all employees called "Knowledge Forum". The network is claimed to be a new way of working which enables *"easier communication and collaboration across organisational, project and geographical boundaries every day"* (ECI, 2013). The main idea about the online network is the opportunity to get access to the knowledge that exists among the thousands of employees in ECI; an employee should be able to sit in Curitiba, Brazil, and have access to the same expertise, knowledge, and experience as someone sitting in Norway. Yet, according to the Knowledge Manager, another reason for setting up Knowledge Forum is the possibility to come up with, distribute and discuss ideas, e.g. by blogging. Ideally, employees should go in there and discuss a bit asynchrony around an idea that they have or someone else has. The Knowledge Manager claims that other organisations that have

implemented similar interaction tools have seen approximately 1/3 increase in the number of generated ideas.

At the moment, Knowledge Forum is still very new and thus not well established in the organisation although the activity is picking up. To get the network started the focus has up until now been on training and communicating to employees what Knowledge Forum is and how it can be used in the everyday work. The Corporate Centre in ECI, supported by one employee from each of the Business Areas (BAs), is responsible for this work. Increased overall activity is the current focus, but later on the network will be put more and more into system. Then, Knowledge Forum is believed to become an important part of the organisation´s innovation processes as a tool to preserve knowledge and generate ideas even better than what is the case today. An evaluation system will also be developed, ensuring that ideas are assessed, selected and further developed. As of today, Knowledge Forum exists of, among other things: a personal profile page, blog posts, newsfeeds, different communities of practice, and global networks.

In Company A, a comparable social network has also just recently been launched, called "STAR". According to the Innovation Manager this network is the big happening within idea management in the company. The main characteristics of the tool in terms of idea generation are that it is decentralised and demand driven. That is, a problem or challenge posted by an employee should trigger the generation of ideas. In addition, there is no central organisation that evaluates and implements the ideas that are generated; these tasks are left to the person who posted the challenge. STAR's four main functions are:

1. Challenge function, where employees can address a challenge or problem that they want help to solve.
2. Free Flyer function, where employees can submit ideas that are not connected to a specific challenge or project.
3. Hosting function, which can host different events, e.g. an innovation jam.
4. Open Innovation function, which enables external players to connect and interact with Company A when needed.

Overall, the concept of STAR implies that the employees should ask, share and build on each other's ideas, challenges and solutions and in this way come up with more and better solutions in the end. The idea is that STAR in the future should embrace the whole company, but it is still in the early phases and has only been implemented in parts of the company so far.

4.1.1.1 CROSS-FUNCTIONAL TEAMS

Cross-functional team is a tool that ECI has gradually started to use more and more, but not primarily with the aim of generating new ideas. Rather, these teams, called Cross BA Initiatives, are set up for very concrete contracts or projects. The way it works today is that one of the BAs has the project execution responsibility and the other BAs contribute with different parts to the responsible BA. The Cross BA initiatives are functioning both face-to-face and online. Although the initiatives are set up to solve concrete problems, the top-management in ECI believes that this setting of people with different backgrounds and perspectives is a favourable condition for coming up with good ideas. In the future the CTO team will thus facilitate and manage the creation of Cross BA plans and strategies. They have no plan however, to create cross-functional teams designed primarily to generate ideas. Rather, idea generation will be an encouraged side effect. This is also the case with the planned tool Front-End Spectrum, which will be explained under the heading "4.1.7 Future idea generation plans in ECI".

4.1.1.2 COMMUNITIES OF PRACTICE

In ECI, the Communities of Practice-tool is an important part of Knowledge Forum that makes idea generation possible. The Advisory who is working with research and innovation at the Corporate Centre

argues that Knowledge Forum is the infrastructure that enables communities of practice. According to the company's intranet, communities of practice are *"where people with a common interest in a topic or theme come together to share experience, discuss and learn from each other"* (ECI, 2013)*.* The communities are created for themes that are most important to ECI; where it is vital to expand knowledge across the organisation, and in areas that are essential in developing the company. Communities of Practice are thus not created simply to come up with ideas, but it is a setting that facilitates idea generation. If an employee has an idea, it can be shared with everyone within his/her field of expertise in a community of practice. The Advisory further emphasises the importance of raising awareness among the employees regarding the possible outcomes of operating in networks. Sharing of knowledge and experience is one part, but if a good idea pops up e.g. in communities of practice, *"by all means, develop it further"* (Advisory, ECI).

The communities of practice operating in ECI today have a moderator, or Community Leader, that has approximately 20% of his/her time set aside to make sure that the community is working well and brings value to the company. This person will in the time to come be given responsibility to take care of both new ideas and validating important experiences through a "lessons learnt" system. Eventually, a reward and recognition system will be put in place, which most likely will reward the "top contributors" in the communities and the best ideas, but this is still to be planned. Likewise, it is not decided if the rewards will be monetary or not. In the future, more roles will also be assigned among the members; each community will e.g. have some Subject Matter Experts and a Sponsor. Employees have to apply for starting up a new community of practice, but becoming a member of an existing community is voluntary and employees can leave whenever they want. The responsibility of further developing these networks lies at the Corporate Centre in ECI, in which Knowledge Forum has become an institution in itself.

In Company A, the idea is that STAR and the challenges that are posted in this social network will open up for different communities of practice. That is, the challenges that are related to each other can be grouped under one community of practice and further discussed there. This is considered as an important way to strengthen the collaboration skills in the company.

4.1.1.4 ORGANISATIONAL CHALLENGES
The challenges connected to innovation networks in Table 13 below are identified in ECI and Company A.
Table 13: Empirical challenges connected to internal innovation networks

Challenges	Explanations
Online sharing in general *(ECI)*	• Once you post something on Knowledge Forum you lose control over where the information flows. • If the information is published externally it is regarded as common knowledge and you are not allowed to patent it.
Get people to communicate online *(ECI)*	• For some employees online communication seems more scary than appealing. • Many employees do not understand what they read, due to hash tags (#), at (@) etc.
Raise awareness among employees *(ECI)*	• Employees have to be aware of their setting and how they could use it in the best way. • When gathered in a network, it is a favourable condition for generating new ideas.
Get the employees to accept the new way of working *(Company A)*	• To take advantage of the networks, the ways of working have to change. • Have to go from "how should I solve this" to "how should WE solve this".

4.1.1.5 ORGANISATIONAL SUCCESS FACTORS

According to the Innovation Manager in Company A, a success factor connected to the social network STAR is the fact that it is built on a **sufficient IT solution**. The IT solution is designed as a social network, which allows the employees to interact and collaborate more easily compared to the previous generation of IT systems.

The Innovation Manager in Company A also stresses the importance of **top management commitment** at the current stage of implementing STAR. From the beginning, this was not a top management initiative. The project sponsor of STAR had a strong belief in this concept and support was also found among other key players at the vice president level. To change the way of working in the company and get all the employees to use STAR, incentives must be integrated in the working processes and here the support from top management plays a crucial role. This also goes for the time aspect. Top management commitment is needed in order for the continuous and long process of changing the ways of working to be successful.

4.1.2 INNOVATION WORKSHOPS

All the three companies under investigation use innovation workshops to come up with new ideas. However, the ways in which these workshops are used vary both between and within the organisations. In ECI, innovation workshops are considered the main tool, and the most concrete tool, for generating ideas. In general a workshop is run to come up with ideas to a very specific problem or issue. The workshops can be quite short, lasting for an hour or two, or they can last longer, up to three days. The shorter workshops are often called idea meetings and are organised e.g. within the disciplines, when new projects are about to start, or they are used for improvement projects. As far as the Knowledge Manager is aware, it is not defined in any process that innovation workshops or idea meetings should be run, but people choose to do it because *"they see a need for it (…) We have some sort of integrated understanding that it should be done".* (Knowledge Manager, ECI). However, when it comes to the execution part of the workshops, the Knowledge Manager argues, *"unfortunately it is never done correctly"* (Knowledge Manager, ECI). In his view, the shorter idea meetings have a tendency to become frustration meetings, especially the meetings asking for blue-sky ideas. Instead of becoming an idea process where participants throw out a lot of ideas and other people build on the same ideas to make the ideas better, preconceptions and "tried this before" attitudes appear and the meetings take a completely different direction.

Regarding the longer-lasting innovation workshops, only one has been organised in ECI. This three-day-workshop was a corporate initiative on Arctic Technology held in January 2013, which according to the Advisory – who was part of the facilitator group – was a great learning for ECI. It was run based on the reasoning that the Arctic environment is the core competency of ECI and therefore the company should take a leading role in the development of this market. Both the CEO and the CTO participated in the workshop. As of today, it is not dictated how often ECI should organise such longer workshops. The idea is that there in the future should be a mix between more loosely defined BA workshops, and CTO initiated cross-BA innovation workshops within clearly defined strategic challenges.

At Company A, they have a long tradition of organising different kinds of brainstorming sessions within existing project groups. This trend has changed a bit in the last few years and the company is now focusing on running more structured workshops than before. These can last for half a day or a day. The set up of each workshop differs depending on its purpose, but all workshops are supposed to result in an idea template that explains the ideas generated in some detail. After each innovation workshop the number of valuable ideas is considered and evaluated. All ideas of interest for the company are additionally saved in an idea-database that is connected to STAR. When a new project is about to start, this database can be searched through for useful ideas for that exact project.

In Company B, face-to-face innovation workshops are frequently used when a specific issue or problem needs to be solved, e.g. in a project or on department level. We did not, however, obtain more details about how this tool is used in the organisation.

4.1.2.1 ORGANISATIONAL CHALLENGES

ECI identifies the following challenges connected to innovation workshops (Table 14):

Table 14: Empirical challenges connected to innovation workshops

Challenges	Explanations
Allow for proper evaluation and testing of ideas *(ECI)*	• Ideas are usually evaluated based on gut feelings, and seldom tested on a small scale to determine what works, and what does not work. • Often, participants dig too fast into details, and evaluate too fast whether the idea will work or not.
Make sure employees understand that this is not team-building *(ECI)*	• Participants in innovation workshops have to understand that they are not invited to team building, where the results do not matter. • The aim of innovation workshops in ECI is to be able to take what is produced in the workshops to the clients. This requires a certain level of professionalism.
Ensure employees prioritise the workshops *(ECI)*	• The projects and deliveries to the clients have priority since they provide the main earnings. • If something is urgent in a project, innovation workshops are put aside to assure the deliveries to the client on time.

4.1.2.2 ORGANISATIONAL SUCCESS FACTORS

One of the key success factors identified in ECI is to **hire an external facilitator**. By doing this, the company is guaranteed that a person with a good understanding of how to run a successful innovation workshop is in charge. For example in the workshop on Arctic technology hiring an external facilitator proved successful. This success factor is also based upon experience from previous shorter workshops, where the facilitator job was not prioritised and considered important. According to the Knowledge Manager, *"it could easily become a project leader or a product responsible who just chaired a meeting and then the preparations were maybe not good enough"* (Knowledge Manager, ECI).

Company A on the other hand stresses the **education of internal facilitators** as a success factor. In the last two years, 30 employees have been educated workshop facilitators with the aim of enabling more thoughtful innovation workshops resulting in an increased number of valuable, new ideas. This has proved very useful; when the facilitator knows the business it is easier to organise a successful innovation workshop according to the Innovation Manager in the company. ECI has never educated internal facilitators, but they see the value of the facilitator having in-house competence and are considering doing it in the future. The Advisory has e.g. been in contact with Hydro, a global supplier of aluminium, which has educated innovation facilitators internally. In the near future he will have a meeting with the company to get insights into how they did it and figure out if it is something for ECI. This idea is supported by the Knowledge Manager who is fancying a hub of innovation facilitators that can be used whenever necessary.

ECI further emphasise that **participants have to be chosen carefully**. According to the Knowledge Manager, diversity is the key. By only including experts, too many ideas are thrown away because experts often argue, *"it will not work, we´ve tried before",* or *"my gut feeling says no".* Also, experts often end up discussing details, which is not the aim in an innovation workshop. Thus, in the workshop on Arctic

technology, both experts and less experienced employees were invited leading to a good mix of people of all ages. The Knowledge Manager argues however, that the shorter idea meetings have a tendency to not choose participants carefully, but to include people that know each other well and work with each other a lot already.

Lastly, ECI stresses the importance of **specifying the theme before the workshop starts**. In the Knowledge Manager´s view, the best meetings are the ones that have a specified challenge. Approaches like "okay, come on now, does anybody have any ideas?" seldom leads to great ideas. Additionally, if the theme is not accurately specified, the participants in the idea meetings end up *"discussing the issue and the validity of the issue, how we could rephrase it…a lot of time is spent on finding the direction of the meeting"* (Knowledge Manager, ECI). Therefore, if the theme is properly defined, time can be spent on coming up with ideas and proposals rather than on figuring out exactly what one is supposed to have the workshop about.

4.1.3 INNOVATION JAM

In Company B, Innovation Jams represents the main tool used for idea generation on an organisation-wide level. According to the Director of the Corporate Innovation Office, the choice to use this tool is based on several things.

1. The jams can be used to reach out to all the employees in the company no matter what division or field they work in.
2. Compared to other methods it is the most resource efficient way to reach out to so many employees.
3. The aim is to affect the climate in the organisation. By using innovation jams, the organisation is able to show that "*this is a company that are open for ideas and we are working actively with ideas*" (Director, Company B).

So far, Company B has organised one innovation jam each year during a three-year period. The first jam was executed during two days, attracted around 1000 participants and resulted in 100-200 ideas. The same time frame was set-aside for the second jam. In this jam however, both the number of participants and generated ideas increased in numbers. The third jam lasted for a week; close to 4000 people participated and over 500 ideas were generated. The themes and problem formulations were designed differently for each jam. According to the Director of the Corporate Innovation Office, the amount of ideas increases when the theme is of less technological character. The ideas that were generated during the jams were mostly of incremental type, but there were also a few radical ones. Around 13-15% of the generated ideas represent products or projects that have already been initiated by the company.

In general, when the jams are finished in Company B, the ideas are evaluated and some are scrapped. The remaining ones are divided into incremental or radical ideas before they are evaluated further. Incremental ideas are evaluated on different criteria, e.g. customer value and difficulty of execution. The radical ones are hard to evaluate internally, they get killed off too easily so alternative methods are used depending on the situation. After this round, additional ideas are scraped while others are pitched to a board of managers, which includes people from the very top of the organisation. Finally, some of the ideas are chosen and are further developed. From the first jam 10 ideas were developed further, in the second 7-8 ideas were chosen and in the third jam 9 ideas were taken forward.

Company A has not organised any jams so far, but the tool has been addressed within the company and once, a planned jam initiative was stopped. This was due to an unclear motive from management; they wanted to trigger employees to come up with ideas but did not have a strategy for how to follow up the ideas. The company is as a whole focused on framing the scope of interest for idea generation based on the brand and the customer needs for a specific product group. Since there are quite a lot of different brands and product groups in Company A, they argue that it has been hard to define a scope that they believe

would benefit from the involvement of the entire company. This is Company A´s main reason for not using innovation jams at the moment. Innovation jams are however considered to be a potential tool to be used in the future. According to the Innovation Manager, an innovation jam can be useful when you want to affect the organisational culture and manifest a way of working.

4.1.3.1 ORGANISATIONAL CHALLENGES

The following challenges are identified by Company A and B (Table 15):

Table 15: Empirical challenges connected to innovation jams

Challenges	Explanations
Communicating that the jam is taking place *(Company B)*	• Some employees do not know about the jam even if it has been marketed within the organisation through several channels, e.g. through posters, group mails, direct mail and posts on the intranet
Online format *(Company B)*	• Hard to use and understand for some employees • Hard to convince the employees to act online when they are sitting in the same building as other participants • Some people prefer to be anonymous
Legitimising spending time on the jam *(Company B)*	• Employees question if the jam is legitimate to spend time on
Establish a strategy for following up the ideas *(Company A)*	• Cannot run a jam if there is no evaluation system in place

4.1.3.2 ORGANISATIONAL SUCCESS FACTORS

One of the success factors identified in Company B is the use of **sufficient IT support**. In the first jam, all feedback on the ideas had to be done manually. Due to resource constraints, it was not possible to respond to and follow up all the ideas that had been submitted during the jam. Today, the IT support has been improved and includes, among other things, an automatic update system that shows how far a certain idea has come in the evaluation system.

Another success factor is the establishment of a **reward system** connected to the jam activities. This has first and foremost proved successful in order to inspire employees to engage in the jams and further development of the ideas. There are no monetary rewards; instead focus is put on recognition and the opportunity to be involved in the development of your own idea. E.g., if you have engaged in the development of an idea you will receive a diploma and a small gift at a ceremony, which initiates the start of the yearly innovation jam. In addition, recognition is given through incorporating top management in the evaluation process; getting the possibility to show and present your ideas to highly positioned managers is often inspiring and appreciated by the employees.

4.1.4 TECHNOLOGY ROADMAPS

In ECI, technology roadmaps are mainly used to tune and develop the product portfolio in the strategic direction that the company is moving. This means that the product owner is included in the process and the roadmap is supposed to reflect his/her needs in the future market. In this regard, the Vice President of

Technology Development emphasises the importance of communicating and getting a common understanding of what the product owner wants with his product. The technology roadmap is thus a helpful planning tool for management, which takes both external and internal drivers into account, and is strategically anchored in relation to where the company wants to be. Accordingly, technology roadmaps are not primarily a tool established to come up with new ideas. In ECI, technology roadmaps are reviewed and updated on an annual basis, but at the same time they are regarded as dynamic documents that can be taken up and modified more frequently if the market is changing drastically. Further, the roadmaps look 5-7 years ahead since the mean time from idea to finished product in ECI is 6 years. Normally, the roadmaps are constructed in Excel.

4.1.4.1 ORGANISATIONAL CHALLENGES

ECI recognises the challenges below in relation to technology roadmaps (Table 16):

Table 16: Empirical challenges connected to technology roadmaps

Challenges	Explanations
Come up with wild ideas *(ECI)*	• Technology roadmaps are a systematic and rigid approach that does rarely open up for wild ideas resulting in game changers. • Focus is mostly on incremental improvements.
Avoid ending up in the same track *(ECI)*	• If the manager initially starts this rigid process on the wrong track and year after year uses the same people, he/she risks losing the broader perspective and finds the company stuck in the same track.
Avoid having a too narrow focus *(ECI)*	• By focusing on the desired positioning in only a few areas the company does not develop in other areas.

4.1.4.2 ORGANISATIONAL SUCCESS FACTORS

The most important success factor according to the Vice President of Technology Development in ECI is to *focus just as much on the process of creating the roadmap as on the roadmap itself*. As a manager you have the possibility to communicate actively with the product owners, and by systematically reviewing the roadmap in relation to market developments interesting discussions might arise that can lead to new ways of taking advantage of a market.

4.1.5 CORPORATE ENTREPRENEURSHIP

It has become clear through our empirical investigation of ECI that corporate entrepreneurship is not a concept that is being used within the company at the moment. The Knowledge Manager however expressed a certain interest for organisational slack, allowing for 10-20% free allocation of research time. In his opinion ECI should become better at testing out concepts on a small scale, and he argues that this could be a useful technique to do a pilot on. The empirical findings are thus more or less non-existing in the concept of corporate entrepreneurship.

4.1.6 ANNUAL IDEA SEARCH (AIS)

According to the Advisory, ECI does not have very institutionalised tools and methods for idea generation. Within each of the business areas, however, annual plans are created to outline the year ahead. In the

period when these annual plans are developed and the budgets are decided on, management usually addresses the organisation and actively ask for ideas. These solicited ideas can be input to specific areas or projects that will be run, or they can be more open but preferably they should be aligned with the corporate strategy. There is not an established management process for soliciting ideas; it is up to each business area how they want to do it. In one of the BAs e.g., employees are asked to fill out a scheme to describe the idea in greater detail, consequently making it easier for management to evaluate the ideas and possibly link them together. An idea has to be recommended by the respective Department Manager before it is submitted.

4.1.6.1 ORGANISATIONAL CHALLENGES

The following challenges are identified by ECI in connection to the AIS (Table 17):

Table 17: Empirical challenges connected to the AIS

Challenges	Explanations
Ensure that employees are not overloaded at work *(ECI)*	• The more busy employees are, the less ideas the company generates in these periods.
Communicate the strategy *(ECI)*	• In order to get ideas within the company's strategic aims, top-management has to communicate the corporate strategy. • Top management admits that they have a way to go communication-wise.

4.1.6.2 ORGANISATIONAL SUCCESS FACTOR

The success factor that can be identified with this technique is **active management**, i.e. that management actively ask for ideas or inputs to, often, specific projects or areas. The Advisory argues that the AIS technique is based on the reasoning that if people are challenged it is also easier for them to come up with new ideas and solutions.

4.1.7 FUTURE IDEA GENERATION PLANS IN ECI

In the CTO strategy document from October 2012 it is stated: *"Engaging our people in innovative problem solving will stimulate for and generate new ideas. In this regard we believe that a more cross BA way of working will contribute to this"* (CTO, 2012, pp.6-7)*. Further on, examples of such BA collaborations are, among others, argued to be: cross-BA innovation workshops, communities of practice, and cross BA initiatives (CTO, 2012). As illustrated above, these tools are already up and running. Up until now however, except for workshops, they have not been used with the aim of generating ideas. Rather, they are functioning with a specific focus. According to the Advisory, the plan for the future is to see the internal tools, methods and techniques that already exist in the company in a broader perspective that encourages idea generation. This will be done by making the employees aware that already existing collaborative settings can foster the generation of new ideas, and is based on the underlying assumption that if employees with different competences connect and discuss, this will lead to more ideas, and to ideas of better quality. In sum, raising awareness among employees, encouraging them and challenging them to come up with good solutions to problems, is what is deemed necessary in ECI to change the focus in the existing idea generation practices and hence improve the company's overall ways of generating new ideas in the future. The biggest challenge in doing this is according to the Advisory to communicate the message to all the employees across the organisation. Below follows a brief description of two of the tools connected to idea generation, which will be put into action in ECI in the near future.

Front-End Spectrum is the name of the first tool. This tool will be an extension of what is today called "front-end projects" and will be a cross-functional team of dedicated, multidisciplinary experts from all BAs in ECI. Front-end signifies the early phases of project execution, and the idea with front-end spectrum is to use the wide competence that exists across the organisation to deliver full field evaluation studies on specific topics to the clients. Earlier ECI has been forced to divide this work up. Thus, according to the Vice President of Technology Development the fact that ECI soon will be able to deliver full field evaluation studies will be a strong message to bring the clients, hopefully giving ECI recognition and access to the right persons important for the continuation of the projects. Additionally, he argues that front-end spectrum will be a prerequisite for coming up with ideas and a perfect setting for capturing the ideas generated. However, a challenge in this regard will be the ability to allocate time and money for exploring opportunities outside the original project team setting.

Another tool to be launched in the near future is the Idea Portal. In the CTO strategy document it is stated that the idea portal *"shall enable* [ECI] *to capture promising ideas that are created outside of the formalised processes"* (CTO, 2012, p.7). Initially, the portal will thus not be created to generate ideas, but rather to capture ideas. According to the Advisory, employees will have the opportunity to submit whatever ideas they may have. In addition, however, they will be also able to respond to challenges posted by ECI. This latter is based on the acknowledgement by ECI that people are not triggered creatively by encouragements like "come up with a good idea". Thus, by posting a challenge the focus will be narrowed down to a particular field of interest within ECI and the Advisory expects ideas to be generated. The idea portal will be web-based and available to all employees on the intranet, but it is not decided yet whether it will be an integrated part of the social network, Knowledge Forum, or not. In a long-time perspective, ECI aims to open up the idea portal for academia, suppliers, clients and eventually the public, making it an "Open Innovation Portal".

4.1.8 SUMMARY TOOLS, METHODS & TECHNIQUES

In sum, the qualitative data obtained through interviews demonstrate that ECI has some tools, methods and techniques that can be used for idea generation, but in most cases they are not exclusively established with this aim. Additionally, the main tools used in Company A and Company B were described. Table 18 below summarises the results briefly:

Table 18: Summary of empirical results regarding search strategies (Not Investigated = NI)

Tool, method, technique	Used in ECI?	Used in ECI primarily to generate ideas?	Used in Company A?	Used in Company B?
Internal Innovation Networks	Yes	No	Yes (main)	NI
Innovation Workshops	Yes	Yes	Yes	Yes
Innovation Jams	No	-	No	Yes (main)
Technology Roadmaps	Yes	No	NI	NI
Corporate Entrepreneurship	No	-	NI	NI

Annual Idea Search	Yes	Yes	NI	NI

4.2 INNOVATIVE ENVIRONMENT

In order to be able to answer our sub-question *"What are the strengths and weaknesses in ECI' innovative environment?"* an innovation audit was conducted. The audit contained both closed and open-ended questions and the results will be presented in the coming sections.

4.2.1 DATA FROM THE CLOSED AUDIT QUESTIONS

The data from the closed questions in the Innovation Audit has been cleaned and statistical tested. The main findings from the 22 questions are presented in the following sections.

4.2.1.1 OVERALL RESULTS
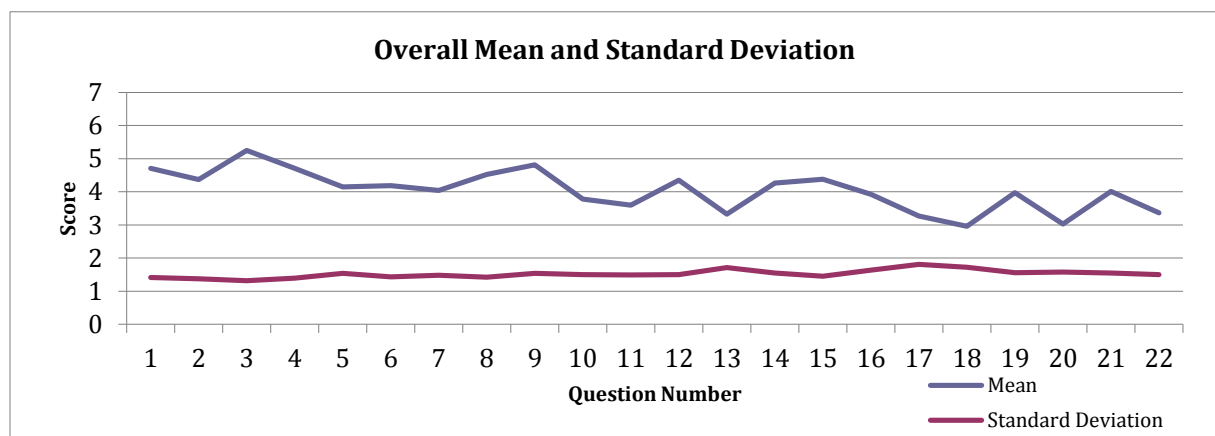
Figure 10: Overall mean and standard deviation for the 22 closed questions.

In total, 13 questions have a mean above 4. Out of these, the top five are presented in Table 19:

Table 19: The questions assigned the highest mean values

Number	Question	Mean	Managerial Area*
Q3	People work well together across departmental boundaries in our organisation	5,24	Innovative Organisation
Q9	Communication is effective and works top-down, bottom-up and across the organization	4,81	Innovative Organisation
Q1	We have top management commitment and support for innovation	4,70	Innovation Strategy
Q4	People are involved in suggesting ideas for improvements to products or processes	4,70	Innovative Organisation

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* *The Managerial Area is connected to the specific question by Tidd & Bessant (2009)*

	Q8	Our organisational structure helps us to take decisions rapidly	**4,52**	Innovative Organisation

In total, 11 questions fall below a mean of 4. Out of these, the bottom five are presented in Table 20:

Table 20: The questions assigned the lowest mean values

Number	*Question*	*Mean*	*Managerial Area*[*]
Q18	Our organization allows some space and time for people to explore 'wild' ideas	**2,96**	Innovative Organisation
Q20	We value people who are prepared to break the rules	**3,03**	Innovative Organisation
Q17	We allocate a specific resource for exploring options at the edge of what we currently do – we don't load everyone up 100%	**3,27**	Innovation Process
Q13	We have reward systems to encourage people to offer their ideas	**3,33**	Innovative Organisation
Q22	Experimentation is encouraged in our organisation	**3,36**	Innovative Organisation

Standard deviation: Is as expected between 1-2. This is because of:

- The size of our sample
- That we use a 1-7 Likert Scale
- That the respondents usually answer close to the middle of the scale (4)

4.2.1.2 RESULTS ACCORDING TO INNOVATIVE ENVIRONMENT AREAS

As was described in the theoretical framework, the innovative environment can be divided into four different managerial areas: Innovative Organisation, Innovation Strategy, Innovation Process and Learning. As can be seen in Figure 11, the means for all the managerial areas are close to 4.
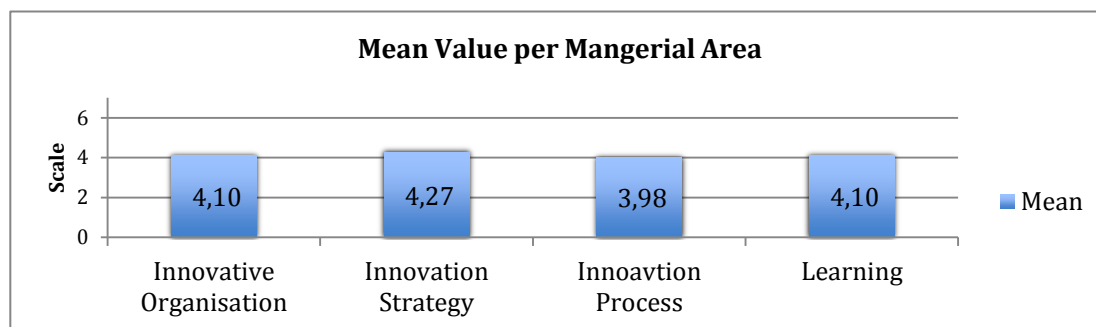
Figure 11: Mean values according to the managerial areas of the innovative environment.

4.2.1.3 SPREAD OF "I DON'T KNOW" ANSWERS

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[*] *The Managerial Area is connected to the specific question by Tidd & Bessant (2009)*
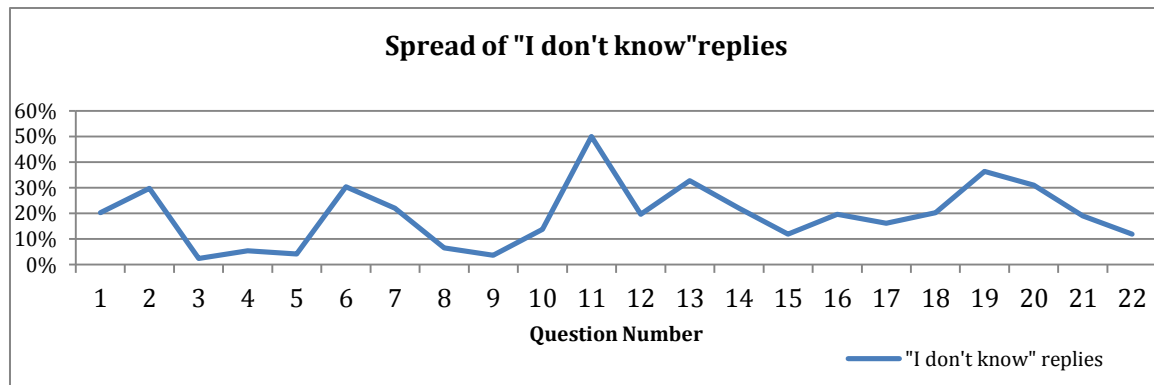
Spread of "I don't know" replies

The questions with 30% or more "I don't know" answers are shown in Table 21:

Table 21: Questions with 30% or more "I don't know" replies

Number	Question	Percent	Managerial Area*
Q11	We have mechanisms for managing ideas that don't fit our current business – for example we license them out or spin them off	50%	Innovation Strategy
Q19	Management create 'stretch goals' that provide the direction but not the route for innovation	36%	Innovation Process
Q13	We have reward systems to encourage people to offer their ideas	33%	Innovative Organisation
Q20	We value people who are prepared to break the rules	31%	Innovative Organisation
Q6	We deploy 'probe and learn' approaches to explore new directions in technologies and markets	30%	Innovation Strategy
Q2	We have processes in place to help us manage new product development effectively from idea to launch	30%	Innovation Process

The questions with less than 10% "I don't know" answers are shown in Table 22:

Table 22: Questions with less than 10% "I don't know" replies

Number	Question	Percent	Managerial Area*
Q3	People work well together across departmental boundaries in our organisation	2%	Innovative Organisation
Q9	Communication is effective and works top-down, bottom-up and across the organization	4%	Innovative Organisation
Q5	We are good at capturing what we have learned so that others in the organisation can make use of it	4%	Learning
Q4	People are involved in suggesting ideas for improvements to products or processes	5%	Innovative Organisation

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* The Managerial Area are connected to the specific question by Tidd & Bessant (2009)

Q8	Our organisational structure helps us to take decisions rapidly	**7%**	Innovative Organisation

4.2.2 DATA FROM THE OPEN-ENDED AUDIT QUESTIONS

Three open-ended questions were included in the innovation audit:
1. What is most helpful and supportive to you in order to come up with new ideas at work?
2. What in your work environment is hindering you in coming up with new ideas?
3. What specific actions can ECI take to improve the environment for idea-generation?

The answers were coded and divided into the managerial areas of the innovative environment: Innovative Organisation, Innovation Strategy, Innovation Process and Learning. The first open-ended question indicates what the respondents believe is helpful in general when generating ideas, while the two remaining questions addresses ECI particularly in terms of what is hindering and what can be improved with regard to idea generation in the company. More detailed results will be presented in the following sections, taking one question at a time.

4.2.2.1 WHAT IS MOST HELPFUL AND SUPPORTIVE IN ORDER TO COME UP WITH NEW IDEAS AT WORK?

Out of the 168 employees who took part in the audit, 52 employees responded to this question. The answers were spread over the four managerial areas as Figure 13 displays:
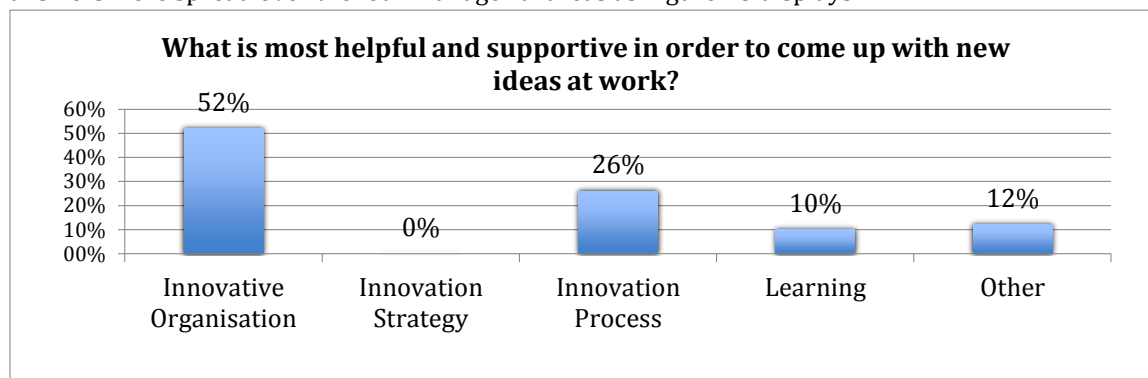
Figure 13: Spread across the managerial areas

The main helpful and supportive items that were addressed in the area of Innovative Organisation:
1. *Time:* To have time to be innovative and come up with new ideas.
2. *Management support:* Supportive coaching, guidance and capability of taking decisions and listening to the ideas.
3. *Colleague support:* The importance of the fellow employees was addressed in terms of team working, listening to ideas and to give constructive feedback.

The main helpful and supportive items that were addressed in the area of Innovation Process:
1. *Sufficient processes:* Frameworks that support idea generation such as workshops, brainstorming and other actions that support innovative ideas.

The main helpful and supportive items that were addressed in area of Learning:
1. *Sharing knowledge:* By evaluating and sharing knowledge, learning by trail and error.

The main helpful and supportive items that were addressed, which is categorized as 'Other':
1. *External:* Get inspiration from external factors such as customers or suppliers.

4.2.2.2 WHAT IN THE WORK ENVIRONMENT IS HINDERING EMPLOYEES TO COME UP WITH NEW IDEAS?

Out of the 168 employees who took part in the audit, 74 employees responded to this question. The answers were spread over the four managerial areas as Figure 14 displays:

What in the work environment is hindering employees to come up with new ideas?

Innovative Organisation	Innovation Strategy	Innovation Process	Learning	Other
59%	7%	20%	0%	14%
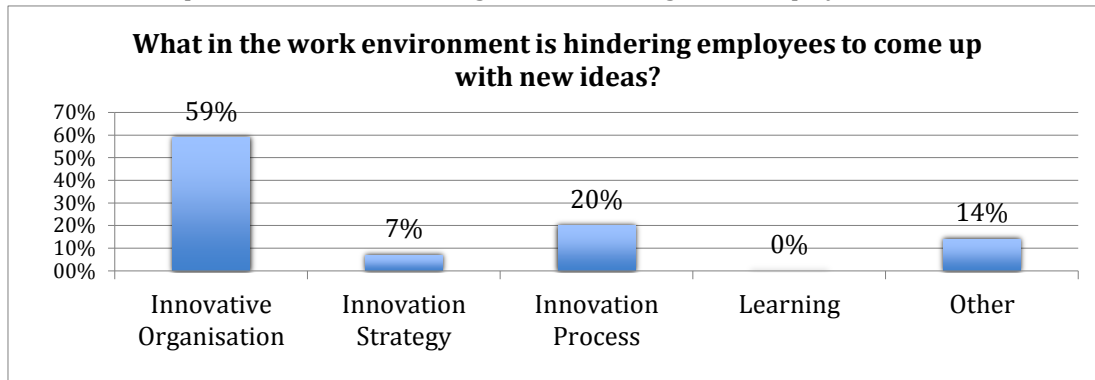
Figure 14: Spread across the managerial areas

The main items that hinder idea generation in the area of Innovative Organisation:
1. *Time:* The work load is heavy, no or little time to be innovative on
2. *Management support:* Managers that are not willing to listen to or support new ideas
3. *Reward system:* The company should have a better reward system. If you contribute, you should get a reward.

The main items that hinder idea generation in the area of Innovation Strategy:
1. *Missing directives:* No clear goals or designated budgets lack of knowledge where the company needs to be innovative and lack of time in good times while lack of resources in bad times.

The main items that hinder idea generation in the area of Innovation Process:
1. *Lack of sufficient processes:* "No one to talk to" about where to announce ideas, and the "R&D department doesn't exist in reality".
2. *The "Project Model":* The process is unnecessary complicated and not user friendly.

The main items that hinder idea generation, which is categorized as 'Other':
1. *External factors:* Clients and customer demands and their willingness to invest or take risks.

4.2.2.3 WHAT SPECIFIC ACTIONS CAN ECI TAKE TO IMPROVE THE ENVIRONMENT FOR IDEA-GENERATION?

Out of the 168 employees who took part in the audit, 61 employees responded to this question. The
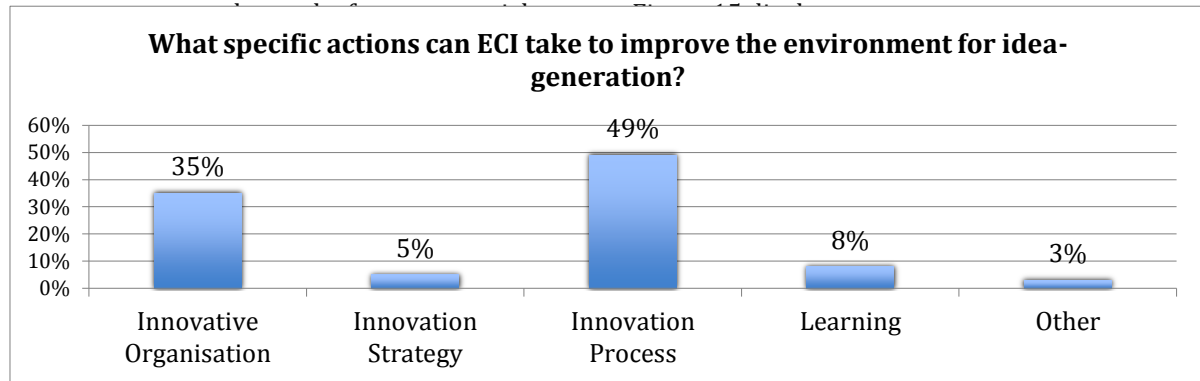
Figure 15: Spread across the managerial areas

The main specific actions ECI could take to improve their environment for idea-generation in the area of Innovative Organisation:
1. *Time:* Allocate time to be innovative. Don't load everyone up to 100%.
2. *Reward system:* Reward ideas, make sure the employees know about it.
3. *Management support:* Dedicate resources, encourage risk taking and accept failure when generating new ideas.

The main specific actions ECI could take to improve their environment for idea-generation in the area of Innovation Strategy:
1. *Strategy adjustment:* Adjust the strategy to the changing market and customer conditions.

The main specific actions ECI could take to improve their environment for idea-generation in the area of Innovation Process:
1. *Provide official processes that support idea generation:* Organisational slack, workshops, brainstorming, work across department boundaries, a place to store and announce ideas, create a R&D department, multi-cultural teams, idea competitions, campaigns for creativity and innovation.

The main specific actions ECI could take to improve their environment for idea-generation in the area of Learn:
1. *Sharing knowledge:* sharing of ideas and knowledge across projects, evaluation of projects and training of employees.

4.2.3 SUMMARY INNOVATIVE ENVIRONMENT

The data from the investigation of ECI's innovative environment have provided the following results:

- Ten questions represent the highest (5,24 - 4,52) and the lowest (2,96 – 3,36) mean values.
- The managerial areas are all scored around a mean value of 4.
- In terms of "I don't know" replies, six questions have a rate of 30% or more while 5 questions represent a rate of 10% or below.
- In the open-ended questions, the employees have mostly referred to elements of the Innovative Organisation and Innovation Process as supporting, hindering or needing to be improved in ECI to enable idea generation.

5. Analysis

As a means to answer our research questions the purpose of this chapter is to compare and analyse the theoretical framework to the empirical findings. The chapter follows the same structure as the theoretical framework and the empirical findings; first tools, methods, and techniques used for internal idea search will be examined, before the innovative environment will be explored. The last section of this chapter contains a discussion of how ECI can improve their ways of generating new ideas internally leading to our final conclusion.

5.1 TOOLS, METHODS AND TECHNIQUES USED FOR INTERNAL IDEA SEARCH

In the theoretical framework, tools, methods and techniques that can be used for internal idea generation were presented in terms of main characteristics, organisational challenges and success factors. The empirical findings on the other hand, displayed the tools, methods and techniques currently applied in ECI, Company A and Company B, emphasising *their* experiences with regard to success factors and challenges. The aim of this section is to come up with suggestions of how ECI can improve their ways of generating new ideas internally by comparing the tools, methods and techniques addressed in theory and in the empirical findings. This means that tools, methods and techniques not currently used in ECI will also be examined.

The analysis provided in this section will to a large extent allow us to answer our main research question. In doing this, the *collective* perspective of successful innovation will be addressed. However, following the theoretical reasoning that employees need to be part of an innovative environment to be able to utilise the available search strategies, we argue that the contextual perspective has to be taken into account as well. After this section, the strengths and weaknesses in ECI´s innovative environment will thus be determined, laying the basis for an overall discussion of how ECI can improve their ways of generating new ideas internally in the last part of this chapter.

5.1.1. INTERNAL INNOVATION NETWORKS

The theoretical framework stressed that in today´s fast changing and global environment building and managing networks have become a prerequisite for innovation (Tidd & Bessant, 2009). Additionally, in order to generate new ideas, the importance of both engineered and emergent networks was emphasised (Nonaka, 1994; Tidd & Bessant, 2009). In the case study of ECI it becomes clear that the company recently has started to pay more attention to the creation of both types of networks, and the value of this setting when it comes to the generation of new ideas. Especially the newly started social network, Knowledge Forum, was emphasised to be a new way of communicating and collaborating across organisational, project and geographical boundaries. Most importantly, it was argued that this social network would make it easier to come up with, distribute and discuss ideas, e.g. through blog posts. However, as this social network is not yet well established in the organisation and no idea evaluation system exists, it is at the moment impossible to determine the effect of this tool. Nevertheless, Knowledge Forum can be considered an Enterprise 2.0 technology and according to theory, Enterprise 2.0 technologies are relevant for the successful triggering of new ideas (Birkinshaw et al., 2011). In this respect, we can conclude that Knowledge Forum is a future way of generating ideas within ECI, but time and processes are needed to be able to use it as an idea-generation tool.

This argument is supported by the fact that Company A also just recently launched a comparable online network enabling more online interaction between employees. Company A however, seems to have a clearer plan than ECI with respect to idea generation through STAR. Here, asking, sharing and building on

each other's ideas, challenges, and solutions is a goal that is clearly communicated and builds upon four formally determined main functions.

In the succeeding text, cross-functional teams and communities of practice will be analysed in greater detail, before organisational challenges and success factors will be evaluated – leading to a concluding remark regarding the main improvement potentials within internal innovation networks.

5.1.1.1 CROSS-FUNCTIONAL TEAMS

In theory, cross-functional teams are recommended in the initial phase of the innovation process because the chances of ending up with the most promising concepts faster and at a lower cost are high (Kim & Wilemon, 2002). As already noted, the value of the network setting when it comes to idea generation is recognised in ECI, and a cross-functional way of working is believed to contribute to the generation of good ideas in the future. This is also exemplified with the intended cross-functional expert team, Front-End Spectrum, which is planned to become a reality in the near future. Currently, however, the so-called cross BA initiatives are set up for very concrete contracts or projects and no routines are in place in order to use this setting to generate ideas. This indicates a clear improvement potential for ECI.

Further, theory emphasises that the organisation should focus on how it best can guide its cross-functional teams (Kim & Wilemon, 2002). Today project execution responsibility in the cross BA initiatives lies by a particular BA in ECI and for the purpose of solving project-specific problems, this seems reasonable. If the aim for the future is to encourage idea generation as a side effect however, the role of the project leaders will according to theory be essential in order to positively affect the innovativeness and performance of the rest of the team. This will be important to think about for the CTO team that in the future will guide the cross-functional teams.

5.1.1.2 COMMUNITIES OF PRACTICE

The development of communities of practice in large corporations has become more and more normal in recent years and our empirical findings confirms that ECI and Company A are no exceptions. Being a part of the newly launched Knowledge Forum, however, the tool has not been in use for more than a couple of months in ECI and a system for taking care of ideas is not yet in place. Like with Knowledge Forum, it is thus too early to determine the level of idea generation in the existing communities and the effect of the tool in general. Still, a comparison with theory can be made to examine how ECI have handled the tool so far and if there are room for improvements.

In theory, the informal setting of communities of practice is stressed, although communities can be established with the aim of obtaining knowledge in a specific field. This is verified in ECI; communities are created for themes that are most important to ECI, but becoming a member of an existing community is voluntary and employees can leave whenever they want. Looking more specifically at the three initial steps for making communities of practice part of an organisation´s success identified by Wenger & Snyder (2000), it becomes clear that ECI has done its homework:

1. The description of communities of practice on the intranet in combination with the information obtained in the interview with the Knowledge Manager make it clear that ECI has understood what communities of practice are and how they work.
2. The future plans for the communities of practice, including a "lessons learnt" system that will take care of both new ideas and validate important experiences, reveals that ECI has recognised that communities of practice are hidden sources of knowledge development and therefore crucial when facing the challenges of the knowledge economy.

3. The fact that Knowledge Forum has become an institution in itself, and that employees at the Corporate Centre are assigned to work specifically with the development of the communities of practices demonstrate that the necessary managerial support for this tool is present in ECI.

Thus, we can conclude that the online communities of practice in ECI so far are well established and organised, but being a part of Knowledge Forum it is still in the early phases of development and must therefore be considered a future way of generating ideas within ECI. Following the reasoning by Wenger & Snyder (2000) a proper reward system should, among other things, be established to maintain the communities of practice over time. The Knowledge Manager in ECI confirmed this, indicating that so-called "top contributors" in the communities and the best ideas will be rewarded in the future.

5.1.1.3 ORGANISATIONAL CHALLENGES

A comparison between the general theoretical and empirical challenges in managing innovation networks is displayed in Table 23 (Tidd & Bessant, 2009, p. 305):

Table 23: Comparison between challenges in managing innovation networks stated in theory and confirmed empirically

Challenges addressed by theory	Confirmed challenges in empirical data
Providing the momentum for bringing the network together (Tidd & Bessant, 2009)	*Raise awareness among employees (ECI)* *Get the employees to accept the new way of working (Company A)*
Establish core-operating processes about which there is support and agreement (Tidd & Bessant, 2009)	-
Sustaining or disbanding the network (Tidd & Bessant, 2009)	-
-	*Online sharing in general (ECI)*
-	*Get people to communicate online (ECI)*

Providing the momentum for bringing the network together: This challenge emphasises the importance of clearly defining the purpose of the network in its set-up phase. ECI expressed this challenge with regard to idea generation, arguing that if ideas are to come up when employees are gathered in networks awareness must be raised, clearly expressing from their start-ups that networks are favourable places to generate ideas. Company A also uttered this challenge. In their view, the concern is to get the employees to understand what working in networks means, signifying the need for a clearly defined purpose from the start. According to theory, third parties can play a crucial role in the start up phase of networks; e.g. a facilitator can prove helpful to enable idea generation as a side effect of other network activities.

The challenges, *Establish core-operating processes about which there is support and agreement* and *Sustaining or disbanding the network,* are not expressed challenges in ECI. This could be due to the fact that all of the internal innovation networks addressed are recently launched and still to a large extent is in the initial phase of development. Additionally, as revealed above, communities of practice and cross BA initiatives seem to be well organised for their current purpose in ECI and thus the core-operating processes established up until now can be considered successful. However, with regard to idea generation, there is a clear link between awareness raising in the initial phase stressed in the last paragraph and the

establishment of agreed upon and supported core-operating processes once the networks are up and running. Thus, if the internal networks are to fulfil the future goal of generating ideas, this goal should be emphasised and agreed upon in the core-operating processes of the networks and could be considered a future challenge that ECI should be aware of.

5.1.1.4 ORGANISATIONAL SUCCESS FACTORS

In the study of ECI, two more challenges were identified, **Online sharing in general** and **Get people to communicate online**. When comparing these to theory, they can be related to the success factor, **Facilitate the use of Enterprise 2.0 technologies.** This success factor was in the theoretical framework identified as crucial to enable the creation and persistence of networks in today's society (Birkinshaw et al., 2011). Company A confirmed this by emphasising the value of having a sufficient IT solution that allows employees to interact and collaborate more easily. The fact that this success factor can be connected to challenges in ECI, indicate that ECI has understood the importance of enterprise 2.0 technologies, but since the innovation networks, and especially Knowledge Forum, are still in the establishment phase, it is not yet regarded a success factor. *Online sharing in general* is by ECI considered a challenge that needs to be solved since sharing and transparency are increasing trends in today´s society that organisations, ECI included, have to follow. *Get people to communicate online* is in the same way regarded as a challenge that requires online training and communication. In sum therefore, it can be concluded that ECI facilitates the use of enterprise 2.0 technologies, but at the moment they regard it more as a challenge than as a success factor.

Continuing with the theoretical success factors connected to internal innovation networks it becomes clear that none of the respondents explicitly mentioned **proactive management**. Although not completely the same, Company A did however express the importance of long-term top management commitment in the implementation phase of the social network, STAR. This, together with the last theoretical success factor emphasising the importance of **balancing the use of Enterprise 2.0 technologies with face-to-face interaction,** are aspects that ECI should be aware of in their future work. In particular, we argue that ECI in order to be able to generate ideas through their networks should keep in mind that the management of networks is crucial and must be adjusted to the type of innovation network and the intentions behind setting it up.

5.1.1.5 MAIN IMPROVEMENT POTENTIALS INTERNAL INNOVATION NETWORKS

In sum, this analysis has revealed that the innovation networks in ECI are still in their early phases of development, but a clear vision exists for the future. An issue is that the networks are set up primarily for other purposes than supporting idea generation; the search for new ideas is planned to be a side effect. If not properly managed and facilitated we argue that there is a risk of forgetting about the collective generation of ideas. We thus conclude that the main improvement potential regarding internal innovation networks is to include idea generation in the defined purpose of the networks and further make it an expressed part of the core operating processes in the networks.

5.1.2 INNOVATION WORKSHOPS

As described by Geschka (1986), innovation workshops are collective group efforts that should be run face-to-face with the purpose of solving tricky problems. Even though this is a useful tool in all stages of the innovation process, theory stresses that the tool is especially favourable to get the search for new ideas started (Geschka, 1986). Our empirical findings disclosed that all the three companies studied use face-to-face innovation workshops to come up with new ideas. In the case study of ECI it became clear that innovation workshops is the main tool, and the most concrete tool, for generating ideas. In accordance with theory, innovation workshops in ECI are run to generate ideas on a specific issue. Typically, they are

used in the initial phase of the innovation process, but they can also be used for improvement projects. Theory emphasises that innovation workshops should include a well-defined goal and a detailed structure to guarantee the generation of relevant ideas (Rhodes & Thame, 1988). The study of ECI showed that this is not always the case. In general, the innovation workshops in ECI can be divided into two types: (1) longer workshops with a clear and detailed structure and (2) shorter idea meetings with an informal structure. While the shorter idea meetings have existed for many years, only one longer workshop has been run in ECI and it proved successful. Although the two types of workshops will be discussed in greater detail in relation to organisational challenges and success factors below, we can already here conclude that the longer workshop run, in our view seems to be the start of something new that should be further developed.

The case study of Company A revealed that they are trying to develop a proper structure around their innovation workshops. This was exemplified with the fact that, regardless of the purpose of each workshop, all workshops should result in an idea template for further evaluation and the ideas of interest for the company should be saved in an idea-database connected to STAR. This shows that Company A, as suggested by theory, are focusing on creating a detailed structure for their workshops. Apart from confirming that they are using innovation workshops to solve specific problems, we obtained little information about Company B´s workshop practices, and it will therefore not be included in the further analysis.

5.1.2.1 ORGANISATIONAL CHALLENGES

A comparison between the general theoretical and empirical challenges in managing innovation workshops is displayed in Table 24:

Table 24: Comparison between challenges in managing innovation workshops stated in theory and confirmed empirically

Challenges addressed in theory	Confirmed challenges in empirical data
Avoid group euphoria leading to unrealistic judgements and decisions (Geschka, 1986; Rhodes & Thame, 1988)	*Make sure employees understand that this is not team-building* *(ECI)*
Avoid taking decisions too fast (Geschka, 1986; Rhodes & Thame, 1988)	*Allow for proper evaluation and testing of ideas* *(ECI)*
-	*Ensure employees prioritise the workshops* *(ECI)*

Avoid group euphoria leading to unrealistic judgements and decisions: According to theory innovation workshops are not set up to facilitate open-ended, free wheeling group work (Geschka, 1986). Thus, to avoid group euphoria information has to be provided by management prior to and during the workshops (Rhodes & Thame, 1988). ECI confirmed this as one of the biggest challenges with innovation workshops, claiming that employees have a tendency to believe that they are invited for team building where the results obtained are irrelevant. To avoid unrealistic judgements and decisions, external speakers were therefore invited to inform the participants at the workshop on Arctic technology, just as theory proposes (Rhodes & Thame, 1988). The company has in other words realised this challenge and according to the Advisory awareness raising and training, i.e. more workshops, will be important to gain experience in this field.

Avoid taking decisions too fast: This challenge stresses that innovation workshops are not aimed at final decision-making. Rather proposals, recommendations and ideas should be encouraged, while final

decisions should be saved for after the workshops (Geschka, 1986; Rhodes & Thame, 1988). The Knowledge Manager in ECI verifies that at least in the shorter idea meetings, too fast decision-making is a general problem: *"We have a tendency to too fast dig into details, and a tendency to too fast evaluate if* [an idea] *will work or not"* (Knowledge Manager, ECI). Accordingly, this is connected to the problem of executing the workshops, and a contributing factor to idea meetings turning into so-called frustration meetings. In the study of Company A it became clear that every workshop run results in an idea template for later evaluation. In our view this is one way of avoiding taking decisions too fast, but it requires time and resources in the aftermath of the workshops, which has to be prioritised by management. The Knowledge manager in ECI also argues that as a result of decisions being taken too fast, and often simply based on a gut feeling, ideas with potentials are thrown away without having been tested to see if they work in reality. We can therefore conclude that the focus of ECI in the future should be on encouraging proposals, recommendations and ideas during the workshops, spend time on evaluating them after the workshop and test some of them on a small scale to see if they work or not. In this way it is also less likely that participants step back psychologically from the results of the workshops (Geschka, 1986).

In ECI an additional challenge, ***Ensure employees prioritise the workshops,*** was identified which was not recognised in theory. This challenge points to the problem of time and work overload, suggesting that the projects and deliveries to the clients on time have priority in ECI. The Department Manager for Arctic Technology explained why he only attended one day out of the three-day Arctic workshop in this wa*y: "It was a very good reason. We delivered a tender on a big Arctic study; I was responsible for running it, so I had to deliver on this commitment. It pays back to – we have to earn money"* (Department Manager, ECI). To our understanding, the challenge of priority is one of the most important when it comes to idea generation in ECI. However, if ECI wants to realise long-term innovation goals, they have to be prioritised, i.e. time and resources must be put aside. In this specific tool, we argue that priority is related to informing the participants of the workshop that they are not invited for team building, but that the results will be taken to the client. Additionally, we believe it is connected to the success factors, *"top management support"* and *"selecting the workshop participants with care",* which will be covered in the next section.

5.1.2.2 ORGANISATIONAL SUCCESS FACTORS

Top management support: When top management backs up innovation workshops, theory claims that it sends out signals to the rest of the company and increases the overall importance of the workshop (Geschka, 1986). This was confirmed in ECI, and the respondents used the Arctic workshop as an example. This workshop was a corporate initiative and both the CEO and the CTO were present. According to the Department Manager: *"It´s obvious, when* [the CEO] *is starting this, it´s clear, then that means that* [the CEO] *knows that work is done here, and then* [the CEO] *knows that there will come deliveries from this work. So of course, it points the setting a lot more"* (Department Manager, ECI). The way we interpret this, top management support puts the workshops higher on the priority list of the invited participants. However, in the shorter workshops, there seems to be a lack of top management commitment leading to poor execution. According to the Knowledge Manager, it is e.g. not stated in any processes that idea meetings should be held, but still an integrated understanding that it should be done exists. In our view this points to a lack of structure and direction and indicates an improvement potential in ECI.

Select the workshop participants with care: In the theoretical framework, two factors were stressed as important for the successful selection of workshop participants: (1) enough competence, and (2) heterogeneous mix of employees (Rhodes & Thame, 1988; Geschka, 1986; Anderson, 2011). ECI confirmed that in the longer workshop on Arctic technology these factors were taken into account, participants included both experts and less experienced employees leading to a good mix of people of all ages. ECI is in other words aware that diversity among workshop participants is a key. However, in the shorter idea meetings respondent answers indicate that participants are not chosen with care, but include people that work with each other a lot already. We thus conclude that the care taken with regard to

choosing participants in the longer workshops should be passed on to the shorter workshops within the BAs. If the same people are included in every idea meeting, there is a risk that the same ideas come up over and over again. Although a workshop is supposed to be within the BA or the department, this does not mean that people from other BAs or departments cannot be invited to join to increase heterogeneity. Additionally, people with practical experience (e.g. offshore experience) would probably add value to a workshop since a larger part of the value chain in this way would be represented.

The skill of the facilitator: An innovation workshop is dependent on a facilitator, who possesses specific know-how in the management of the workshop *process*, and could be either internal or hired-in specifically for the workshop (Rhodes & Thame, 1988; Geschka, 1986). ECI verified the success of hiring an external facilitator, especially pointing out the good job of the facilitator before and during the Arctic workshop. However, in the shorter idea meetings the job of the facilitator often seems to be underestimated. Company A in the same way emphasised the importance of a skilled facilitator, but stressed the value of educating internal facilitators in order to enable more thoughtful innovation workshops where the facilitator knows the business. According to the Advisory in ECI, the company has been thinking about doing the same thing, but has not taken a definite decision yet. In sum, theory underlines the value of using a skilled facilitator, but does not claim that an internal is better than an external, or vice versa. Based on the respondent in Company A however, internal facilitators have proved very useful and thus we conclude that this is something ECI could continue to consider for the future. The value of in-house competence is the main argument, but not least, internal facilitators could e.g. help facilitate the shorter idea meetings.

Optimal duration: A workshop lasting 1-4 days is according to theory more cost effective and gives better payoff relative to the initial time invested in it (Geschka, 1986). The issue of duration is not confirmed as a success factor in ECI, but through the respondents it became clear that the shorter idea meetings usually last for an hour or two, while the longer workshop organised lasted for three days. Theory emphasises among other things that shorter workshops make it hard to become effective as a group, and that stress is often connected to these sessions. Compared to theory, the shorter workshops lasting one to two hours are thus not ideal. Furthermore, the fact that the idea meetings according to the Knowledge Manager often turns into frustration meetings can in our view be connected to the duration issue. Like ECI, Company A did not point out the duration of the workshop as a success factor. The interview with the Innovation Manager revealed however, that their workshops last for half a day or a day. In conclusion we argue that ECI should reflect upon what they get out of idea meetings lasting for an hour or two, and consider extending these workshops in order to improve their overall successfulness. Overall successfulness in the idea meetings, of course, requires improvements in the other areas addressed in this section as well. Based on the experience from Company A, however, extending the shorter workshops to at least half a day will be better than one to two hours meetings. In general our impression is that the longer, residential workshops appear more successful than the shorter, stressful idea meetings.

An additional success factor, ***specifying the theme before the workshop starts*** was identified in ECI. This is not recognised as a success factor in theory, although it is stressed that an innovation workshop demands a well-defined goal and a carefully structured agenda in order to, among other things, maximise the number of generated ideas (Rhodes & Thame, 1988; Geschka, 1986). ECI identifies this a success factor because they have realised the value of having a specified challenge, rather than searching for blue-sky ideas. However, too loosely defined idea meetings still seem to be a challenge that they have to work specifically on improving in the future.

5.1.2.3 MAIN IMPROVEMENT POTENTIALS INNOVATION WORKSHOPS

In sum, the study of ECI has shown that the company has identified many of the success factors and challenges connected to innovation workshops, but they act better on them in the longer workshop than in the shorter idea meetings. The most evident improvement potentials appear to be within the latter; the duration, degree of facilitation, participants, evaluation routines, and themes discussed are the most prominent issues that need to be considered and improved. Overall, top management commitment is to our understanding more or less lacking in the shorter idea meetings, while it is extremely present in the longer workshops, exemplified with the Arctic workshop. First and foremost the structure and direction of the search distinguish the two. If ECI aims at an innovation culture embracing the whole company, it can be good to start at the top, but the main challenge and improvement potential is to trickle the effect down in the rest of the organisation.

5.1.3 INNOVATION JAM

Innovation Jams are the main tool used for generating ideas within Company B. ECI has not been involved in any jam activity while the tool has been addressed within Company A. According to theory, jams are massive online conferences, where tens of thousands of people can interact with each other at the same time (Bjelland & Chapman Wood, 2008). In Company B's case however, the number of participants has been between 1000 and 4000. Thus, the jams in Company B were conducted inside the company only including employees, while e.g. IBM included university researchers, clients, business partners, and family members in their jams as well. Further, the set-up and carrying out of jams can vary and is continuously evolving depending on their contexts and aims (Bjelland & Chapman Wood, 2008). In Company B, both the duration and the problem formulation were designed differently for each jam. IBM's Innovation Jam resulted in 46 000 posted ideas that eventually resulted in ten new business units (Bjelland & Chapman Wood, 2008). Company B's jams are however smaller in scale, which is reflected in the outcomes of the jams. The jams in Company B have not resulted in new business units; most of the ideas have been incremental even if there have been some radical ones too. Every year, between 100 and 500 ideas have been posted in the jam and between 7 and 10 ideas have been developed further in Company B.

From the discussion above it is clear that both IBM and Company B have generated ideas by using the jam concept. The scale of the jams and the way they have been organised are however quite different, which illustrate that this tool is flexible and can be used in very different settings. One common factor for these two companies is that they have both aimed at incorporating the whole company in their jam activities. This factor is one of the main reasons why Company A has not conducted a jam so far; they have found it hard to define a scope that they believe would benefit from the involvement of the entire company.

5.1.3.1 ORGANISATIONAL CHALLENGES

A comparison between the general theoretical and empirical challenges when engaging in jam activities is displayed in Table 25:

Table 25: Comparison between challenges when engaging in jam activities stated in theory and confirmed empirically

Challenges addressed in theory	Confirmed challenge in empirical data

Put aside enough time and resources for the time-consuming task of reviewing and categorising the posts after a jam is over. (Bjelland & Chapman Wood, 2008)	**Establish a strategy for following up the ideas** *(Company A)*
The role of the facilitators needs to be developed and fitted to the online format.	**Online format** *(Company B)*
The issue of intellectual properties need to be discussed before the jam session starts. (Bjelland & Chapman Wood, 2008)	-
Actions need to be taken to inspire and encourage the participants to contribute in the jam activity. (Bjelland & Chapman Wood, 2008)	**Communicating that the jam is taking place** *(Company B)* **Legitimising spending time on the jam** *(Company B)*

Put aside enough time and resources for the time-consuming task of reviewing and categorising the posts after a jam is over: It is crucial to handle this challenge since the true value of a jam lies in bringing small and big ideas together. This is time-consuming and the outcome of this process emerges after the jam is finished; in IBM's case it took several weeks (Bjelland & Chapman Wood, 2008). Company B has not expressed this as a challenge, but they have a review system in place to evaluate all ideas that are submitted during a jam. In Company A however, this challenge has been acknowledged. A jam initiative was stopped since management did not have a strategy for how to follow up the ideas that were submitted. Thus, both theory and empirical findings point out the importance of being able to review the submitted ideas in order to make the jam valuable.

The role of the facilitators needs to be developed and fitted to the online format is addressing that there is a difference in facilitating online and face-to-face brainstorming. The facilitators may need additional education to be able to guide the online sessions in a favourable way (Bjelland & Chapman Wood, 2008). Company B has not recognised online facilitation as a specific challenge but stresses other challenges connected to the online format, which rather are connected to the participants of the jams. For some people the online format makes it difficult to participate while others do not understand why the 'jaming' cannot be done face-to-face since many of the participants are sitting in the same building. Finally, some people prefer to be anonymous when suggesting their ideas and this is not possible for the participants in a jam.

The issue of intellectual properties need to be discussed before the jam session starts since the online format includes the publication of ideas, which could affect potential future intellectual properties and challenge the protection of an organisation's secrets (Bjelland & Chapman Wood, 2008). Company B has not acknowledged this challenge. However, it can be related to the challenge of *online sharing in general,* which was addressed by ECI in the section on innovation networks above. If information is published externally it is regarded as common knowledge and thereby it is not possible to patent it. Thus, this issue would probably be a challenge that that ECI would have to deal with if they choose to run a jam. Accordingly, this challenge may become more important if the jam is run with external parties as in IBM's case compared to running it in-house.

Actions need to be taken to inspire and encourage the participants to contribute in the jam activity is also considered to be a challenge in theory. Although management is supportive, the activity among the participants varies (Bjelland & Chapman Wood, 2008). The participants need to be encouraged to join in order to create the most value from the jam activities. In Company B this is identified as a challenge as well: Firstly, it has to be communicated that a jam is taking place and this has proved to be hard. Even when the information has been communicated through posters, group mails, direct mail and posts on the intranet there are still employees that do not know that a jam is organised. Secondly, company B claimed that it can be hard to assure the employees that it is legitimate to spend time on the jam. Thus, a success

factor recognised in Company B is to **establish a reward system** to inspire people to participate in the jam. The rewards in Company B are non-monetary and also emphasise the importance of recognition.

5.1.3.2 ORGANISATIONAL SUCCESS FACTORS

According to theory, **Top management support** is essential for making the outcome of the jam successful. Three main points were stressed in this regard: (1) there has to be a belief in that the employees can contribute, (2) the mind-set of "every idea counts" is crucial to inspire employees, and (3) top management commitment should be of long-term character (Bjelland & Chapman Wood, 2008). In Company B, none of these points are explicitly expressed but they are taken into consideration. E.g., a reason why Company B uses the jam is to involve and reach out to every employee in the organisation. This indicates that they believe that employees can contribute. Further, all the ideas that are submitted during a jam in Company B are reviewed, no matter how big or small they are. Next, Company B also uses jams to influence the organisational climate and show that "*this company is open for ideas*" (Director, Company B). This indicates a long-term commitment since a change in climate takes many years. Accordingly, the jams are seen as a yearly activity and not as a single event in Company B. Finally, the fact that managers from the very top in the organisation are involved in the evaluation process points out that Company B has top management support.

Since jams are defined as massive online conferences, having a **suitable software platform** is considered to be a success factor in theory. The software platform should have the ability to sort and review an enormous number of idea posts in order to assist the analysis of the jam sessions (Bjelland & Chapman Wood, 2008). Company B confirms this success factor. In the first jam, all feedback on the ideas had to be done manually, which resulted in not all ideas being reviewed. Today, the software platform has been improved and compromises, among other things, an automatic update system that shows how far a specific idea has come in the evaluation system.

5.1.3.3 SUMMARY INNOVATION JAM

The discussion in the previous sections illustrates that jams are a flexible tool and can be used in very different settings. The main characteristics of this tool are that it is conducted online, it aims at involving the whole company, and can be used to influence the organisational climate. The theoretical and empirical findings proved to correspond to a large extent. If ECI decides to organise a jam in the future, special attention should be put on the organisational challenges and success factors presented in this analysis in order to be effective in their execution.

5.1.4 TECHNOLOGY ROADMAPS

The former CEO of Motorola, Robert Galvin, considered technology roadmapping primarily as a tool for innovation (Rinne, 2004). In ECI, technology roadmaps are mainly used to tune and develop the product portfolio in the strategic direction that the company is moving. The technology roadmap is thus a helpful planning tool for management, but is not primarily used to come up with new ideas. In theory, the usage of technological roadmaps has mostly focused on discovery and consensus building rather than to spot opportunities for innovation during the last couple of years (Phaal et al., 2004). Thus, this indicates that ECI is not the only company using technology roadmaps for other purposes than innovation.

5.1.4.1 TECHNOLOGY ROADMAPS AND VIRTUAL INNOVATION

Rinne (2004) argues that technology roadmaps can become important drivers of innovation by supporting so-called "virtual innovation". Technology roadmaps play an important role in terms of persisting the virtual innovations (or prototypes) i.e. ideas or products can be saved virtually on a technology roadmap and become valuable in the generation of new ideas (see Figure 7) (Rinne, 2004). The roadmaps used in ECI today do not support virtual innovation. If ECI wants to widen the focus and use this tool more specifically for idea generation, supporting virtual innovation in their roadmaps could be one way to do it.

5.1.4.2 TECHNOLOGY ROADMAP INTEGRATION

Rinne (2004) further argues that technology roadmaps can be integrated, so that otherwise unrelated technologies are connected and the context for innovation is widened. E.g., an idea that appears in the periphery of one roadmap can be useful to the development of a product or technology on another roadmap. In this way roadmap integration enables new opportunities to be spotted, and possibly it could be products or technologies of disruptive kind (Rinne, 2004). In ECI, roadmap integration is not used but one of the challenges addressed by the company is the difficulty of **coming up with wild ideas**. Technology roadmaps in ECI are regarded a systematic and rigid method that focuses mostly on incremental improvements and therefore rarely open up for the generation of wild ideas. Like with virtual innovation, if ECI wants to widen the focus and use technology roadmaps more specifically for idea generation, this could be a way to it. An advantage of this technique is that it opens up for the generation of both incremental and disruptive ideas.

5.1.4.3 ORGANISATIONAL CHALLENGES

A comparison between the general theoretical and empirical challenges when engaging in technology roadmapping is displayed in Table 26:

Table 26: Comparison between challenges in technology roadmaps stated in theory and confirmed empirically

Challenges addressed in theory	Confirmed challenge in empirical data
Starting up and developing a robust technology roadmap process (Phaal et al., 2004)	**Avoid ending up in the same track** (ECI) **Avoid having a too narrow focus** (ECI)
Keeping the roadmap alive (Phaal et al., 2004)	(Expressed, but not explicitly as a challenge)

Starting up and developing a robust technology roadmap process emphasise the challenge of taking advantage of the process of constructing a technology roadmap, rather than the final outcome (Phaal et al., 2004). The Vice President of Technology Development in ECI also considers the process of constructing the roadmap to be important and has identified it as a success factor: "*the most significant part about a roadmap is the process you are in when you create it*" (Vice President Technology Development, ECI). Further, ECI has identified two challenges related to this area: how to **avoid ending up in the same track**, and **avoid having a too narrow focus** when developing the roadmaps. The former addresses how the broader perspective might be lost while the latter deals with the problem of only developing in the prioritised areas and not in other areas that could be of interest. Additionally, if the manager to begin with starts the process on the wrong track and repeatedly makes use of the same people, he/she risks ending up getting stuck in the same track. Theory describes that the process of creating a roadmap needs to be

thought through and organised; people from different parts of the business should be involved and information and perspectives should be shared to enable a holistic view of problems, opportunities and new ideas (Phaal et al., 2004). Consequently, if the process is organised in a proper way in ECI, these challenges can be accounted for.

Except for having a robust roadmap process in place, another challenge lies in **keeping the roadmap alive**. According to theory, the value of the roadmapping activity can only be extracted if the roadmap is updated on a regular basis, at least once a year (Phaal et al., 2004). ECI has not expressed this specifically as a challenge. However, the technology roadmaps in ECI are reviewed and updated on an annual basis and are regarded as dynamic documents that can be taken up and modified more frequently if the market is changing drastically.

5.1.4.4 ORGANISATIONAL SUCCESS FACTORS

In theory **top management commitment** is identified as a success factor when engaging in technology roadmaps. It is expressed that top management need to believe in the concept of technological roadmapping and regard the outcomes as useful for the company. In this way the necessary resources that are needed to go through with the roadmapping process can be put aside (Phaal et al., 2004). In ECI, a top-level roadmap is constructed that gives an overall strategic direction of the technology portfolio. This is presented to the CEO and used for other presentations in the organisation. It indicates that ECI has top management support for roadmap activities, even if it is not explicitly expressed.

According to theory **communication and knowledge sharing** is important in order to utilise the benefits connected to technology roadmapping (Phaal et al., 2004). Thus, to get a shared view where the company is heading, the involved people have to understand how the process works and what the organisation wants to get out of it. This can be linked to ECI's focus on the actual development of a roadmap and the notion that most value can be extracted here. The product owner has a central role in the process and the Vice President of Technology Development emphasises the importance of communicating and getting a common understanding of what the product owner wants with his product. The process allows for management to actively communicate with the product owners as well as reviewing the roadmap in relation to market development. By connecting this to the organisations strategic goals, a shared vision of were the company is heading can be created.

The **application of software** is another success factor connected to technology roadmapping. According to theory simple word processing, spreadsheets, and graphic software are appropriate in the initial development of roadmaps. However, more advanced software is needed if the roadmaps should be furthered developed (Phaal et al., 2004; Rinne, 2004). This success factor has not been recognised by ECI. The reason is probably that they do not use virtual innovation, integrate different roadmaps or other advanced features. Basically, they are doing fine with Excel since roadmaps mainly are used to tune and develop the product portfolio and not to support idea generation. If ECI decides to support virtual innovation or engage in roadmap integration in the future, the software used today probably have to be upgraded or complemented by more advanced programs.

5.1.4.5 MAIN IMPROVEMENT POTENTIALS TECHNOLOGY ROADMAPS

From the analysis above, it is clear that technology roadmap activities have top management support in ECI but they are not primarily established to generate new ideas. If ECI wants to generate new ideas by using technology roadmaps, they can either support virtual innovation and/or engage in technology roadmap integration. If ECI decides to include idea generation in the focus of technology roadmaps, the software needs to be improved. Further, more emphasis needs to be put on sharing knowledge and making connections among the involved employees. E.g., if technology roadmaps should be integrated across the different business areas it will demand increased communication among the participants.

5.1.5 CORPORATE ENTREPRENEURSHIP

In theory, corporate entrepreneurship is a concept closely connected to the organisational culture and considered to enable organisations to act in an entrepreneurial way (Bessant & von Stamm, 2007). Further, there are two ways of engaging in corporate entrepreneurship; skunk work (Augsdorfer, 2005) and organisational slack (Dodgson et al., 2008). One can question whether corporate entrepreneurship should be thought of as tool or a concept. In our point of view, corporate entrepreneurship seems to be more a concept that relates to the organisational culture than an actual idea generation tool. However, skunk work and organisational slack are tools that can be managed, which indicates that they can be used to foster an organisational culture. Our empirical findings in this area are very limited due to the fact that ECI does not use this concept or the related tools at all. Therefore this analysis will aim at how corporate entrepreneurship, as described in theory, can be used in ECI based on the general empirical findings we have about the company.

Based on the theory, skunk work is a way to centralise innovation by creating an elite department that engage in specific ideas or concepts, often isolated from the rest of the organisation. ECI works in a very project based way and our impression is that it is hard for the employees to engage in activities that are not directly connected to a specific project. By using skunk works ECI could create an open, creative climate with few stop-mechanisms for the ideas that arise (Fosfuri & Rönde, 2009). Skunk works also tend to foster a more radical type of innovation, which could be beneficial for ECI. However, to organise this type of elite department and to successfully take advantage of the outcomes requires proper planning and management. Since ECI seems to lack experience of corporate entrepreneurship as such and skunk work is a large task to take on, we argue that this tool might not be useful for ECI at the moment.

Organisational slack means that a certain amount of time is allocated to the individual employee, who decides independently what to conduct research on. Instead of centralising the innovation activities, it is spread among employees in the organisation (Dodgson et al., 2008). The amount of slack has to be balanced and fitted to the company's specific situation (Nohria & Gulati, 1996) and it is our understanding that this tool is not applied to all parts of the company. It appears to be mainly employees that engage in different kind of research that can benefit from this tool. This means that ECI should only allow organisational slack in certain parts of the company, not in the whole organisation. Since lack of time seems to be an overall issue in ECI and organisational slack is addressing allocation of time, we argue that this might be a useful tool to use in order to free up innovation time for at least some of the employees. The Knowledge manager in ECI has expressed his support for organisational slack and suggests testing the concept in a pilot project.

5.1.5.1 ORGANISATIONAL CHALLENGES AND SUCCESS FACTORS

According to Bel (2013), ***top management support and leadership*** is vital in succeeding with corporate entrepreneurship. This means that top management in ECI have to support e.g. experimental projects and create reward systems that are connected to innovation activities.

There are also a number of challenges connected to corporate entrepreneurship. ***The human problem of managing attention*** indicates that ECI have to balance exploiting existing capabilities and exploring new ones, which can be related to the ambidextrous challenge large organisations often experience. In addition, ***the process problem of managing ideas into good currency*** emphasise that ECI have to be good at legitimising and implementing the ideas that are generated through skunk works or organisational slack. Finally, ECI have to handle ***the leadership problem of managing the context for entrepreneurship*** and find a leadership balance. In our understanding this final challenge is related to hierarchical structures in ECI and that the management should give the employees freedom to investigate and develop their ideas.

5.1.5.2 SUMMARY CORPORATE ENTREPRENEURSHIP

We argue that corporate entrepreneurship as such can be considered a concept that is closely related to the organisational culture while skunk work and organisational slack are tools that support the development of corporate entrepreneurship. Further, it is our understanding that skunk work and organisational slack are continuous tools and should not be thought of as single events, rather something that is integrated in the everyday working life and supports the organisational culture. Concluding, ECI could use these tools to enable idea generation and at the same time affect the organisational culture. Based on ECI´s lack of previous experience of corporate entrepreneurship we argue that they should start out with organisational slack, since skunk work is harder to implement.

5.1.6 ANNUAL IDEA SEARCH

The Annual Idea Search as such has not been identified in theory as a tool that can be used for idea generation. Therefore the analysis will build upon the general theory and empirical findings that are relevant and applicable in the AIS. In the AIS, the managers go out to the employees and actively ask for ideas once a year. The managers are taking an active role in triggering idea generation by challenging the employees and inspiring them to be creative and come up with new ideas. So far it has been different technological areas that have been addressed, and as is the case with some of the other tools used in ECI, this indicates that the scope is quite wide. By narrowing down the focus and addressing specific challenges, the employees could become more inspired to contribute with new ideas. An improvement potential for ECI is thus to narrow down the scope and express specific challenges instead of technological areas.

When the technological areas or challenges are announced there are no more actions taken to enable the employees to come up with ideas. The activities that take place in the time between the challenges are launched and until an idea is submitted appear to be unknown. Therefore we consider the actual idea generation as a 'black box', which indicates that ECI lacks idea generation processes connected to the AIS. This can be a reason why the concept of AIS is not addressed in theory; the tool seems to *capture* ideas rather than generating them. In the theoretical framework several tools were addressed that in one way or the other supports idea generation, e.g. Innovation Networks, Innovation Jams, and Innovation Workshops. These tools have different ways of connecting people and creating a playground for idea generation. It seems to us that these elements are lacking, so to improve the AIS an idea generating tool, method or technique could be connected to it.

The concept of challenging employees used in the AIS can be compared with Company A's STAR, which also is challenge-driven. STAR is based on Enterprise 2.0 technologies and serves as a social network, which according to theory supports idea generation (Birkinshaw et al., 2011). Hence, when a challenge is launched in STAR there are structures and processes set up to enable the employees to collaborate and come up with solutions or ideas connected to the challenge. This indicates that no 'black box' exists in STAR. In order to support idea generation and avoid the 'black box' scenario we argue that ECI could connect the AIS to the recently launched Knowledge Forum, which possess the Enterprise 2.0 features. Another alternative could be to address the challenges posted in the AIS in a workshop. ECI has made progress with the longer workshops and if this can be trickled down on the BA level, it can be used in connection with the AIS.

The AIS can also be compared with ECI's future plan of launching an Idea Portal. The Idea Portal is going to have two main functions. First, it will enable employees to submit their ideas, regardless of were they got it, to the organisation. Secondly, this is a forum where challenges in specific areas will be launched in order to inspire the employees to come up with new ideas. In these regards, the Idea Portal is similar to the AIS. The differences are that the AIS is executed on a BA level while the Idea Portal addresses the whole company and that AIS is executed once a year whereas the Idea Portal is a permanent feature.

Based on the similarities, our understanding is that the AIS could be executed through or integrated in the Idea Portal.

5.1.6.1 ORGANISATIONAL CHALLENGES AND SUCCESS FACTORS

There are no theoretical challenges or success factors connected to the AIS, a comparison to the empirical findings is therefore hard to make. Based on the reasoning above, the challenges addressed by ECI could potentially be reduced. By narrowing down the scope of the search in AIS, the challenge of **communicating the strategy** could be reduced since it becomes easier for the employees to come up with valid ideas due to the more specific guidance. Further, by connecting the AIS to an idea generating tool, method or technique it can become easier to free up time for the employees to contribute. The challenge of **ensuring that employees are not overloaded at work** can thereby be reduced to some extent.

The success factor of **active management** that is identified by ECI points out the importance of challenging the employees in order to inspire them to come up with new ideas. From our point of view the employees can be even more inspired by narrowing down the scope and connecting the AIS to an idea generating tool, method or technique.

5.1.6.2 MAIN IMPROVEMENT POTENTIALS ANNUAL IDEA SEARCH

The above outlined arguments make it possible to conclude that the challenges should be expressed more precisely to narrow down the focus and that the AIS needs to be connected to a tool, method or technique that support idea generation (e.g. social network or workshop). Further, we consider that there is a possibility to execute or integrate the AIS in the intended Idea Portal. Even if ECI identifies the AIS as an idea-generation tool, the main emphasis is on capturing ideas at the moment.

5.1.7 FUTURE IDEA GENERATION TOOLS IN ECI

In this section the future idea generation plans in ECI will be briefly reflected upon based on the general theory presented in this thesis. Recalling our theoretical starting point for successful innovation practice, creative employees need to be part of an environment facilitating innovative thinking, and they need the collective tools, methods and techniques to be able to get out their full potentials (Bessant & Tidd, 2011). Through our empirical findings it became clear that the plan for the future in ECI is to see the internal tools, methods and techniques that already exist in the company in a broader perspective and in this way encourage idea generation. This will be done first and foremost through awareness raising among employees, and thus communication is considered the biggest challenge. As stressed already in the case of internal innovation networks, we argue that there is a risk of overlooking collective idea generation in a setting that primarily has another focus. I.e. the way the future of the collective tools is planned, we do not believe that employees will be able to utilise their full potentials with regard to innovation. We thus conclude that in addition to raising awareness, it is crucial that idea generation is well managed and facilitated in the future – even if it is only regarded a side effect. This argument is linked to the challenge *Lack of follow-through in idea generation programmes that from the beginning have good intentions,* identified by Birkinshaw et al. (2011). ECI seems to have good intentions for their search strategies, but the company has to make sure that they are followed-up and implemented properly if they want them to become successful.

The plans for *Front-End Spectrum* reveal that, as with the other proposed cross-functional ways of working, idea generation will be regarded as a secondary. The same arguments as just outlined above thus apply to this future tool as well; idea generation has to be properly organised and facilitated despite the fact that it is regarded a side effect.

The *Idea Portal* is considered to be a future idea generation tool in ECI. According to the Advisory, it has not been decided yet if the Idea Portal will become a part of Knowledge Forum or not. Knowledge Forum is built upon Enterprise 2.0 technologies that support online innovation activities, while it is our understanding that the intranet is less developed in this manner. Since the Idea Portal is going to be web-based, we argue that the tool should be integrated in Knowledge Forum in order to benefit from the Enterprise 2.0 technologies that facilitate idea generation.

As was concluded in the analysis of the AIS, the Idea Portal could serve as host for this yearly search for new ideas. This could be a good way to promote and draw attention to the Idea Portal and would make the employees aware of its existence when it is launched.

5.1.8 CONCLUDING REMARKS ANALYSIS TOOLS, METHODS AND TECHNIQUES ECI

Table 27 below concludes our analysis of the tools, methods and techniques used for internal idea search.

Table 27: Main improvement potentials tools, methods and technique in ECI

Tool, method, technique	Addressed in theory	Used in ECI primarily to generate ideas?	Main improvement potentials
Internal Innovation Networks	Yes	No	Idea generation should be included in the defined purpose of the networks and an expressed part of their core operating processes.
Innovation Workshops	Yes	Yes	The structure and direction present in the longer workshops initiated by top management should be transferred to the shorter idea meetings at the BA level.
Innovation Jams	Yes	-	Possible tool for the future, especially if ECI wants to include all the employees.
Technology Roadmaps	Yes	No	The focus should be widened to include idea generation; ECI can generate ideas by either using roadmaps to support virtual innovation and/or engage in technology roadmap integration.
Corporate Entrepreneurship	Yes	-	Possible technique for the future, especially if ECI wants a continuous tool integrated in the everyday working life.
Annual Idea Search	No	Yes	A process has to be established around this tool in order to make the search for new ideas more focused on specific challenges.

5.2 INNOVATIVE ENVIRONMENT

The main goal of this section is to analyse the theoretical and empirical findings in order to determine strengths and weaknesses in ECI's innovative environment, which addresses the *contextual* perspective of successful innovation. Throughout the analysis the mean values serve as main determinant for strengths and weaknesses, while additional information is seen as complementary. In the theoretical framework, we explained that the innovative environment constitutes a number of different elements. These can be divided in to five different managerial areas, of which we investigated four: Innovative Organisation, Innovation Strategy, Innovation Process and Learning (Tidd & Bessant, 2009). According to our empirical findings and statistical measurements, our data proved that it is legitimate to look at the four different managerial areas in terms of strengths and weaknesses. In Table 11 in the empirical findings we could see that none of the four managerial areas had a remarkably higher or lower mean value than the others, i.e. all the managerial areas had a mean that was close to 4, which is the midpoint of the 1-7 Likert scale used in the audit. Based on this, we conclude that none of the managerial areas as a whole can be seen as a particular strength or weakness in ECI.

Consequently, we will focus our analysis on the individual questions that were asked in the audit. The main emphasis will be put on the closed questions and how they are related to the different elements of the managerial areas explained in theory. This mainly applies to the area of Innovative Organisation, which constitutes five elements, while the remaining areas will be addressed on a general level. Since we want to identify strengths and weaknesses, only the items that were ranked in the top or the bottom five in terms of mean will be included in our analysis. Strengths and weaknesses are considered relative to the empirical findings, not according to a pre-set mean value. As the managerial area of Learning cannot be found in either the top or bottom five, it will be excluded from the analysis. When applicable, inputs from the open-ended questions will be incorporated.

The level of "I don't know" answers is measured in percentages. The way we reason, a respondent who has answered "I don't know" actually do not know the current situation in ECI and can thereby not rank if the specific statement is *Not True at All* or *Very True*. Consequently, we believe that an "I don't know" answer is not a matter of misunderstanding or interpreting the statement in the wrong way. The confidence regarding this matter is based on verification from a few of the respondents and the fact that the questions used are theoretically anchored and have been used in previous research (Tidd & Bessant, 2009). It thus seems logic to us to understand a high level of "I don't know" answers as worse than a low level of "I don't know" answers. According to statistical reasoning, we consider a low level as maximum 10% "I don't know" replies while a high level equals 30% or more (Hair et al., 2010). When analysing the individual questions, we will consider the level of "I don't know" responses as a compliment to the mean value and only address the data within the low or high level of "I don't know". Accordingly, the questions with 11-29% "I don't know" replies will not be taken in to account and will be marked (-) in the tables below.

In general, the empirical findings indicate that the overall level of "I don't know" responses can be considered to be high; only 5 out of 22 questions are in the low range of 10% or less "I don't know" replies while the remaining questions represent higher levels. The way we interpret it, a large number of employees in ECI do not possess knowledge about what activities the company engages in or do not engage in when it comes to innovation. This could indicate that the innovative environment in ECI is underdeveloped. However, since we have not investigated the average knowledge spread in other companies, it is hard to draw any definite conclusion regarding the existence of the innovative environment based on this result. However, it is clear that there are room for improvement in this area.

5.2.1 STRENGTHS IN ECI´S INNOVATIVE ENVIRONMENT

The five individual questions with highest mean value are displayed in Table 28. Each question will be analysed further in the coming paragraphs.

Table 28: Top five questions according to mean values

Nr.	Question	Mean	Percent "I don't know"	Managerial Area	Elements of Managerial Area
Q3	*People work well together across departmental boundaries in our organisation*	**5,24**	2%	Innovative Organisation	Organisational Structure
Q9	*Communication is effective and works top-down, bottom-up and across the organization*	**4,81**	4%	Innovative Organisation	Organisational Structure
Q1	*We have top management commitment and support for innovation*	**4,70**	(-)	Innovation Strategy	(-)
Q4	*People are involved in suggesting ideas for improvements to products or processes*	**4,70**	5%	Innovative Organisation	Employee Involvement
Q8	*Our organisational structure helps us to take decisions rapidly*	**4,52**	7%	Innovative Organisation	Organisational Structure

As can be seen in Table 28 above, question number 3 "***People work well together across departmental boundaries in our organisation***", question number 9 "***Communication is effective and works top-down, bottom-up and across the organization***" and question number 8 "***Our organisational structure helps us to take decisions rapidly*** " have several similarities. To start with, they all have high mean values. Further, they have a low level of "I don't know" responses, below 7%. In our point of view, this means that a large part of the respondents know that work is conducted across departmental boundaries, that communication flows well and they have knowledge about the organisational structure in ECI. In terms of theoretical connection, these questions can be linked back to the managerial area of Innovative Organisation. According to Tidd & Bessant (2009), cross-functional cooperation and smooth information flow are important factors of an organisational structure that support innovation and team-working capabilities. To be more precise, we argue that these three questions address the element of organisational structure. Based on the high mean values and the level of knowledge in these specific areas, we are confident in stating that question number 3, 9 and 8 indicate the organisational structure in ECI as a strength in their innovative environment.

Question number 1 "***We have top management commitment and support for innovation***" has a high mean value equalling 4,70. The level of "I don't know" is neither high nor low and is therefore not taken into account. Theoretically, this question is connected to the managerial area of Innovation Strategy, which stresses the importance of having strategies for innovation. According to theory there has to be some kind of overall plan made by top management that sets out the direction of how the organisation wants to handle innovation (Tidd & Bessant, 2009). The high mean in this specific question indicates that the employees believe that top management commits to and supports innovation in ECI. This is also confirmed through the existence of the CTO Strategy Document, which was developed by top management. Accordingly, the top management involvement in developing innovation strategies is supporting the innovative environment in a positive way and we therefore conclude that Innovation Strategy can be considered a strength in ECI.

When looking at the open-ended questions however, the managerial area of Innovation Strategy points in another direction. Initially, innovation strategy is not considered to be helpful in coming up with new ideas according to the respondents (0%). Further, this area is considered to hinder the respondents and is pointed out as an improvement potential in ECI. Yet, since the Innovation Strategy only represents 7% of the hindering reasons and 5% of the improvement potential related to idea generation in ECI, we argue that these results not overshadow the results of the closed questions. Accordingly, this does not affect our

conclusion that the managerial area of Innovation Strategy can be considered a strength in ECI's innovative environment.

Question number 4 "*People are involved in suggesting ideas for improvements to products or processes*" has also been assigned a mean value of 4,70 and qualifies as a top-five question. In addition, the level of "I don't know" is 5% and considered to be low, which means that the knowledge regarding idea involvement among employees is high. Question number 4 is in theory linked back to the managerial area of Innovative Environment. In the theoretical framework, it became clear that every human being could find and solve complex problems and people involve in this in different ways. Most often, employee involvement results in incremental improvements related to existing products or services in the company (Tidd & Bessant, 2009). Based upon this theoretical reasoning, we argue that question number 4 is addressing the element of Employee Involvement. We conclude that the level of employee involvement is high when it comes to suggesting improvements to products or processes and therefore should be seen as a strength in ECI's innovative environment.

5.2.2 WEAKNESSES IN ECI´S INNOVATIVE ENVIRONMENT

The five individual questions with lowest mean value are displayed in Table 29. Each question will be analysed further in the coming paragraphs.

Table 29: Bottom five questions according to mean values

Nr.	Question	Mean	Percent "I don't know"	Managerial Area	Elements of Managerial Area
Q18	*Our organisation allows some space and time for people to explore 'wild' ideas*	**2,96**	(-)	Innovative Organisation	Creativity (space and time for ideas)
Q20	*We value people who are prepared to break the rules*	**3,03**	31%	Innovative Organisation	Creativity (reward system)
Q17	*We allocate a specific resource for exploring options at the edge of what we currently do – we don't load everyone up 100%*	**3,27**	(-)	Innovation Process	(-)
Q13	*We have reward systems to encourage people to offer their ideas*	**3,33**	33%	Innovative Organisation	Creativity (reward system)
Q22	*Experimentation is encouraged in our organisation*	**3,36**	(-)	Innovative Organisation	Top management commitment

Based on the mean value, question number 20 "**We value people who are prepared to break the rules**" indicates a weakness in ECI´s innovative environment. The formulation of the question however lacks a clear link to innovation and therefore leaves room for misinterpretation. The question can be interpreted as if ECI value people who break the rules in more general terms, which thereby measures something completely different than what we aimed for. Due to this situation it is hard to argue whether or not question number 20 actually represents a weakness in ECI. Therefore, this specific question will be excluded from our analysis.

Question number 18 "**Our organisation allows some space and time for people to explore 'wild' ideas**" and question number 13 "**We have reward systems to encourage people to offer their ideas**" both score low mean values: 2,96 respectively 3,33. While question number 18 does not have either a low or a high level of "I don't know" replies, question number 13 has a high level of "I don't know". In our point of view, this means that a large part of the respondents do not possess knowledge about if there are reward systems that encourage people to offer their ideas in ECI. Basically, around one third of the employees do not know about these matters and the ones who do, they assign a low score to the subject.

Common for these two questions is that they are connected, in theory, to the managerial area of Innovative Organisation. In the theoretical framework, it became clear that the level of creativity among employees is connected to the organisational climate, which can be influenced by reward and recognition systems (Tidd & Bessant, 2009). Question number 13 is addressing the presence of reward and recognition systems in ECI. Further, Tidd & Bessent (2009) argue that time and space for idea generation are important for creating a creative climate. This matter is addressed in question number 18. Based on this argumentation, these two questions can be connected to the element of Creativity. Concluding, the element of creativity can be considered a weakness in ECI´s innovative environment; the company seems to be lacking reward and recognition systems and little time and space are given for idea generation.

When looking at the answers from the open-ended questions, we could see that the matters of *Time* and *Reward Systems* were addressed frequently. The respondents indicated that if they are given time to be innovative, it will help them to come up with new ideas. Further, the respondents expressed that they are hindered to come up with new ideas if they have heavy workloads and thereby no time to be innovative. Lastly, *Time* is considered to be an improvement potential for ECI. The respondents ask for allocation of time to be innovative and one of the respondents stated: "*Limited manpower makes it difficult to set resources for idea-generation. Most people are 100% engaged in project work*". In terms of reward systems, it is addressed in two of the questions. The respondents' answers indicate a lack of reward systems in ECI today. In terms of how this hinders the employees in coming up with new ideas, one of the respondents state, "*Provide more information that new ideas are welcomed. Attract new ideas with some rewards which should be more clearly communicated to all employees*". Reward systems are also addressed as an area of improvement for ECI, where respondents express that ECI should reward ideas but also make sure that the employees are aware of that a reward system exists. Based on the previous reasoning, we can argue that the results from the open-ended questions support that reward and recognition systems as well as time and support for idea generation, which is linked to creativity, can be considered weaknesses in ECI´s innovative environment.

Question number 17 "***We allocate a specific resource for exploring options at the edge of what we currently do – we don't load everyone up 100%***" can also be found among the low scored mean values, accordingly 3,27. The level of "I don't know" is neither high nor low and is therefore not taken into account. In theory, this particular question can be linked to the managerial area of Innovation Process. According to Tidd & Bessant (2009) innovation can be seen as a process, the challenge for organisations is to find ways to mange the process and find a good solution to the problem of renewal. Further, all the steps in the process should have sufficient support, which can include a mix of different structures, procedures and processes. We interpret "allocating specific resources" as the tools, methods and techniques that are used to create structure within the search phase of the innovation process. Throughout the interviews with ECI, it became clear that this is an issue in the company as well. One example of this is when the Knowledge Manager argues that *"I think we need a process around [innovation], it is too 'person dependent', you know"* (Knowledge Manager, ECI).

The matter of having *sufficient processes* was evident in the open-ended questions as well. The respondents believe that frameworks that support idea generation such as workshops, brainstorming and other tools will help them to generate new ideas. Further, the respondents have comments on that the "Project Model" is unnecessary complicated, there is '*No one to talk to*' about where to announce ideas and the '*R&D department doesn't exist in reality*'. This is hindering the employees to come up with new ideas. In terms of how ECI can improve, the respondents ask for official processes that support idea generation such as organisational slack, workshops, brainstorming, work across department boundaries, idea competition, and a place to store and announce ideas. Basically, we can conclude that the lack of sufficient processes i.e. tools, methods and techniques to generate ideas, is confirmed in the open-ended questions as well. Based on the reasoning above, the Innovation Process can be considered as a weakness in terms of lacking the tools, methods and techniques to generate ideas.

Question number 22 "***Experimentation is encouraged in our organisation***" is assigned a low mean value, equalling 3,36. The level of "I don't know" is neither high nor low and is therefore not taken into account. This particular question is, in theory, linked to the managerial area of Innovative Organisation. In the theoretical framework it is expressed that the main challenge is to transform management's innovative visions into real activities that reflect management support, commitment and enthusiasm. Additionally, it is explained that management needs to be able to take risks in order to be successful in their innovation activities. Failure should not be considered as a negative thing, rather it should be thought of as an opportunity for learning and development. In an organisation with low acceptance of risk and failure, the employees find e.g. experimentation activities hard to take on (Tidd & Bessant, 2009). Based upon this theoretical reasoning we consider question number 22 to address the element of Top Management Commitment, which we conclude to be a weakness in ECI´s innovative environment.

Now, there might be a small confusion here since we already concluded that question number 1, employees believe that top management commits to and supports innovation in ECI, is a strength in their innovative environment. However, in our view question number 1 and 22 address two different things. It is clear from the reasoning around question number 1 that there is top management commitment for innovation in ECI, in terms of including innovation in the strategy process. Question number 22 also addresses top management commitment but in the sense of what actually has been implemented from the strategy and is used in the company today. So even if top management is supporting innovation in ECI, the strategic visions are not translated into something real, such as mechanisms or processes for experimentation leading to idea generation. Thus, this and the reasoning above indicate that the element of top management commitment should be treated as a weakness in ECI´s innovative environment.

In the open-ended questions the subject of *management support* was addressed. In order to get help with generating new ideas, the respondents emphasise supportive coaching, guidance and capability to take decisions, and listening to the ideas from management. Managers that are not willing to listen to or support new ideas are considered to be hindering the generation of new ideas according to the respondents. Further, the respondents indicate that management support can be improved by ECI. By dedicating resources, encourage risk taking and accept failure when generating new ideas the respondents believe the generation of ideas can become better. Thus, the open-ended replies support the notion of top management commitment being treated as a weakness in ECI´s innovative environment.

5.2.3 SUMMARY STRENGTHS AND WEAKNESSES

ECI´s innovative environment was analysed in the previous sections. We can conclude that none of the managerial areas of the innovative environment, as a whole, can be pointed out as a strength or weakness. When analysing the individual questions, however, it became clear that the managerial area of Innovative Organisation was represented in both the strengths and the weaknesses. Accordingly, ECI are handling some elements within this area better than others, which are reflected in their strengths and weaknesses.

Based on our analysis, the main strengths and weaknesses of the innovative environment are presented in Table 30:

Table 30: Strengths and weaknesses of ECI´s innovative environment

Strengths	Weaknesses

Organisational structure • Work across departmental boundaries • Communication is considered good • ECI´s structure helps to take rapid decisions	***Creativity*** • Lack of reward systems as well as time and space for idea generation
Innovation Strategy • There is an understanding that an overall plan exists, which indicates top management commitment for innovation	***Innovation Process*** • Lack of sufficient structures and processes that support idea generation for example tools, methods and techniques
Employee involvement • Employees feel that they are involved in incremental improvements	***Top management commitment*** • The strategic visions are not translated into real activities, such as mechanisms or processes for idea generation

In the open-ended questions, the managerial areas Innovative Organisation and Innovation Process were addressed most frequently. Factors such as time, management support, reward system and sufficient processes were pointed out as something that helps, hinders or can be improved by ECI to support employees in their generation of ideas. Consequently, we can conclude that the results from the open-ended questions support the strengths and weaknesses identified through the closed questions.

Additionally, the level of "I don't know" replies can be considered high among the employees. This indicates that the knowledge regarding the innovative environment in ECI is quite low and one could question to what degree it exists at all. Concluding, the low level of awareness of the innovative environment in ECI is considered an overall weakness.

5.3 DISCUSSION

The analysis of the collective perspective addressed a number of tool-specific improvements that can help ECI generate more ideas. Thus, we could argue that we answered our research question already in that section. Yet, to gain a deeper understanding and get a more complete overview of ECI´s specific situation, we claim that the contextual perspective examined in the previous section has to be taken into account as well. This is consistent with theory and also with ECI´s intentions of creating an innovation culture where innovation is treated as a *"systematic, structured and managed approach"* (CTO, 2012). By discussing how the collective and contextual perspectives of successful innovation practice are interlinked, we will after this section be able to give a more comprehensive answer to our research question.

First however, we want to emphasise that the above analysis in our opinion reveals that ECI is still in the early stage of development when it comes to the search for new ideas. This can be justified with the findings claiming that the tools, methods and techniques aimed at idea generation are not yet fully institutionalised in ECI, and by the weaknesses identified, demonstrating that an innovative environment is under construction but not completely established thus far. The overall low level of awareness of the innovative environment identified through the observed "I don't know" replies strengthens this argument.

In the theoretical framework, three paradoxes involved in the management of idea generation were presented (Björk et al., 2010). To be successful in generating ideas, emphasis should be put on finding the right balance within each paradox. By investigating the balance in each paradox we will connect the collective and the contextual perspectives and address the overall improvement potentials with regard to idea generation in ECI.

Paradox 1: The reliance on formal and informal structuring and process
This paradox addresses the difficulty of finding the right balance of formalisation in the search for ideas (Björk et al., 2010). In our analysis of the innovative environment in ECI, the managerial area of Innovation Process came out as a weakness. Accordingly, this indicates that there is a lack of structures and processes that support innovation in ECI, which points to a more informal structuring. The risks involved in informal structures are according to theory that idea generation easily can become inefficient or organisations can lose control of what they are doing (Björk et al., 2010). The informal structure was also evident in the open-ended questions: the lack of sufficient possesses were considered to hinder the employees to come up with ideas in ECI and was further addressed as an improvement potential.

Considering the specific tools, methods and techniques we argue that innovation networks, technology roadmaps and idea meetings are organised in an informal way with regard to idea generation while there are more formalised processes around the longer workshop (i.e. the Arctic workshop organised) and the AIS. Innovation networks, technology roadmaps and idea meetings are considered informal because idea generation is regarded as a side effect rather than being included in the main purpose of the tools. This points to inefficient idea generation. Accordingly, we consider ECI to rely mostly on informal structures and processes when it comes to idea generation. Taking into account that ECI is still in the early stage of developing search strategies, and knowing that they have not spent a lot of time on structuring their processes up until now, this conclusion is expected.

In ECI's CTO Strategy Document it becomes clear that they want to work with innovation in a more structured and systematic way. In other words, the strength identified in terms of Innovation Strategy is evident. However, since the strategy document is still awaiting approval, little action in reality appears to be the result. In our view this is reflected in the weakness "top management commitment" discovered in our audit. So far, strategy has not been transferred into action, which indicates a clear improvement potential. To conclude, more formal structures and processes are needed in ECI to facilitate the efficient generation of new ideas internally. The Arctic workshop is a good example of a formalised tool built up around a proper process and consequently considered successful; to make it happen, time and sufficient resources were required. It should be noted, however, that too formalised processes could lead to negative effects (Björk et al., 2010), but at the moment this is nothing to worry about in ECI.

Paradox 2: Direction of freedom in the search for new ideas
If there is too much direction in the search for new ideas, the search becomes narrow and potential ideas that lay outside the focus area can be missed. If the search entails too much freedom on the other hand, useful ideas may be hard to find (Björk et al., 2010). This challenge is connected to the previous paradox and since ECI seems to lack structures and processes for idea generation, we argue that it is difficult for ECI to have a clear direction in their search activities. In the analysis of the tools, methods and techniques it became clear that innovation networks (cross-functional teams and communities of practice) and technology roadmaps are tools that can be used to generate ideas, but at the moment there is a lack of focus on idea generation in them. This is in our view connected to the fact that ECI works in a project-based manner, which leads to very specific problem definitions that do not naturally open up for idea generation. In order to improve these tools, a clearer focus on idea generation is needed and idea generation needs to be integrated in the purpose and operating process of the tools. In the tools that ECI use specifically for idea generation today, there seems to be too much blue sky in the search, both in the AIS and the idea meetings, while a good balance has been achieved in the longer workshop. In general however, we argue that there is too much freedom in the search activities due to the lack of formal processes and the lack of a clear focus on idea generation. We thereby conclude that ECI needs more direction in their search activities in order to generate more ideas.

Paradox 3: The level of involvement of all parts in the company or not
This paradox addresses whether or not to use a company-wide idea generation system. Organisational Structure is one of the strengths identified in ECI's innovative environment, which points out that communication is good, there is smooth information flow and it is possible to make rapid decisions.

Consequently, we argue that communication works well across the organisation and therefore we suggest that cross-functional teams could be useful to use in the search for new ideas. Another strength recognised in ECI is Employee Involvement. The employees are involved in improving the processes and services within ECI and they contribute with incremental innovations. Based on the findings that the employees want to be involved in development of products and services, and that the organisational structure is favourable, we argue that there is room for a company wide search tool that involves all the employees in ECI. Further, in the CTO Strategy Document it becomes clear that ECI wants to create an innovation culture; including the whole company in the search for new ideas can be helpful in this sense. Björk et al. (2010) argue that a company-wide system can become too formalised, and in this way have negative effects on the idea generation results. This risk however is considered small in the case of ECI since the company relies mostly on informal structures today. That said, it is something that ECI should keep in mind.

At the moment there is no idea generation tool that involves all the employees in ECI. Knowledge Forum has potential of becoming a future company wide idea generation tool, but in comparison to Company A and Company B we believe that a lack of focus on idea generation is evident in this social network. Company A's social network, STAR, is challenge-driven and relies on every employee to generate ideas in their specific work area. In Company B, they use Innovation Jams to involve all employees and affect the innovation climate in the organisation. To us it is clear that Company A and Company B have an idea generation focus in these company wide tools, which is not evident in ECI.

In the theoretical framework it is stated that to make idea generation across the company work, time needs to be put aside for these activities (Björk et al., 2010). Creativity, in terms of time and space for ideas, has been identified as a weakness in ECI´s innovative environment. This is supported by the answers to the open-ended questions where the lack of time was addressed to hinder the employees in generating new ideas. Further, the respondents also addressed time as an improvement potential for ECI. Overall, we argue that the lack of time seems to be a general problem in ECI.

The theory also addresses that idea generation is hard to trigger through hierarchical power. Instead other incentives should be used (Björk et al., 2010). Company B has for example a reward system connected to their jam activities in order to inspire the employees to get involved in idea generation. In terms of creativity, reward systems were identified as a weakness in ECI´s innovative environment. This was also supported by the open-ended questions, which addressed the lack of a reward system as both a hindrance to idea generation and as an improvement potential for ECI.

To conclude, ECI would in our view benefit from using a company wide tool since this is a way to involve all the employees in generating ideas as well as a way that can influence the innovation culture in the company. To succeed with a company wide search tool, time needs to be put aside and a reward system needs to be created to enable and inspire the employees to participate in the generation of new ideas.

6. Conclusion

The aim of this chapter is to answer our research questions by summarising and discussing the conclusions drawn from our research. This will lead to a recommendation for ECI and subsequently the implications of our study for future research will be explored.

The objective of this thesis was to study internal idea generation practices and in this way help ECI improve their own ways of generating new ideas within the company. In order to do this, a mapping and evaluation of the tools, methods and techniques enabling internal idea generation was called for, as well as an investigation of the strengths and weaknesses of ECI' innovative environment.

Our main research question was:

How can ECI improve their ways of generating new ideas internally?

This question was guided by the sub-question:

What are the strengths and weaknesses in ECI's innovative environment?

The main research question was to a large extent answered by addressing the *collective* perspective of successful innovation. More specifically, the tools, methods and techniques enabling internal idea generation were examined and a number of tool-specific improvements were identified in ECI. Based on their usage in the organisation, the tools, methods and techniques can be divided into three categories, and we conclude that their main improvement potentials in terms of idea generation are the following:

1. Tools, methods and techniques used specifically for idea generation

Innovation Workshops: The structure and direction present in the longer workshops initiated by top management should be transferred to the shorter idea meetings at the BA level.

Annual Idea Search: A process should be established around this tool in order to make the search for new ideas more focused on specific challenges.

2. Tools, methods and techniques used, but lacking an idea generation focus

Internal Innovation Networks: Idea generation should be included in the defined purpose of the networks and an expressed part of their core operating processes.

Technology Roadmaps: The focus should be widened to include idea generation; ECI can generate ideas by either using roadmaps to support virtual innovation and/or engage in technology roadmap integration.

3. Tools, methods and techniques not used today, but a possibility for the future

Innovation Jams: If ECI wants a flexible, online brainstorming tool involving the whole organisation for a specific time period, this tool should be used.

Corporate Entrepreneurship: If ECI desires techniques that are continuous, integrated in the everyday working life and over time becomes part of the organisational culture, organisational slack or skunk work should be used.

The sub-question addressing the strengths and weaknesses in ECI's innovative environment was answered by applying the *contextual* perspective of successful innovation. We conclude that:

- The **strengths** in ECI's innovative environment compromise their organisational structure, the existence of an innovation strategy, and the high degree of employee involvement.

- The **weaknesses** in ECI´s innovative environment include the lack of a reward system as well as time and space for idea generation, the insufficient innovation processes, and the limited top management commitment in terms of transferring strategy into action. In addition, we consider the low level of awareness of the innovative environment in ECI as an overall weakness.

By integrating the results obtained through the collective and the contextual perspectives we acquired a more comprehensive picture of ECI´s situation. In general, we conclude that ECI can improve their ways of generating new ideas internally by:

- Implementing more formal structures and processes in their search activities.
- Focusing more on direction in the search activities once the structures and processes are up and running.
- Putting aside more time for idea generation, while at the same time involving all the employees in the search activities to make innovation a part of the organisational culture.

Our overall conclusion implies that a cohesive set of success routines in the search activities are still to be established in ECI. This can be explained by the fact that ECI is in the early stage of development when it comes to institutionalising their tools, methods and techniques aimed at idea generation, and developing an environment that facilitates innovative thinking. In some tools, such as innovation workshops, processes are in place and a clear direction in the search exists, while in others, such as innovation networks, search routines are more or less absent. Likewise, some elements of the innovative environment are better facilitated and handled than others; the existence of an innovation strategy indicating a clear plan for the future is but one example. ECI are in other words doing a lot of things right with regard to innovation, but there is still a way to go.

The development of successful search routines will take time and only comes through experience. Although it is possible to learn from other companies' trials and errors, routines are firm specific and must be learned over time, while simultaneously updated on a regular basis. In the development of these routines, a supportive innovative environment thus plays a crucial role (Tidd & Bessant, 2009). In sum ECI needs to keep on testing and improving their tools, methods and techniques in order to discover the specific practices that fit them and their particular situation the best. The next section provides ECI with our recommendation in this regard.

6.1 RECOMMENDATION

This thesis has presented several implications for management that should be taken into account in order to improve ECI´s ways of generating new ideas internally. In this section we will, based on ECI´s specific situation, provide a recommendation for the company. As a means to come up with this recommendation, we asked ourselves the following two questions: (1) *what does ECI need to do less of, or stop?* and (2) *what does ECI need to do more of, i.e. strengthen?,* in order to improve their ways of generating new ideas internally.

To start with the first question, we recommend ECI to prioritise some of the search practices, and let go of the others in the short run. Our research has provided the company with the tools, methods and techniques that *can* be used to generate ideas internally, but this does not necessarily mean that all search activities presented should ideally be used. This turns back to the concluding remark that ECI has to find the tools, methods and techniques that suit the company the best in their specific situation. We know by now that ECI is still in the early phase of developing routines with regard to idea search and establishing a supportive innovative environment. In our opinion it is therefore obvious that ECI cannot search everywhere, but rather should focus their search to a limited set of practices that eventually can lead to successful routines.

Thus, turning to question number two we advise ECI in the short run to strengthen their two tools specifically aimed at idea generation, i.e. innovation workshops and the AIS, while at the same time further advancing the online network, Knowledge Forum, by making idea generation an integrated and essential part of this tool. ECI´s future plan of assessing all the internal tools, methods and techniques that exist in the company in a broader idea generating perspective should consequently not be a main priority at the moment. The argumentation for focusing on improving in particular innovation workshops, Knowledge Forum and the AIS follows below.

First of all, we recommend ECI to continue to run innovation workshops, which is their main tool for generating ideas. Although they have different experiences with this tool, the one longer workshop on Arctic technology organised in January 2013 appears to be the start of something new. Being a corporate initiative, ECI clearly invested time and resources into arranging this workshop; an external facilitator was hired, participants were chosen with care, and the scope was narrowed down to avoid too much blue sky, among other things. We recommend that the learning obtained in this workshop should be further developed in the future, leading to cross BA innovation workshops being run on a yearly basis. Additionally, we advise ECI to put increased focus on developing this type of workshop on the BA level. The shorter idea meetings proved ineffective in our analysis; thus, if success routines across the entire company are to be established in this tool, BA commitment is a requirement. This however calls for top management support; structured processes must be developed on paper, but most importantly they must be put into action and become an integrated part of "the way things are done around here". The latter should be regarded as a long-term goal.

While innovation workshops are a favourable face-to-face search tool, it does not involve all the employees in the organisation. Our audit revealed that employees in ECI communicate well and work well across departmental boundaries. This is something ECI should use to their advantage. In line with ECI´s long-term desire to develop an innovation culture embracing the whole company, we therefore recommend ECI to further advance the online network, Knowledge Forum. This network makes it possible for all the employees on a company-wide basis to contribute with their ideas and challenges. Yet, as of today, the network is constructed primarily to facilitate knowledge exchange and idea generation is regarded an indirect goal for the future. In accordance with the social network STAR studied in Company A, however, we suggest that ECI should provide a clearer plan with regard to idea generation in Knowledge Forum. Idea generation should in our view become a defined purpose of the network and not just an encouraged side effect. Taking STAR as an example, we thus recommend ECI to establish an idea generation function in Knowledge Forum based upon a proper structure.

Our more concrete suggestion in this regard, is to integrate the AIS in the planned idea portal, which we argue should be incorporated in Knowledge Forum. Through our analysis it became clear that the AIS and the intended idea portal have many similarities. Yet, the idea portal is intended to be a continuous, web-based tool available to all employees, while the AIS today is BA-specific and executed once a year. In our view, all the functions of the AIS can be performed through the idea portal. Moreover, the idea portal should be integrated in Knowledge Forum in order to take advantage of the Enterprise 2.0 technologies, which make idea generation easier and is deemed to be the future. In this way, both the AIS and the idea portal will in our opinion be fully utilized. A suggestion for the future, again taking STAR as an example, is to implement a "hosting function" in Knowledge Forum, which would make it possible to e.g. run innovation jams on a regular basis. In sum, we recommend ECI to invest time and resources into making Knowledge Forum as well functioning as possible. If an innovation culture is the long-term aim, all employees should be included and have the possibility to contribute in the search activities – and Knowledge Forum is in our view a good place to do it.

To make it happen however requires more than just the infrastructure around Knowledge Forum. Based on our results, we advise ECI to create a reward system as soon as possible that inspires employees to participate in idea generation. Both theory and empirical findings from Company B suggest these rewards to be non-monetary and we concur with this view. Additionally, we recommend ECI to allocate more time

and space for search activities. Even though we expect this as a long-term result of more structured idea generating processes, a possibility is to incorporate organisational slack in the everyday work and make it part of the organisational culture. To get started we therefore advise ECI to run a pilot, where they actually test this technique on a selected part of the organisation. This is in our view the only way to see if the method fits ECI or not.

To conclude, ECI can improve their ways of generating new ideas internally by following the recommendations above. Yet, the willingness and commitment from top management is crucial for any of the improvement potentials suggested in this thesis to be realised. Even if clear strategic goals support the innovative activities in the company they have to be transformed into action; our final recommendation is therefore that top management continuously, and on a long term basis, should focus on how they best can make innovation happen.

6.2 FUTURE RESEARCH

During this research, some observations have been made that calls for future research. While our study was limited to internal idea generation, it would be interesting to investigate external search strategies that ECI can use, and more specifically the concept of open innovation. Increasingly, organisations have started to recognise that that they should open up the innovation search game to the external world since "not all smart guys work for us" (Bessant & Tidd, 2011). P&G is one example of a large company that has been rethinking their search strategies for many years, while Statoil more recently opened their innovation process to the external world by launching an open innovation portal. We believe that an exploration of external search strategies would help ECI to keep track of and access external knowledge in the future, and that such an investigation overall would add value to the company´s ways of generating new ideas. Although we know that ECI has touched upon this issue already, further research is needed to understand the opportunities of open innovation.

In this study it was assumed that the employees in ECI possess the individual attributes needed for succeeding with innovative activities. Just as we have examined the collective and contextual perspective of successful innovation practice, it would in our opinion, add value to the research if the individual perspective was investigated in the same way, e.g. through a questionnaire. Such a future research would offer a deeper understanding of ECI and hence give an even more comprehensive answer to our research question. Even if the investigation would confirm that the employees of ECI do possess the necessary individual attributes, the results obtained would undoubtedly also provide ECI with specific improvement potentials – not just in relation to their search activities but also in their general practice of innovation.

Furthermore, we believe that an additional number of multiple case studies would add value to and complement our findings. With focus on search strategies, such a study would allow us to group and compare companies from different industries according to their tools, methods and techniques used to generate ideas internally. This would provide a broader and more general picture of how organisations search for ideas. Consequently, it would be possible to discover "best practice tools", and determine overall, and empirically based, success factors and challenges. In this way ECI could to a larger extent learn from other companies' trials and errors, although the firm-specific routines would still have to be developed and learned inside the organisation.

Lastly, while our study was limited to the search stage of the innovation process, a natural future research would be to investigate the improvement potentials in the remaining stages of this process. Although not within our scope, our research indicated that great challenges exist in the select-, implement- and capture stage. As in the search stage, it would be interesting to compare ECI to the practices of other organisations. Additionally, a further research into these stages could possibly point out other areas of the innovative environment as more important than the ones we identified in the search phase. The turning of ideas into practical use is in other words an area that calls for further investigation in ECI.

7. Reference List

Anderson, S.P., 2011. *Problems with Innovation Workshops: Eight key pitfalls to avoid.* [Online] Available at: http://uxmag.com/articles/problems-with-innovation-workshops#.UXVatkXAKeI.email [Accessed 15 April 2013].

Assink, M., 2006. Inhibitors of disruptive innovation capability: a conceptual model. *European Journal of Innovation Management*, pp.215-33.

Augsdorfer, P., 2005. Bootlegging and path dependancy. *Research Policy* , 34, pp.1-11.

Bel, R., 2013. Innovation: Misconceptions, Trends and Directions. *Global Business and Organizational Exellence*, 32(2), pp.71-87.

Bessant, J., 2009. *The British Chamber of Commerse.* [Online] University of Exter, UK Available at: http://www.britcham.com/sites/britcham/files/Managing%20Innovation%20by%20Prof%20John%20B essant.pdf [Accessed 30 May 2013].

Bessant, J. & Tidd, J., 2011. *Innovation anf Entrepreneurship*. 2nd ed. West Sussex, UK: John Wiley & Sons Ltd.

Bessant, J. & von Stamm, B., 2007. *Twelve search strategies that could save your organisation*. London: Advanced Institute of Management Research Executive Briefing.

Birkinshaw, J., Bouquet, C. & Barsoux, J.-L., 2011. The 5 Myths of Innovation. *MIT Sloan Management Review, Sloanselect Collection Winter*, pp.1-8.

Björk, J., Boccardelli, P. & Magnusson, M., 2010. Ideation capabilities for continuous innovation. *Blackwell Publishing Ltd*, 19(4), pp.385- 396.

Bjelland, O.M. & Chapman Wood, R., 2008. An Inside View of IBM's 'Innovation Jam'. *MIT Sloan Management Review*, 50(1), pp.32-40.

Bryman, A. & Bell, E., 2011. *Business Research Methods*. 3rd ed. Oxford: Oxford University Press.

Cook, N., 2008. *Enterprise 2.0: How social software will change the future of work*. London: Gower.

CTO, 2012. *CTO Strategy Document.* Memo. Oslo: ECI.

Dearstyne, B.W., 2007. Blogs, Mashups, & Wikis: Oh, My!. *Information Management Journal* , pp.25-33.

Dodgson, M., Gann, D. & Salter, A., 2008. *The Management of Technological Innovation, Strategy and Practice*. 1st ed. New York: Oxford University Press.

ECI, 2013. *ECI Intranet.* [Online] [Accessed 14 April 2013].

Fosfuri, A. & Rönde, T., 2009. Leveraging resistance to change and the skunk works model of innovation. *Journal of Economic Behaviour & Organization*, 72, pp.274-89.

Geschka, H., 1986. Creativity Workshops in Product Innovation. *Journal of Product Innovation Management*, pp.48-56.

Hair, J.J.F., Black, W.C., Babin, B.J. & Anderson, R.E., 2010. *Multivariate Data Analysis: A Global Perspective*. 7th ed. New Jersey: Pearson Education Inc.

Katila, R. & Ahuja, G., 2002. Something Old, Something New: A Longitudinal Study of Search Behaviour and New Product Development. *Academy of Management Journal* , December. pp.1183-94.

Kim, J. & Wilemon, D., 2002. Strategic issues in managing innovation´s fuzzy front-end. *European Journal of Innovation Management* , pp.27-39.

Lave, J. & Wenger, E., 1991. *Situated Learning: Legitimate Peripheral Participation*. Cambridge: Cambridge University Press.

Leonard, D. & Sensiper, S., 1998. The role of tacit knowledge in group innovation. *Calefornia Management Review*, pp.112-32.

Matthaei, E.E. & Andreas, J.M., 2007. Search Strategies for Discontinuous Innovation: Theoretical Findings and Practical Relevance. In *Proceedings of the European Academy of Management (EURAM) 2007 Annual Conference*. Paris, 2007.

McAfee, A.P., 2006. Enterprise 2.0: The Dawn of Emergent Collaboration. *MIT Sloan Management Review*, Spring. pp.21-28.

McAfee, A.P., 2009. *Enterprise 2.0: New collaborative tools for your organization´s toughest challenges*. Boston.

Nohria, N. & Gulati, R., 1996. Is slack good or bad for innovation? *The Academy of Management Journal*, 39(5), pp.1245-64.

Nonaka, I., 1994. A Dynamic Theory of Organizational Knowledge Creation. *Organization Science*, February. pp.14-37.

O'Connor, G., Leifer, R., Paulson, A. & Peters, L., 2008. *Grabbing Lightning. Building a Capability for Breakthrough Innovation.* San Francisco: John Wiley & Sons, Inc.

Phaal, R., Farrukh, C.J.P. & Probert, D.R., 2004. Technology roadmapping - A planning framework for evolution and revolution. *Technological Forecasting & Social Change*, 71, pp.5-26.

Porter, M., 1990. *The Competitive Advantage of Nations*. London: Macmillan.

Rabes, K., 2010. *Innovation Lab*. [Online] Available at: http://innovation-lab.org/explore-innovation-1 [Accessed 20 February 2013].

Rhodes, J.D. & Thame, S., 1988. Accelerating Innovation Through Real-time Workshops. *Long Range Planning*, pp.41-46.

Rinne, M., 2004. Technology roadmaps: Infrstructure for innovation. *Technological Forescasting & Social Change*, 71, pp.67-80.

Sapsed, J. et al., 2002. Teamworking and knowledge management: a review of converging themes. *International Journal of Management Reviews*, pp.71-85.

Saunders, Lewis & Thornhill, 2007. *Research Methods for Business Students*. 4th ed. Pearson Education Limited.

Single, A. & Spurgeon, W., 1996. Creating and commercializing innovation inside a skunk works. *Reserach Technology Management*, 39(1).

Swan, J., Newell, S., Scarbrough, H. & Hislop, D., 1999. Knowledge management and innovation: networks and networking. *Journal of Knowledge Management*, pp.262-75.

Tidd, J. & Bessant, J., 2009. *Managing Innovation: Integrating Technological, Market and Organizational Change*. 4th ed. West Sussex: John Wiley & Sons, Ltd.

Van de Ven, A. & Engleman, R., 2004. Central problems in managing corporate innovation and entrepreneurship. In *Advances in Entrepreneurship, Firm Emergence and Growth*. 7th ed. Elsevier Ltd. pp.47-72.

Wenger, A., 2006. *Communities of Practice - a brief introduction*. [Online] (1) Available at: http://www.ewenger.com/theory/index.htm [Accessed 9 April 2013].
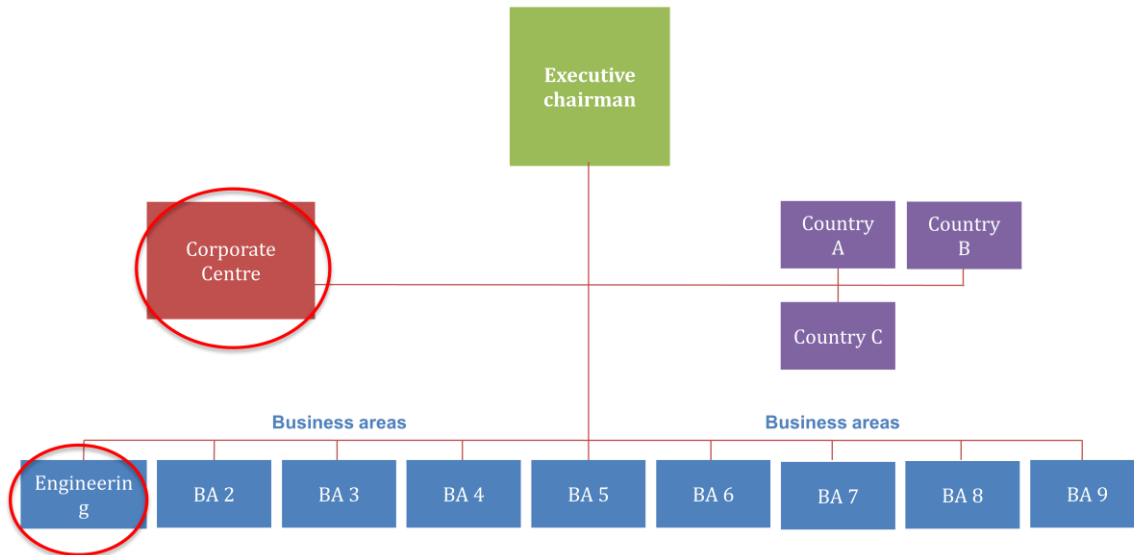
Wenger, E.C. & Snyder, W.M., 2000. Communities of Practice: The Organizational Frontier. *Hardvard Business Review*, January-February. pp.139-45.

Yin, R., 2009. *Case study research: Design and Methods, Applied Social Research Methods Series*. London: Sage Publications.

8. Appendixes

ECI's Management Structure

When conducting semi-structured interviews we used the interview guideline below. The questions were not followed strictly, but rather served as a guide and was adjusted to the interviewees, their role and the companies they represented.

GENERAL QUESTIONS

1. What has been done within the organisation in relation to identifying opportunities for innovation (idea generation)?
2. Which tools, methods and/or techniques do you use within your organisation and which of these are most important?
3. Why have you chosen to implement this combination of tools, method and/or techniques?
4. Have you defined a strategic aim in connection to these tools, methods and/or techniques, and if so which?
5. How have you implemented the tools, methods and/or techniques within the organisation, top-down or bottom-up?
6. What have you learned from the implementation of the different tools? Success factors and challenges?
7. How do you measure the success of the tools, methods and/or techniques?
8. Do you have any concrete plans for implementing new tools, methods and/or techniques in the near future?

TOOL SPECIFIC QUESTIONS

1. What are the advantages and disadvantages with this tool/method/technique?
2. What is the strategy behind using this exact tool/method/technique?
3. How long have you been using this tool/method/technique?
4. Which results have you obtained by using this tool?
5. How useful do you find the tool/method/technique?

QUESTIONS TO PARTICIPANTS IN SPECIFIC TOOLS

1. Can you explain the process briefly?
2. Who was responsible for conducting this tool/method?
3. What do you think about the setting?
4. Do you think that this kind of tool/method helped in identifying opportunities for future innovations?
5. What were the pros and cons with this kind of tool/method in terms of generation ideas?
6. What do you think are the success factors and challenges connected to this tool/method?
7. What were the results?
8. Who were the other participants?

APPENDIX C. AUDIT QUESTIONS

The following statements were used in the Innovation Audit conducted in ECI.

DEMOGRAPHIC QUESTIONS
- Gender
- Age (optional)
- Highest level of education
- Department affiliation
- Current title or position in ECI
- How many years you have worked in ECI, as a consultant or employee
- Amount of time you have been in your current position

CLOSED QUESTIONS

Nr	Question	Managerial Area
1	We have top management commitment and support for innovation.	Innovation Strategy
2	We have processes in place to help us manage new product development effectively from idea to launch.	Innovation Process
3	People work well together across departmental boundaries in our organisation.	Innovative Organisation
4	People are involved in suggesting ideas for improvements to products or processes.	Innovative Organisation
5	We are good at capturing what we have learned so that others in the organisation can make use of it.	Learning

6	We deploy 'probe and learn' approaches to explore new directions in technologies and markets.	Innovation Strategy
7	We systematically search for new product ideas.	Innovation Process
8	Our organisational structure helps us to take decisions rapidly.	Innovative Organisation
9	Communication is effective and works top-down, bottom-up and across the organization.	Innovative Organisation
10	We make regular use of formal tools and techniques to help us think 'out of the box'.	Learning
11	We have mechanisms for managing ideas that don't fit our current business – for example we license them out or spin them off.	Innovation Strategy
12	We actively explore the future, making use of tools and techniques like scenarios and foresight.	Innovation Process
13	Our reward and recognition system supports innovation.	Innovative Organisation
14	We have a supportive climate for new ideas – people don't have to leave the organization to make them happen.	Innovative Organisation
15	We create an atmosphere where people can share ideas through cross-fertilization.	Learning
16	There is sufficient flexibility in our system for product development to allow small 'fast track' projects to happen.	Innovation Strategy
17	We allocate a specific resource for exploring options at the edge of what we currently do – we don't load everyone up 100%.	Innovation Process
18	Our organization allows some space and time for people to explore 'wild' ideas.	Innovative Organisation
19	We have mechanisms to identify and encourage 'intrapreneurship' – if people have a good idea they don't have to leave the company to make it happen.	Innovation Process
20	We value people who are prepared to break the rules.	Innovative Organisation
21	Peer pressure creates a positive tension and creates an atmosphere to be creative.	Innovative Organisation
22	Experimentation is encouraged in our organisation.	Innovative Organisation

OPEN-ENDED QUESTIONS

- What is most helpful and supportive to you in order to come up with new ideas at work?
- What in your work environment is hindering you in coming up with new ideas?
- What specific actions can ECI take to improve the environment for idea-generation?

RELIABILITY TEST: INNOVATIVE ORGANISATION

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,866	,869	10

Inter-Item Correlation Matrix

	Q3ORG	Q4ORG	Q8ORG	Q9ORG	Q12ORG	Q13ORG	Q17ORG	Q19ORG
Q3ORG	1,000	,391	,418	,561	,195	,325	,305	,202
Q4ORG	,391	1,000	,575	,488	,242	,447	,410	,264
Q8ORG	,418	,575	1,000	,627	,229	,574	,511	,250
Q9ORG	,561	,488	,627	1,000	,272	,483	,430	,301
Q12ORG	,195	,242	,229	,272	1,000	,388	,538	,286
Q13ORG	,325	,447	,574	,483	,388	1,000	,567	,323
Q17ORG	,305	,410	,511	,430	,538	,567	1,000	,466
Q19ORG	,202	,264	,250	,301	,286	,323	,466	1,000
Q20ORG	,189	,333	,447	,358	,329	,540	,508	,356
Q21ORG	,187	,439	,439	,314	,371	,414	,685	,52

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q3ORG	32,43	99,791	,432	,345	,864
Q4ORG	33,02	95,200	,574	,417	,854
Q8ORG	33,19	93,774	,663	,579	,847
Q9ORG	32,85	95,196	,619	,532	,851
Q12ORG	34,94	93,825	,461	,318	,865
Q13ORG	33,78	88,991	,673	,502	,845
Q17ORG	34,55	88,822	,742	,643	,839
Q19ORG	34,43	97,315	,478	,326	,861
Q20ORG	34,12	90,985	,576	,389	,854
Q21ORG	34,18	94,701	,633	,566	,850

RELIABILITY TEST: INNOVATION STRATEGY

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,649	,659	3

Inter-Item Correlation Matrix

	Q1STRAT	Q6STRAT	Q15STRAT
Q1STRAT	1,000	,438	,335
Q6STRAT	,438	1,000	,404
Q15STRAT	,335	,404	1,000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q1STRAT	8,12	6,948	,457	,222	,571
Q6STRAT	8,17	8,738	,516	,266	,499
Q15STRAT	8,47	8,326	,429	,194	,593

RELIABILITY TEST: INNOVATION PROCESS

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,794	,797	5

Inter-Item Correlation Matrix

	Q2PROCESS	Q7PROCESS	Q11PROCESS	Q16PROCESS	Q18PROCESS
Q2PROCESS	1,000	,501	,424	,364	,420
Q7PROCESS	,501	1,000	,487	,351	,492
Q11PROCESS	,424	,487	1,000	,452	,409
Q16PROCESS	,364	,351	,452	1,000	,501
Q18PROCESS	,420	,492	,409	,501	1,000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q2PROCESS	14,21	32,100	,559	,326	,760
Q7PROCESS	14,34	31,405	,606	,398	,744
Q11PROCESS	13,57	35,581	,580	,351	,758
Q16PROCESS	14,47	34,012	,540	,333	,765
Q18PROCESS	14,83	30,159	,604	,383	,746

RELIABILITY TEST: LEARNING

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
,706	,712	3

Inter-Item Correlation Matrix

	Q5LEARN	Q10LEARN	Q14LEARN
Q5LEARN	1,000	,401	,527
Q10LEARN	,401	1,000	,428
Q14LEARN	,527	,428	1,000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q5LEARN	7,84	7,307	,541	,315	,593
Q10LEARN	8,44	7,445	,473	,226	,686
Q14LEARN	7,52	8,129	,569	,333	,572