How to Facilitate Innovation within the Supply Chain of a large manufacturing firm

A Case study at Sandvik Machining Solutions

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Abstract

**Background:**
The Supply Chain department at the division Sandvik Machining Solutions within Sandvik AB have found a need of introducing a process for managing innovation within the organization in order to gain competitive advantages and to stay on the leading edge in their field.

**Research Questions:**
1. How can a generic model for managing innovation within the supply chain look like?
2. How can an innovation process be configured and managed in order to create and manage new ideas in the supply chain?

**Methodology:**
An exploratory case study approach to answer the research questions has been conducted in order to develop a model for innovation management within a supply chain of large manufacturing firm. The data collection methods have been interviews and from internal documentation. The interviews have been conducted with managers at Sandvik Machining Solutions within the SCM department, R&D department (innovation manager) and sales departments. The amount of correspondents has been no more than the amount 10 because of the empirical evidence it will result in otherwise and the time limit of this research. The fact that this is a case study, based on a single company, our findings will not be completely generalizable to other populations, but it can be generalizable to some extent if applied to similar companies and situations. To increase the validity of this research, the model could have been tested and evaluated.

**Findings and Results:**
The results showed that there is a need of becoming more innovative within the supply chain. Moreover, to get inputs through-out the organization we have also received significant information regarding e.g. the supply chain strategies, innovation and customer needs. These inputs have been analyzed in order to develop an innovation management process that will fit a supply chain department. The model also provides a structured approach to create and manage new ideas in within the Supply Chain.
1. Introduction

Today’s market environment stresses companies to find new innovative methods to gain competitive advantages. Sandvik Machining Solutions brand Coromant is recognized as one of the leading global firms within machining tools. Coromant is recognized worldwide for its leading edge technology in its field. Not only have they gained competitive advantages through innovative products and cutting edge technologies, but also through offers like 24-hour worldwide delivery, and explicit customer training in how to use their cutting tools in the most efficient way. However, the supply chain has not evolved in the same pace regarding developments and innovation within the chain as the Research & Development department (R&D) has concerning the products. Hence, innovation does not only imply products, but also e.g. services and methods. The rather “radical” innovation that the supply chain introduced a long time ago concerning the 24-hour deliveries service, is nowadays not only unique to Coromant, thus many of their competitors are offering close to the same services. Other threats and challenges amongst the competitors are “good-enough” products that could be sufficient for the customers. To maintain their position as a world leader will require them to stay one step ahead to its competitors. Today, the R&D department at Coromant has their own innovation department consisting of models, processes and visions to manage innovation. However, they are limited to manage innovation of products or processes associated with the products. Consequently, there is a need for the supply chain management department (SCM) to develop their own model for managing innovation within the supply chain. According to the literature, as stated above, product innovation should not be done alone within the product development department, simultaneously as the supply chain is managed without structurally managing innovation. To synchronize and manage innovation on both areas will eventually prevent them of losing competitive advantages. Therefore, innovation management could be fortunate for the supply chain department. It has also shown that there is a knowledge gap regarding how innovation processes could be driven within the Supply Chain of a large manufacturing firm. Previous research has shown that most of the articles concern innovation towards product innovation and less on the logistics innovation. Researches are also often general focusing on e.g. knowledge sharing, continuous improvements and collaborations. This is not specifically what we have investigated since we are not looking at specific parts of the supply chain process, hence we are looking at an innovation model for the whole chain.

As Sandvik have innovation processes for the products and not for the supply chain will probably contribute to losing competitive advantages towards its competitors. So, it appears to be a need within SCM to develop ways to manage innovation (both incremental and radical) concerning the supply chain. A model for how the innovation management process could look like within the supply chain will be developed. The model consists of various stages where the first part involves the idea creation- and management whilst the later part involves the development and implementation of the idea. However, our research is focusing on the idea creation part as well as the idea management part. The later stages in the innovation process will not be analysed deeper since the case company already have a clear and well-established project management.
1.2 Purpose
The purpose of this paper is to develop a structured process to facilitate innovation within the supply chain of a large manufacturing firm.

1. How can a generic model for managing innovation within the supply chain look like?
2. How can an innovation process be configured and managed in order to create and manage new ideas in the supply chain?
2 Theoretical Framework

2.1 Previous research
Scientific articles treating how firms manage innovation have been addressed in our thesis. However, most of the articles about innovation often concern product innovation and less on logistics innovation (Flint, Larsson & Gammelgaard, 2005). Moreover, when seeking for with the terms “innovation management within the supply chain” and “continuous improvements in the supply chain”, very few or no articles with the main focus on how firms structurally can work with innovation management in the supply chain was found. Furthermore, most of the articles that was found are dealing with e.g. continuous improvement processes and having collaborative partnerships (Chapman & Corso, 2005). Hence, this is closely related to innovation management but not quite in line with what we aim to find in this thesis. Another search term was “supply chain innovation” as well as “innovation management in supply chain”. Here we found an article by e.g. Franks (2000) that deals with developments and changing supply chains. We also found an article by Ellram (1990) concerning third-party relationships and its benefits. Hence, this is not exactly in line with what we were looking for i.e. “an applicable model to structurally work with innovation management in the supply chain. Moreover, articles that deal with innovation in the supply chain in some way have been found, but not any articles that specifically concern the idea management aspect. Kim (2000) has also concluded that coordination of the supplier innovation between supplier and manufacturer is profitable for both parties.

However, after further searching with the keyword “logistics innovation”, an interesting article has been found. The article of Flint et al (2005) deals with logistic innovation with understanding of the dynamic customer value, market orientation and “new service development” compared to other articles that deal with product innovation. Flint et al (2005) differs from other articles since it is about “logistic innovation” and concerns the innovation management towards customer demands, gathering knowledge and sharing knowledge. Logistic innovation according to Flint is “As such, by logistics innovation, we mean any logistics related service from the basic to the complex that is seen as new and helpful to a particular focal audience” (Flint, 2005: p.114). For the management of an innovative organization Flint (2005) argues that “stages” could be considered for the approach of structurally creating innovations.

2.2 Supply Chain Management
The global market, customers with increasing demands as well as increased market volatility bring high pressures on companies’ supply chain. Interestingly, today's supply Chain Managers has shifted focus from seeing supply Chain Management (SCM) as activities for sourcing, procurement, operations and logistics activities management, to a definition based on demand fulfilment and creation (Jüttner & Christopher, 2013). Consequently, this implies that supply chain managers might need to work more collaboratively with other divisions in the company in order to obtain outside information and knowledge. Companies have started to focus more on business strategies than in the past and this has partwise contributed that the term “Innovation management” has evolved. From the beginning, logistics has been developed through the years and supply chain management (SCM) has emerged compared to back when logistic developments were the preliminary area to work with. Traditionally logistics
have been much about creating operational effectiveness. However, in recent years, many scholars argue that the role of logistics have shifted to become more strategical and a driver for growth and profitability within the firm (Sandberg & Abrahamsson, 2011). Thus, logistics has become a part of gaining competitive advantages for companies towards its competitors. Sandberg & Abrahamsson (2011) debate in their study that using a resource based view to look at the logistics on both operational and dynamic capabilities of two best practice companies in order to find out how they are building a sustainable competitive advantage through their logistics capabilities.

Sandberg & Abrahamsson (2011) conclude that it is the combination of efficient and standardized logistics processes as well as a well-functioning, in-house developed IT system that are the main operational capabilities and underlying their success. Increased market volatility will also increase the demand on the supply chain operations as well as the strategic operations within the organization. This puts “new” ideas like demand management in the spotlight as well as it makes scholars question how well suited for e.g. logistics and supply Chain Management are for this new business environment (Walters, 2008). In order to create superior customer value, many authors have studied the interrelationship between different functions, that not normally is associated with marketing within an organization. One of these functions is supply chain management, which has become an important priority in recent years. For instance, if a company has a strong supply chain that is not linked to the marketing department, it most likely will compete with price and availability. This is a common strategy with cheap generic providers. However, if a company wants to gain competitive advantages through something other than price and availability Jüttner & Christopher (2013) suggest that they need to align the market activities with the supply chain. Innovation however, has evolved due to the challenge in keeping up with the competitors and the aim to form approaches to meet customer expectations and demands. A rather modern and new strategy is term the “innovation management” where knowledge and ideas is seen as an approach and strategy (Flint, Larsson & Gammelgaard, 2008).

The trend of almost all markets nowadays is increased customization of products. These present new challenges for managing the supply chain. One way many companies try to solve this is by moving towards a demand chain. A demand chain is: “A demand chain is a supply chain that emphasizes market mediation to a greater degree than its role of ensuring efficient physical supply of the product” (De Treville, Shapiro & Hameri, 2004).

Supply chain management theories has however shown that just improving demand chain performance through the transfer of demand information will not make the supply chain more adaptable to market demands when the lead times are long. The extent that demand information is being transferred is also significant for accurate market mediation. Partial demand information in e.g. requires close customer-manufacturer collaboration. This information can also be quite hard to interpret in order to turn it into useful data. They also conclude that an improvement activity is more likely to be successful when the organization is focusing on one improvement activity rather than more at the same time. Producing companies with long lead times have often tied up capital and large stocks. Fawcett, Magnan & McCarter (2008) argue that how firms use and develop their resources, knowledge, information and skills during a change has direct effect on the performance. This approach needs to be well planned during change and the resources need to be utilized in the right way. The products on the markets are
constantly developing with new technologies and modernization which sets challenges and competition that forces companies to constantly develop its supply chains to become more responsive. As many firms are continuously innovating their products they should also consider other areas to be innovative in. Kuhn, & Gertsen (2006) argue that product innovation should not stand alone, as the only point of innovation within the organization. The firm need to be innovative in the whole business system including the supply chain. Further, all parts of the supply chain must work as efficiently as possible as it is the customer who in the end is the payer for the non-efficient supply chains. As many firms are continuously innovating their products they should also innovate in other areas, for instance the supply chain.

Supply chain innovation however could be beneficial for companies and a part to consider within its development strategies (Flint et al., 2005). The companies that will succeed best on the market are the ones that can utilize their sources and capabilities of the partners’ network. Halldorsson & Larsen (2004) argue that relationships can help companies to develop competences to gain competitive advantages. These relationships can enable parties to learn from each other. Many authors, e.g. (De Treville et al., 2004; Prajogo & Olhager, 2012) agree on the need for a more responsive integrated supply chains with increased information exchange in order to meet customer demand more efficiently. Moreover, creating this kind of supply chain (or demand chain as some authors name it) requires higher level of collaboration between the members in the supply chain. Furthermore, internal efforts regarding improvements like e.g. downsizing and quality management have shown gaining competitive advantages (Woodruff, 1997). However, they have also concluded that it is important look more externally and to understand the customer needs in order to gain even more benefits and competitive advantages.

2.3 Innovation management

The term innovation can be described as the creation and new ideas of a product, process or other parts of the business (Bessant & Tidd, 2007). A strategically flexible organization is described as the ability to develop new products, market approaches, processes, technologies, competencies, organization and management systems that can satisfy the customer needs for tomorrow. Further, they argue that continuous product innovation will not be enough to meet these needs. Companies need to develop something they call continuous innovation capability, which means, according to (Boer et al., 2006);

“To enable the effective, ongoing interaction between operations, incremental improvement and learning (exploitation processes), and radical innovation and change (exploration processes).”

To innovate in a business system means learning and changing the way of working at the company, hence it also entails risks and can become a large cost for the company if it's managed incorrectly (Bessant & Tidd 2014). Moreover, Bessant & Tidd (2014) argue that the profitability can decline simultaneously as the market is constantly developing. In that aspect, innovations are beneficial since the company is most likely keeping up with the market needs and can gain competitive advantages against its suppliers.
To conduct investments, having R&D and innovation departments within the company is often a high cost for firms but also profitable if the systematic management of innovations is successful.

To keep up with the markets today, innovation is an aspect to consider. It has shown that only being efficient is not enough, for the long-term goal, innovation is important for the business growth in many scenarios. The cost for innovation is not a small expense for the company, especially if it is managed incorrectly. Therefore, it is important that strategies and approaches are well designed and analysed in order to succeed with the implementation of an innovation approach. Companies can come up great ideas but in the next step, regarding the development of the idea and to apply it to the market can be costly without the right structures and processes in place (Bessant & Tidd 2014). Besides having a clear strategy and approach, the communication is also an essential aspect to consider whilst operating innovation management (Medina, Lavado & Cabrera, 2005). There are also large amounts of recommended approaches and tools that are used for managing and creating innovation strategies, examples of methods are mentioned in section 2.5. Managing innovation will require handling many parts e.g. the culture, leadership and approach selection. To succeed with an innovation approach or model, collaborations and knowledge sharing has shown playing a significant role and the key for gaining innovative abilities (Enkel, Gassmann, & Chesbrough, 2009). For an organization to be successful with innovation management, Kissi & Dainty (2012) argue that it will set demands on the leadership in order to create an environment that foster innovation and is well adjusted to the firm.

In order to lead an organisation towards an innovative direction, the amount of knowledge and creativity is not as important as the ability to use the existing talent and translate it into new knowledge (Massa & Testa, 2004). Innovative firms imply the need for innovative characteristics that can be useful due to their enthusiasm and always wanting to try new ideas (Martins & Terblanche, 2003). Motivators can be to set goals and create a good environment that allows the innovator to be creative. Many authors are addressing the need for companies to start working on continuously improving themselves and to have an innovation strategy. Boer et al (2006) e.g. argues that organizations need to develop a continuous innovation strategy were incremental improvements and learning, ongoing interaction between processes and lastly radical innovation is combined.

2.4 Innovation management models

The innovation strategies vary among companies and within the management of innovation, there are some innovation processes associated to it. A prominent, rather simple process created by Bessant & Tidd, (2014) is their classic process model of innovation, figure 1. The process consists of four steps: Search, select, implement and capture. The first step involves finding an opportunity for innovation. The next step includes the selection of what to do, thereafter an implementation should take place and how it is done. The last step “capture” includes the benefits taken from it. All of the steps require an approach for dealing with each step in the model (Bessant & Tidd, 2014).
Bessant & Tidd (2014) also mention their view on the stage gate model in addition to the basic Stage gate model. The model consists of five stages in their case are: Idea, Concept, Product, test and marketing. Another noteworthy simplified innovation process model is the “Innovation funnel” that Bessant & Tidd (2014) describe as roadmap for helping the organization bring ideas to life. Moreover, in addition to the organizational vision and strategy, processes like innovation funnel, stage-gate and innovation models are examples of helpful models that can be used.

The Swedish standards institute have created a standard of an innovation process that could be seen in figure 2 below. The innovation process includes a detailed method from gathering inputs and ideas that in the end will get introduced on the market. The four main steps between ideas and innovation results are idea management, developments of projects, protection/exploitation and market introduction. How the firm should generate, evaluate and get hold of new ideas is covered by the idea management step (Swedish standard institute, 2013). To have a systematic process for idea management implies that a continuous stream of new ideas is constantly being supplied. The process for idea management includes e.g. where ideas should be gathered from, in terms of internal or external sources. The next step in systematic process is the development of projects including how the idea should be developed. The ideas could be developed through e.g. partnerships and alliances and also to set out helpful for example: tools, techniques and resources needed for the project (Swedish standard institute, 2013. The third step “protection and exploitation” deals with protection activities to protect newly generated ideas. The last step “market introduction” is the finishing stage where establishing the production, supply chain and developing a marketing and sales plan is conducted (Swedish standard institute, 2013). In accordance to the four systematic process steps, an equally important step is the “Assessment and improvement”-step. The firm should in detail specify how often, towards what and whom the results should be assessed. The firm should also have indicators that measure the innovation results that are financial and non-financial (Swedish standard institute, 2013).
The Stage gate process
An innovation process for ideas could be managed with the well-known idea- to-launch system called “Stage gate” that have been used by plenty familiar companies (Cooper, 2008). Further, Cooper (2008) simply describes the system as a “map” of what needs to be done. Unfortunately, many firms have failed to successfully finalize the projects due to not properly following the principles, methods and leadership in a sufficient manner. In the simple Stage Gate model there are five-gates and five stages. The discovery-phase involves e.g. ideas and customer needs or other suggestions. After every stage there is a “gate” that functions as a Go/Kill decision point (Cooper, 2008). The stages in the model could be seen in figure 3.

Figure 3: Stage Gate summary (Cooper, 2008)
Each stage consists of a “best practice” activities required for proceeding to the next stage (Cooper, 2008). The procedure can be explained as following: After every stage the decisions of either to “go” or the “kill” the project is dependent on the resources in order to be able of proceeding to the next stage. The “kill”-option however is when the project is at risk and not performing as it should. The model shows how a project for ideas could be structured from ideas to the launch of the product and explained well in figure 3 (Cooper, 2008). Factually, the model is dependent on the decision-points of either go further or not. The figure 4 shows the model.

Figure 4: Stage Gate: Stages (Cooper, 2008)

2.5 Innovation strategies

Corporations nowadays are facing an increasingly more volatile, complex and competitive market and factors like shorter product life cycles and advanced technology will set high demands on the organizations. Innovation management is therefore an important part in terms of keeping up with the speed of the global developments that occurs and according to Bessant & Tidd (2014) There are many examples of big companies and organizations that have failed to keep up with the global growth and developments and as a result lead to economic failure. Also in competitive markets, competitors can surprise with radical innovations or offers that thereby help them to take competitive advantages. Innovation can be divided into either radical or incremental innovation, where radical stands for ground-breaking or maybe revolutionary ones. Incremental innovation however, stands for small developments an existing process or product (Tidd, Bessant & Pavitt, 2005). Moreover, Tidd & Bessant (2014) argue that companies need to have a clear strategy and process of finding opportunities, choosing what project to undertake and then implementing them. Nevertheless, organizations also need to develop their way of managing the innovation.
Furthermore, (Boer et al., 2006) states that continuous innovation (CI) implies a company’s ability to combine both incremental and radical innovation. Additionally, (Bessant, Kaplinsky, & Lamming, 2003) claims that continuous learning will be a key requirement for organizations in the future in order to stay competitive. Further, their study also shows that supply chain learning (SCL) can be beneficial for both the chain coordinators and their first tier suppliers. Yet, supply chain learning is a difficult undertaking for any organization and will require persistent long-term efforts and support from managers in all levels in the organization to successfully implement it throughout the supply chain. It is also important for organizations to be very clear about their strategy for innovation, i.e. something to guide the in what to do and why they should do it.

According to Börjesson & Elmquist (2011), companies need to find where to innovate and why it would be worth doing so. Additionally, they propose that companies should work with both short-term experimentation and simultaneously work with the long-term development of a new way of working. Further, they argue that it is important to include a wide range of co-workers from different areas within the organization.

There are a number of different approaches on how to evaluate and explore current innovation capabilities and opportunities in order to develop an innovation strategy. An example of a tool used by companies in order to visualize its strengths and weaknesses is the SWOT analysis (Hill & Westbrook, 1997). Sawhney, Wolcott, & Arroniz (2006) argues that innovation can take place anywhere in the business system. They have developed the innovation radar, based on interviews with managers connected to innovation activities from a number of different large organizations. They conclude that there are 12 different dimensions in which an organization can innovate, see figure 5. These dimensions are in turn divided into four Key dimensions; offerings (what), customers (who), process (how), and presence (where).

As shown in figure 5, supply chain is defined as a dimension in which a company can innovate and it can e.g. be to streamline the flow of information though the supply chain, or change the structure in order to enhance the collaboration between the different participants. However, it can be noted that these dimensions should be seen as intertwined within the business system and therefore related or dependent on each other. In addition, Bessant & Tidd (2014) have developed an innovation audit tool, appendix 2, that enables firms to evaluate their innovation capabilities through five different dimensions; Strategy, Processes, Organization, Linkages, Learning.

One of the approaches used by companies within innovation management is the paradigm “Open innovation”. The method is used in the knowledge-gathering phase within the organization and defined by (Chesbrough, 2003) as ideas coming from an external sources or internal operations within the organization or explained as the utilization of both external and internal sources in the innovation process. By that meaning, the ideas do not come from a closed circuit within the organization or a group that are responsible for the innovations. Moreover, Bessant & Tidd (2014) argue that
Open innovation is used for widening the firm’s research and development area. To develop ideas and gather information both internally and externally is beneficial, since only having an internally lead source within the firm will eventually result in missing chances (Chesbrough, 2007). This means that competitors can take action and reach the market with e.g. new offers for the customers, new ideas or developments. A disadvantage with open innovation is to be able to keep the knowledge within the company since the external sources also have connections with competitors (Bessant & Tidd, 2014). They also argue that only having a totally open innovation is not the best approach.

2.6 Innovation performance measurement

Patents and copyrights are used to protect the idea and product. Further, the legal aspects e.g. intellectual property rights are essential for economic growth. Patents is one kind of measurement tool used to ensure the innovation and product. Patents can also be described as an instrument that substitute innovation (Jalles, 2010). There are a number of different measurement tools used to measure the innovation performance. For instance, Chan, Felix & Qi (2003) explain different types of innovation performance measurement methods, e.g. input measures as time and costs, output measures and composite measures. The composite measure combines both input and outputs as. Many companies tend to focus on measuring the outputs in terms of patents and other innovation performance measurement tools (Adams, Bessant & Phelps, 2006). However, to measure the ongoing internal effort as e.g. the numbers of proposals per individual, average lead-time for introduction of the idea and failure rates are important for ongoing measurements (Bessant & Tidd, 2014). In addition of measuring the input and output, it is also a challenge and important to measure the innovation process. This enables managers to evaluate and continuously improve the innovation management process (Adams et al., 2006). As discussed above, there are many dimensions that affect the innovation and organizational performance in an organization. Innovation can be measured in a number of different ways. For example, Bessant & Tidd (2014) state that organizations can measure outputs in terms of number of patents (an indicator of knowledge produced), number of new products introduced (with the percentage of sales derived from them) which will give a measure of the innovation success. Moreover, output measures in terms of customer satisfaction (via e.g. surveys) can give an indication of improvements made in quality and flexibility. The strategic success can also be an output measure, when the overall business performance is improved in some way. These output measures have the potential to increase profitability, provide higher value added or growth in revenue. However, internal measures can also be of interest for measuring innovation performance. Examples of these are; number of new ideas at the start of the innovation process, customer satisfaction (e.g. did we develop what the customer wanted), measures of continuous improvements (e.g. suggestions/employee or number of problem solving teams), and failure rates (in the development process or in the market place).

2.7 Supply chain performance measurement

To measure the accomplished work is an important part for driving continuous improvements. Measuring the supply chain performance are not only conducted to see good or bad results; it can be used to create visibility. Performance measurements can be on an operational level or tactical where the operational concerns the results from
lower level managers and the tactical concerns e.g. approaches against targets and resource allocation for measuring the performance (Gunasekaran, Patel & McGaughey, 2004). To develop a system for measurements, Beamon (1999) argue that output, resource and flexibility are the most significant parts to deal with concerning a performance measurement system for the supply chain. The performance measurement consists of, for instance the total cost, manufacturing costs, return on investment (ROI) and so on. The output measurement however contains e.g. quality, quantity and responsiveness. The flexibility measurement includes the delivery flexibility and how well the firm is managing the constantly changing environment. The “resource-part” concerns e.g. the use of resources and the output (Beamon, 1999). There are many ways to measure and evaluate the supply chain performance. Benchmarking is one kind of measurement tool, where a firm can compare their own approaches and methods to see what they need to improve (Beamon, 1999).

2.8 Idea management

How firms generate ideas “Idea generation” is about the procedure of generating them. Processes for idea generation could be e.g. analyses of trends, products with a brainstorming exercise as method (Flint et al., 2005). Over time, idea generation have been mostly focused towards the product management within the organization (Flint et al., 2005). The ideas should be evaluated and a business case created before the project is launched in order to minimize the risks. Moreover, the business case should include an evaluation of potential factors crucial for the innovation success as well as details of the product or service, barriers and strategy (Bessant & Tidd, 2014). The business case should be around 10-20 pages and provide good information for the decision-maker in order to make a thought through reliable choice of the mixture of risks and rewards (Bessant & Tidd, 2014). Research have shown that many fail to complete projects or run over the budget, this might have to do with not constructing a well thought through idea selection process. Therefore, selection approaches with different levels of complexity can be used in different phases of the innovation management process (Bessant & Tidd, 2014). The table 1 below is a table of different selection approaches used concerning project selection.

<table>
<thead>
<tr>
<th>Selection approach</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
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<tbody>
<tr>
<td>Simple ‘gut feel’</td>
<td>Fast</td>
<td>Lacks evidence and analysis, may be wrong</td>
</tr>
<tr>
<td>Simple qualitative techniques, e.g. checklists and decisions matrix</td>
<td>Fast and easy to share – provides a useful focus for initial discussions</td>
<td>Lacks factual information and little or no quantitative dimensions</td>
</tr>
<tr>
<td>Financial measures, e.g. return on investment or payback time</td>
<td>Fast and uses some simple measurement</td>
<td>Doesn’t take account of other benefits which may come from the innovation –</td>
</tr>
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</table>
Complex financial measures, e.g. ‘real options’ approach | Takes account of learning dimension – the benefits from projects may lie in improved knowledge which we can use elsewhere as well as in direct profits | More complex and time-consuming – difficult to predict the benefits which may arise from taking options in the future

Multidimensional measures, e.g. decision matrix | Compares on several dimensions to build an overall ‘score’ for attractiveness | Allows consideration of different kinds of benefits but level of analysis may be limited

Portfolio methods and business cases | Compares between projects on several dimensions and provides detailed evidence around core themes | Takes a long time to prepare and present

The term “ideation” stands for the processes for identification and selection of ideas (Björk, Boccardelli & Magnusson, 2010). Furthermore, Björk et al (2010) argue about the importance of constantly creating new ideas in order to have a starting point where innovations can emerge. In addition, they argue that organizations that actively are asking and trying to involve a large part of the organization to generate ideas often also succeed in doing so and will take advantage of a larger part of the organizational knowledge. Moreover, in addition to creating ideas, they also need to go through a selection process. To pick an idea to develop further is the tricky part of selection process since it requires a careful evaluation of both risks and opportunities (Björk et al., 2010). Further they suggest that a stage gate process can be used to handle and develop ideas. However, using a stage gate model for idea selection can eventually eliminate an idea that perhaps had been a successful idea in the end. Thereby the Stage-gate model can reduce the chance of coming up with radical innovations (Björk et al., 2010). McAdam & McClelland (2002) investigated the different sources that ideas can come from. These are e.g. technical knowledge within the organization, bright ideas within the organization, sales office, market research, competitors, suppliers and internal researches. They also determine that brainstorming and meetings gave a significantly better effect than using e.g. suggestions boxes for idea generation. Moreover, Björk et al (2010) research shows that using incentives as motivation for creating new ideas does not have a positive correlation to the number of ideas generated by the employees. Further, they argue that there is need to allocate time and resources for the employees to spend time on the ideation. Hence, these activities are often down prioritised due to other operational activities. Moreover, the term “ideation capabilities” is also a well-known term among idea management and it stands for the processes and systems for identification, selection and stimulation of ideas used by companies (Björk et al., 2010).

2.9 Theoretical Framework Summary

To summarize the theories, a simple model (see figure 6) to show how the innovation management process could look like within the supply chain has been developed. Every management process need to have a clear strategy and vision, supporting and driving every action and work that need to performed. To develop our model, we have gathered
information and inspiration from looking at commonly used models. For example, Bessant & Tidd (2014) model as well as the Swedish standard institute (2013) model has been studied in order to find a model that could work for managing innovation in a SCM department of a large manufacturing firm. It is crucial to have an underlying strategy that support the innovation management process (Bessant & Tidd, 2014). If there are no specifically expressed innovation strategy, reaching all areas within the organization. A suggestion is that the overall SCM strategy should be reformulated so that it can serve as the strategy for innovation within the SC as well. Nevertheless, there must be support and drivers within this strategy in order for it to facilitate innovation in the SC.

Another important part of any process is to be able to measure the performance in some way. Bessant & Tidd (2014) have a number of different suggestions of how to measure the innovation process. However, when introducing a new way of working, it can be facilitated by starting small and simple, and then continuously develop it along the way. A common approach within lean management described by for example (Rother, 2009). Bessant & Tidd (2014) argue that internal measures like number of new ideas at the start of the innovation process or failure rates in the development process is a good way to measure the internal process. In figure 6, we have putted three internal measuring points, i.e. input in terms of number of ideas, throughput in terms of lead time from idea to implementation and launch to market and output is measuring the number of successfully implemented ideas. Further, output measures should be made with reference to every unique project (evaluation), described as an important part of the innovation management process (Swedish standard institute, 2013). Hence, a project aiming to create more customized solutions for the customer should probably be measured by customer satisfaction and what internal effect the change resulted in. An improvement that aims to reduce the tied up capital should be measured in terms of tied up capital and if it resulted in any unwanted side-effects.

Figure 6: Innovation management process
The core phases of the innovation management process are four blue coloured blocks in the centre of the model. Starting from left, idea generation is essential if any innovation to take place. Ideas can come from a different number of sources and can come accidental or by targeted search strategies (Björk et al., 2010). Further, there are a number of different search strategies to use. For example, Bessant & Tidd (2014) argues that one way is to get closer to the customer is to collaborate with the market or sales department. McAdam & McClelland (2002) listed that e.g. market research, sales office and competitors as common sources of ideas for innovation. Moreover, they suggest that activities like brainstorming and meetings would generate more ideas than just suggestion systems (e.g. main inboxes for new ideas). Hence, there is a need to create good collaborations between different departments for the idea management process to work sufficiently.

Idea selection are one of the more difficult parts of the idea management process thus it involves both risks and opportunities that need to be carefully considered. However, in the first screening, between idea generation and idea selection, this approach would probably be a too extensive to use. A simple qualitative technique, as shown in table 1 would probably be more useful there. The second screening in the idea selection phase could however make use of a more extensive approach for idea evaluation, like the decision matrix in table 1. The later stages in the innovation management process are just to illustrate them being there and will not be studied further in this research. Hence, the focus in this paper lies on the idea generation and idea selection phases of the process. The case company already have existing and well functioning processes for the development and implementation processes, thus the first two phases will be synchronized with the existing phases. Moreover, it is important that the organizational structures are designed and supports innovation and collaborations across the different department boarders. Hence, collaborations are sufficient for succeeding with an innovation approach or model (Enkel et al., 2009).
3 Methodology

Due to the nature and purpose of this study, we think that a phenomenological approach will be appropriate. Further, in order to answer the research questions, the authors of this paper will use an exploratory case study approach. An exploratory case study allows according to (Yin, 2003) the researcher to retain holistic significant characteristics of managerial and organizational processes. In a case study, the researcher is often digging into specific features within in a single unit i.e. a company or division in a company (Biggam, 2011). Furthermore, Pettgrew (1990) argue that the case study approach is very suitable for studying processes of change, as will be case in this study as well.

3.1 Data collection

The study will be based mainly on qualitative data, which is particularly useful in a case study like this thesis. The qualitative can be assorted as primary and secondary data. The main data sources in this paper will be:

**Primary data**
- Interviews

**Secondary data**
- Documentation such as, historical data from previous implementation programs at the company, corporate website and previous thesis work at the company.

The usage of more than one technique enables us to triangulate the results in order to strengthen the research’s validity (Eisenhardt, 1989). Furthermore, (Biggam, 2011) argues that triangulation can enable the researchers to get a more rounded picture of what we are exploring.

3.2 Interviews

Interviews will be conducted with managers at Sandvik Machining Solutions within the SCM department, R&D department (Innovation manager) and sales departments. We will however not use more than 10 correspondents due to the time limit of this research and large amount of empirical evidence it would result in. The interviews will be held with managers within the organization. The reason for this is that they are more likely to possess more knowledge in the different topics we want to get a deeper understanding in. This decision correlates to the information criteria that Jacobsen, Sandin & Hellström (2002) states is one of the criteria that can be used for choosing the respondents. The information criteria can be used when knowledge in the specific topics are preferable.

The other criteria’s described are Random selection, Width and variety, The typical, The extreme, and the Snowball effect. Random selection means that the respondents are randomly chosen from a population. Width and variety is when the respondents are grouped together based on certain backgrounds that could be, age, gender, position and so on. The typical criterion is when respondents are chosen due to the assumption that they will answer the questions with a positive view. The opposite to the typical is the extreme, where respondents are chosen due to the assumption that they would have a
generally negative view. The snowball effect implies that the first person is randomly selected and the following respondent are chosen are the first interview, and so forth. The interviews will be semi-structured with both open and closed ended questions, see the interview script in appendix 1. An advantage with semi-structured interviews is that it enables the respondents to express their own views in the subject by their own terms (Cohen & Crabtree, 2006). Moreover, the questions were developed and sorted into different themes, identified as key phases presented in the theories summary (see figure 6).

The interviews are used to analyse the current situation in order to build and adjust the model after inputs given. Further, the model of the innovation management process we developed from the results and literature have been validated several times by the intended process owner (Supply Chain Engineer manager) in order to make fit in the existing organization as smoothly as possible.

3.3 Documents
We received a number of different internal documents such as; presentations of different departments, tools used for different situations and a framework for innovation management, used within the case organization, provided by the Swedish Standards Institute (SIS). These documents helped us to get a wider understanding about the organization and the present situation. Further, these documents were analysed together with the empirical data gathered in interviews, i.e. cross-checking the responses etcetera.

3.4 Analysis of data
In order to make sense of the large amount of qualitative data, we had to categorize the data in a systematic way based on the identified factors presented in the theoretical summary. Also, we had to read a lot of research and literature in the subject to be able to interpret the data in a useful way. According to Biggam (2011), the researcher need to categorize and systemize the empirical data so that the researcher will be able to interpret the data and present the data and findings in a way that gives the reader a clear picture of the reality. In this study, we started by structuring and categorize the data based on the innovation management model (see figure 6). Further, key points and relationships between the literature and results were identified. These relationships were then further discussed in the discussion chapter.

3.5 Quality of the study
A valid research is described by (Biggam, 2011) a research conducted with tried and tested research strategies, and data collection methods. The data also needs to be analyzed in an appropriate way in order to create a valid research.

A reliable research is to perform and present a research where with trusted results. Yin (2003) describes that one way to strengthen the validity is: “to make as many steps as operational as possible”. - Meaning that the research methods should be meticulously described. Hence, we have tried to describe our methods as detailed as possible. Nevertheless, due to the nature of this study, it will be difficult to perform exactly the same study all over again, thus this study is based on the specific environment in which Sandvik Coromant is operating in. However, the operations can be used as guidance if a similar case is to be studied or the developed model is to be implemented elsewhere. (Yin, 2003) describes three ways to increase the validity of a case study. These are; to
use various sources of evidence, to establish a chain of evidence and to let the key informants review the findings and conclusions. We used these three of these ways in order to strengthen the validity. For example, we used both interviews and internal documents as sources of evidence. Moreover, we reviewed and made a practical validation of the proposed model several times with Supply Chain Engineering manager. It is also important to use data collection and analyzing methods and techniques that are suitable for this specific research. We believe the methods used in this research are well suited for its purpose and should therefore contribute to the validity of the research.

The fact that this is a case study, based on a single company, our findings will not be completely generalizable to other populations, but it can be generalizable to some extent if applied to similar companies and situations. Nevertheless, it will be hard to use the findings and conclusions for completely different companies acting in completely different environments. It would also have been good to use more than just one unit in the study in order to make the conclusions more generalizable. This would have increased the validity of the study, (Yin, 2003). Furthermore, observations of e.g. management board meeting, could have increased the validity further thus it would have enabled us to cross-check our findings with how things are actually done. However, due to the time constraints and the fact that these meetings is held once every quarter we were not able to observe such a meeting. The results have been presented to key stakeholders in this study, which confirmed and validated our findings and conclusions as reasonable. This should increase the validity of the research. Another method that would have increased the validity of this study further is to actually have tested the model in reality and then evaluate the results. However, this was not possible due to the limited time and resources in this research.

3.6 Ethical and Societal Aspects
It is important to have the ethical aspects in mind, when collecting, analyzing empirical data. We had a framework for this when we conducted interviews and described the empirical data in the findings chapter. Firstly, before every interview we informed the respondents the purpose with the interview, that they were to be anonymous when we presented the findings chapter. Furthermore, we informed the respondents that the interview was going to be recorded to make sure that we did not miss interpret their statements. We also made it clear that they could terminate the interview or skip a question at any time if they felt uncomfortable in any way. This approach is also argued by Trost (1997) as important, thus the person interviewed has the right to his or her personal integrity. Furthermore, all information gathered from homepages, researchers and books have been cited. This is important to do in order to minimize the risk of plagiarism. The societal impact of this study can be that if more firms, actively start working with an innovation approach within the supply chain, the environmental impact is likely to be reduced as supply chains become more efficient.
4 Findings

In this section will start with a brief introduction to the case company SCM department, Sandvik Machining Solutions and how they are organized. This is followed by an interview summary, divided into different themes identified as important factors for this study’s purpose (the interview script can be found in appendix 1).

Sandvik Machining Solutions (SMS)

SMS Consists of four products, with four different brand names; Sandvik Coromant, Walter, Seco and Dormer Pramet, all with leading positions on the global market for cutting tools. SMS turnover in 2014 reached 30.9 billion SEK and they employed 18,927 people globally. SMS have more than 100,000 direct customers, more than 20,000 distributors and have more than 30 sales training centers around the globe.

SMS organization can be divided into a number of different support functions (see figure 7), and stand for the main body of costs. These support functions can collaborate and share resources within all four of the different product areas. Hence, create synergy effects, economies of scale and standardize best practices.

Figure 7: SMS organization

Supply Chain Management (SCM)

SCM plays a key role within SMS. The department handles all the processes shown in the figure 8, except production. However, some production is sourced from external suppliers with the purchasing organization as process owner. The main challenge for SCM within SMS is to find the right balance between availability and quality towards cost and capital.
The operating processes within SCM in SMS are Planning, Purchasing and Deliver (order to delivery). QEHS consists of three supporting functions; Environment, Health & Safety, Quality, and Supply Chain Engineering.

The planning process main responsibilities are; Tactical inventory and supply planning in SMS Distribution Centers and the global supply network, Managing SMS sales and operations planning process, continuously developing SMS supply chain planning process, and create information transparency for all of their stakeholders. Furthermore, planning is using four Key Performance Indicators to measure the performance.

Planning KPIs are:

Stock Availability (SA) – *The possibility to deliver stocked items to customer on requested day. The measurement covers all Distribution Centers, i.e. both the main and the secondary stocks.*

Days in Inventory (DII) – *The number of days in a year that an item stays in stock before being consumed or sold. Covers the whole supply chain.*

Days in Inventory for finished goods (DIF) – *The number of days in a year that an item stays in stock before being sold. DIF is a sub measurement of DII, covering only finished goods.*

Introduction security – *Number of articles where required introduction volume has been produced/Total number of articles in the introduction package.*

The order to delivery process (OTD) main responsibility is to ensure that every order anywhere in the world is delivered in time, in perfect condition, with lowest possible impact on the environment, and with the lowest possible cost for Sandvik. Thus, their responsibility includes everything from the ordering point to the delivery. OTD’s focus areas are; optimizing the global footprint, processing of orders in the DCs, transport from Production Unit (PU) to DC and from DC to the customer (which includes selection of logistics provider), line organization for all DCs within SMS. The DCs are located in strategic places around the globe and the central DC is located in Schiedam, Netherlands. Order to delivery uses four KPIs in order to make sure that their main tasks are fulfilled.
These are;

**Quality** – measures the number of customer claims per million order lines shipped (standard and special orders).

**Ship in time** – Number of order lines shipped divided by the number of order lines received before deadline.

**Cost per order line** - Total administration, sales and freight (inbound and outbound) cost divided by the total number of standard and special order lines shipped.

**Productivity** - Number of order lines received (standard and returns) plus shipped (standard and special) divided by the total hours paid for (excluding sickness and vacation).

Supply Chain Engineering’s responsibilities are to provide a network, knowledge and capabilities to energize and enable SMS and partners to exceed their customer's expectations. Moreover, they should design and implement top supply chains in order to gain competitive advantages and profitable growth. Focus is on customers and the total cost of ownership.
The Supply chain department have 5 major focus areas within their strategy:

Network building – *Involves coordination through effective cross-functional processes in order to remove organizational silos.*

Supply chain knowledge – *Increasing supply chain knowledge in SMS and open up for new innovations and collaborations, create cost-effective and sustainable improvements to meet current and future business requirements.*

Supply chain performance knowledge – *Integral, cross-functional key performance indicators that accurately measure the performance of supply chain operations are the basis for SCM in order to plan, do, check and act and initiate improvements.*

Supply chain performance measurement, decision support – *Informed decisions are the foundation for Supply Chain Management to take efficient actions to achieve their objectives.*

Execution – *Executing strategic initiatives is needed to develop our supply chain processes and support SCM to achieve its objectives.*

4.1 Interviews

In order to get a picture of the current strategies, knowledge and practices within SCM and innovation management semi-structured interviews were conducted with employees and managers from the SCM, R&D (Coromant brand) and Sales department. More specific the interviews were conducted with the following respondents; R&D specialist from Coromant (working with innovation management), The Vice President (VP) of the SCM department within SMS, Head of the SC Engineering department, and a manager responsible for the Strategic Global Accounts. The questions are sorted into different themes identified as important areas to address within innovation management and the answers are listed below. The interview themes as innovation & supply chain strategies were asked in order to get an overall picture of the supply chain where the model is meant to be introduced so it fits the department. The innovation theme was asked to all, however the innovation process was asked to the R&D specialist since he/she have a process for innovation within their department.

4.1.1 Innovation & Supply Chain Strategies

The supply chain strategy is according to the respondents to deliver products deliver the products with high delivery precision and with excellent service. SMS supply chain should be a competitive advantage for the PA’s. The respondents were also asked what they thought were the main strengths with SMS supply chain. They all stated that the 24-hour delivery strategy is a great strength for the supply chain. Also, many of them argued that the effective DC setup should be seen as strength in the supply chain. They all stated that the head of the SCM department also stated that the “supply chain engineering department is one of the strengths with the supply chain, hence, they possess unique competences and have a holistic understanding of the supply chain”. The supply chain engineering manager on the other hand stated that one of the main strengths with the supply chain is the close collaboration with logistics providers that enables high service levels and delivery precision around the globe.
There is no common view of what the main challenges for the supply chain are. The R&D specialist stated that one challenge is if they stop using “Coropac” (name of the 2 product launches every year) and the effects of it. Moreover, he/she thought a challenge will be to create a more flexible supply chain. The VP of SCM sees the fact that they are relying on air freight as a possible challenge in the future. Moreover, he/she states that the producing/distributing setup need to become more effective in the future. One example is that SMS at the moment can be producing one tool in e.g. the US, even though the bulk of the sales is in Europe. Moreover, the supply chain engineering manager sees collaboration with other departments as one of the main challenges. Further, one respondent argued that managing complaints can get better in how to respond to the customer and the production units can become more customers orientated. To facilitate and make the customer orientation better, for example the sales units can get better to provide information that the PU require, in order from them to prepare. This will set high demands on the communication and how the work with complaints are done in order to fulfil the importance of satisfying the customer needs. As stated before, the strategic and global account management work with the strategic customers and have a global responsibility to coordinate and to keep a promise concerning for instance the delivery time. The more value we can add to the end customer, the better both can get out of it.

The first question about innovation was how they would describe the word innovation. Most of the respondents agreed on that innovation is about improving a product or process. One interesting conflicting view were however whether or not innovation is about bringing this improvement or new product to the market (i.e. creating customer value) or not. However, Sandvik Coromant’s own definition of innovation (Sandvik innovation, 2016) is stated as follows;

“Innovation is people creating or finding insightful ideas and bringing them successfully to the market”.

Moreover, the respondents were asked to describe the innovation strategy at SMS. The R&D specialist working with the Coromant brand stated that the overall strategy was to develop new products and offers from a product management and R&D perspective. He/she also stated that the main challenge right now is to balance what we do today with what we will do tomorrow. The head of the SCM department stated that there is no spoken innovation strategy at SMS and that it is the responsibility of each PA to come up with their own strategy. Nevertheless, he/she stated that innovation is strongly rooted in the Sandvik organizational culture. Additionally, the SC Engineering manager stated that SMS should be leading in technology.

Most of the questions about innovation strategy were asked to the R&D Specialist. When we asked about the main strengths about how they manage innovation the respondent thought that Coromant’s history of being innovative and being a market leader were of great importance. Moreover, good collaboration with external sources were also highlighted as important strengths at Coromant. Additionally, when asked about the main challenges for managing innovation the manager stated that; “one challenge is to focus on business modelling rather than just focusing on technical solutions like for example patents”. Historically, Coromant has been focusing heavily on in-house R&D on products. However, the industry is built up like a tightly interconnected eco-system were the different parties are depending increasingly more
upon each other due to the rapidly increasing technological advances. Consequently, more networking and collaboration efforts will need to take place in the future. We need to stop focusing on our own technology, there are so much more we can do in order to strengthen our innovativeness. Thus, shifting focus to other areas, looking outside our own boundaries, will lead us to new opportunities and challenges. We need to find win-win situations with our partners.

Further, we wanted to know if top management showed commitment and support towards innovation. All of the respondents pinned out that they thought top management recognized the need for innovation and that it is essential in order for SMS to stay at leading position. However, one respondent stated that;

"There are lots of demands of decreasing the costs at the moment but that top management is committed to development. We always get support if employees come up with new ideas to develop”.

4.1.2 Innovation management

First question about innovation management were about how they come up with new ideas and improvements. Firstly, regarding ideas for R&D projects, we use a stage gate model where the projects are generated from product management area, since they are closer to the market and sales organization. Moreover, we work with idea management in order to seek out ideas within the organization. One way of finding these ideas is by using “idea challenges” were ideas within certain areas are asked for within the organization. This is a good way to focus the attention. For example, we have recognized the need to develop our sustainability, what can we do in to become more sustainable in the future? Further, for more spontaneous ideas, the persons own network is often used. Additionally, there is a mail inbox for ideas, however it is not used so much. Moreover, he/she argue that there is a need to allocate resources for this idea management and give room for some slack time, were ideas can be developed further, not generated. However, we need to have a way to ensure that this time is used for its purpose and not used for other tasks.

Next, a question about how the selection process of ideas work were asked in order to get a deeper insight in how they select the ideas or projects to develop further or take to the next step. In the stage gate model, they try to balance the projects in a project portfolio. For the idea management model, they evaluate the ideas by using a set of
dimensions listed in table 2. These dimensions are then valued via a scorecard (e.g., on scale of 1-7) before the scores are putted into a radar diagram, visualizing the scores in a good way. These scorecards are then compared to each other then used as a basis for decision making by the management board.

**Continuous Improvements**

In some areas within SMS they work with continuous improvements in a structured way, but according to the respondents within the supply chain they do not have an arrangement for this. The strategic global accounts manager stated that;

“they have improvements in progress where they are developing a manual for fulfilling the ISO-standards for this work”.

These instructions will have a common approach in e.g. how the work with customers and questions like “what does the customers need?” The R&D department have a process for CI in addition to the idea management procedure. Further, they have started to work with improvement aspects together with the quality department. Recently there have been major changes in the production system across SMS.

Conferences and customer visits also contribute to the ongoing improvements. Within “idea management”, there is a touch of a continuous improvement process but according to the R&D specialist, they have not reached all the way. The Research & Development department have a continuous improvement process and the well-known company McKinsey recently went through the system without finding any improvement suggestions, indicating that they have a solid improvement process in place. All respondents argued that everyone needs to start sharing ideas and stop working in their own “silos”. Recently they have started to set individual goals within the Project management and R&D department. The employees can argue for what goals they want, for instance personal goals they want to fulfil during the year e.g. own improvement suggestions or a problem they want to solve. According to the strategic account manager, the CI process is about to get better within estimated 2-3 years. They have a plan regarding more automated flows, globalisation, "one way of working" and make room for projects (budget issue). Also according to a respondent, more clear roles and responsibilities needs to be set in order for the organization to evolve. To develop the continuous improvement process, suggestions could be done on an individual level based on the employee’s situation, “what can they do better?” and “New opportunities?” Another suggestion from a respondent is that time could be scheduled for presenting a creative idea or improvement, for instance 10 minutes every Friday, an employee could present an idea for the manager and tell the amount of money needed and the possible outcomes. Another suggestion could be to involve employees from various areas within SMS to get different ideas and perspectives. The supply chain engineering manager argued that;

“when someone comes up with an idea, they should quickly be able to evaluate the idea and if necessary, compose a short business case concerning what needs to be done involving costs and potential benefits from it”.

When it comes to smaller ideas/improvements, they could be taken care of by the employee itself. In addition to the suggestions, a thesis is conducted at Coromant to see if the targets are followed in order to see if they have been improved.
4.1.3 Supply Chain Management & Innovation

First question about innovation in the supply chain showed that there is a need of getting more structured in how they manage innovation. From the supply chain departments perspective, procedures for working in a more structured way could be e.g. using a benchmarking-approach, to see how others are doing. Additionally, respondents argue that activities for instance the involvement in networking and so on are beneficial for innovation process.

To measure innovation in the supply chain can be done in plenty ways. For instance, according to the R&D specialist, an individual goal is a good measurement. To measure the innovation performance in the supply chain does not have to imply measurements e.g. KPI: s, though targets give a framework that "one can think like this" and other ways to measure is the input, throughput and output-variable and also the traditional customer satisfaction. To have these measurements, one can clearly define “where we are” and “where we are ending” and whom the players are. According to R&D department, it is important to highlight the throughput, in order to see the ongoing status, hence "It can be green in the beginning, red in the middle and green in the end that is not highlighted if only input and output is measured. Another great measurement is to sum the number of innovations and also the effect of the innovations resulted in, e.g. did it affect the profitability? However, not everything can be measured in terms of money, though measuring the impact or payback of improvements will generate noteworthy information. According to the respondents, a suggestion or a thought can also be measured or the number of business cases and successfully implemented cases.

Questions regarding innovation were also asked to respondents. In order to promote innovation, some argued that campaigns can be held and regarding the size of an innovation, a recommendation is to compose a strategy for how to deal with the change in a size-dependent way. A respondent from the supply chain department argue if the innovation concerns a big change, then maybe one should work cross-functional and take help of people across the different departments. To succeed with an innovative approach, an overall vision or goal for this approach can be a great help for dealing with this. A vision according to a respondent within SMS is a painting of the ideal estimated state. The vision by idea management at R&D can be described as: “To feel that one is heard and supported from the boss where new opportunities can be take and to have a creative climate.” The vision at SMS-supply chain is that they should stand for “A competitive advantage for the product areas through SC innovation”. That means that they should keep developing what they are good at but also come up with new innovative improvements or ideas and always think of the customer need in the future. The respondents agree that the supply chain is performing and serving the customer needs. They are also aware of that the competitors are catching up with good-enough products. Based on an assumption, they also believe that they meet the KPI: s for the most part. However, there are improvement suggestions on customer solutions from the strategic account-department. As confirmed from the respondents, the global market technology is moving towards more flexibility in the future and more customized requirements from the customers. The supply chain department believes that they are performing and serving the customer needs, mainly regarding the standardized products. When asked about the high stock availability and good delivery precision at SMS the respondents argue that it’s important, however there are some uncertainty regarding
how important the delivery precision is among the customers. As mentioned, the standard products are meeting and fulfilling the customer needs. On the other hand, they are not satisfied with the delivery precision regarding the process for special products and it could be improved since many of the strategically important customers buy special products and holistic solutions.

4.1.4 Collaboration

Questions regarding the linkages concerned collaborations and support between SMS and different departments. Cooperation between the departments and external sources to find new ideas and solutions also differs between the departments. The R&D department has plenty different external sources for finding new knowledge and ideas whilst the supply chain has a rather poor information gathering. The strategic and global account management primary collaborates and supports the global sales department but also with the price function department and customized solutions. The customized solutions department is an engineering function for customized products and solutions. Also collaboration with their 'link' business operations is conducted with EHS-questions. If a large implementation is to be initiated, they set a project for that implementation.

Since the organizational structure has changed, it has contributed to that the balance also has shifted. A suggestion is that synergies and benchmarking between different departments should be done. Moreover, should the supply Chain-department get more inputs from sales since there are no direct channels to sales, just to a representative from sales. Questions regarding the participation in projects related to developments of new products were also held and the supply chain-department had poor involvement. The strategic accounting department are participating in a process perspective, handling the economy and thereby not so much participation regarding the product. According to the interviews one can see that there are plenty improvement opportunities within collaborations and communication-area.

A number of respondents argued about the difficulties concerning the motivation among the employees from the entire chain, e.g. an 18 months’ project regarded a new product: Then it was hard for the market responsible to find motivation since the market only needs to act in the end and thereby, the further away from the finish line you are, it's harder to find the required motivation. A common aspect as a major company is that every department and organization becomes an “own company” instead of us using the synergies of being a large organization which was highlighted during the interviews. Moreover, the respondents were asked about the collaborations with external partners. At the R&D department, they have a “research collaboration” with the university centre. Employees at the R&D-department also have own networks working on similar issues where they exchange questions and knowledge at certain application centres. They also have set up a Jammer page on Facebook called “Innovation Group” where they take in knowledge. SMS also has collaboration with the University of Gavle but mostly for guest lectures and thesis work. The results show that SMS does not have so many collaborations or partnerships. Speaking of innovation methods e.g. Open innovation and networking, according to the interviews, there is a need to work more structured with it and interpret the knowledge into the organization. Other potential and positive aspects that promote collaborations is that top management have visited customers. Strategic accounting has spoken about collaborations with potential excepted customers which are about to become external partners.
They also have something that is called “channel partners”, meaning that some customers have chosen to outsource for instance their purchasing functions. Therefore they become “channel partners”. Another area that is potential for collaborations and partnerships is digital machining area. The strategic accounting area is on their way to exploit external partners to find solutions. Another question that was asked was about the knowledge concerning the market needs among the employees and some respondents replied that shared opinions are present and that everyone has a general knowledge about the market needs, however there are gaps in the knowledge of “customer needs”. Within the R&D department they think that everyone understands that the market need is important but then one can struggle with how to come closer to the understanding. Product developers are out at the customer with the purpose of trying to understand the customer's needs; hence it will require a lot of data to understand the movements. Product management and R&D are constantly trying to be up to date on their competitors to see what happens. Another question was if they thought that the communication worked effectively within the organization. Finally, there seem to be a united view that the communication between different levels works. However, e.g. the R&D Specialist stated that:

“the communication works well Top-Down and Bottom-up but more difficult through the boundaries of their own department”.

5 The proposed model

Figure 9: The proposed model for managing ideas and innovation in the Supply Chain
The proposed model, Figure 9, is a stage-gate inspired model that has been developed by analysing the theories and empirical data as well as by validation with the supply chain engineering manager. The following paragraphs will describe the different phases of the model marked as 1, 2, 3, and 4 in the boxes in figure 9. The remaining phases of the model will not be explained further in this research.

**Phase 1:** Five different sources will be used as inputs for idea creation. These will then be managed (see Table 3) and used as input for the workshops being held every quarter. By running a workshop every quarter, an input of ideas will be created to every management board meeting (box nr. 4 in Figure 9) that is being held once every quarter. Furthermore, SCE are responsible to create a short “summary of inputs” every quarter that can be presented to the management board.

**Table 3: Input management to idea creation, box nr 1 in Figure 9**

<table>
<thead>
<tr>
<th>Input</th>
<th>Method</th>
<th>Responsible</th>
<th>Frequency/time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sales areas</strong></td>
<td>Short interviews</td>
<td>Supply Chain Engineering</td>
<td>3 Sales areas / Quarter, approx. 30 min</td>
</tr>
<tr>
<td><strong>Strategic Accounts</strong></td>
<td>Short interviews</td>
<td>Supply Chain Engineering dep.</td>
<td>1 / Quarter, approx. 30 min</td>
</tr>
<tr>
<td><strong>Environmental scanning</strong></td>
<td>Scanning for new knowledge</td>
<td>Supply Chain Engineering dep.</td>
<td>Continuously every week, with dedicated resources</td>
</tr>
<tr>
<td><strong>Networks/Conferences/Seminars</strong></td>
<td>Create a short summary</td>
<td>Supply Chain Management dep.</td>
<td>Occasionally, when participating in an event.</td>
</tr>
<tr>
<td><strong>R&amp;D Department</strong></td>
<td>Short interviews</td>
<td>Supply Chain Engineering dep.</td>
<td>1 / Quarter, approx. 30 min</td>
</tr>
</tbody>
</table>

**Phase 2:** The workshops will be held every quarter with a SCE representative as workshop leader. The supply chain engineer is also responsible to put together the inputs from phase 1 and use these in the workshop to create ideas for innovation. The workshops will consist of approximately four persons with representatives from different areas within SMS. These areas are:

- Planning
- Purchasing
- Order to Delivery
- Quality, Environment, Health & Safety
- IT
- Product Areas Representative

Further, the groups will be mixed from workshop to workshop, ensuring that collaboration takes place across different borders within SMS. The workshops are also...
responsible to assign a person responsible for the idea development process in phase 3 of the generated ideas.

**Phase 3:** The idea development phase involves creating a one-page scoping of the idea that can be evaluated further in Decision Point 1 (DP1). The scoping needs to be developed further by SCE department. However, it should include an overview of the idea from the seven different criteria, see table 3, used in phase 4. The scores can then be inserted in radar diagram, shown in figure 9. The idea evaluation chart below should be used a basis for decision making at DP1 and DP2, see phase 4 in figure 9.

**Phase 4:** The first screening (DP1) is a quick “quality check” performed by a process expert manager. This is done to make sure that the ideas are qualitative enough to be brought further to the management board meeting. After the ideas have been approved in the first screening, they will be forwarded and presented at management board meeting. The managers should after being briefed make an evaluation of each idea themselves, using the idea evaluation criteria, shown in table 3. The scores can be incorporated and an average can be calculated and then be entered into the radar diagram, Figure 9.

However, this evaluation alone should not serve as the only decision basis. The strategy, vision and prioritizing are important factors they will consider as well. The strategy developed for the SCM department will be the same strategy to support and drive the innovation process in the supply chain.

The already existing projects (improvements and projects from other sources e.g. R&D department) will connect to the process in DP2 and be evaluated together with and on the same terms as the generated ideas. The “looped” path in DP2 is for interesting ideas that need a small amount further investigation as well as ideas that are good but down prioritized can be looped and brought up in the next quarterly meeting.

In some occasions, must do projects can appear and will be passed on directly to the development process of the model.

The normal path is that the ideas that pass through DP2 are further developed into business cases. The projects will also get a project manager and steering group assigned to it. However, this paper will not evaluate and analyze this part of the process. Thus, Sandvik already have a well-established project methodology to use.

### Table 4: Idea evaluation criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Score scale 1-7</th>
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<tbody>
<tr>
<td>Novelty</td>
<td></td>
</tr>
<tr>
<td>External value</td>
<td></td>
</tr>
<tr>
<td>Internal value</td>
<td></td>
</tr>
<tr>
<td>Organization</td>
<td></td>
</tr>
<tr>
<td>Technology</td>
<td></td>
</tr>
<tr>
<td>Uncertainty/Risk</td>
<td></td>
</tr>
<tr>
<td>Opportunity</td>
<td></td>
</tr>
</tbody>
</table>

*1=Disagree*  
*4=Partly Agree*  
*7=Fully Agree*
6 Discussion / Analysis

In this section we will discuss empirical findings and analyse them through the identified phases and key factors of the innovation management process, Figure 10.

6.1 Idea Management process

The first part until the DP2 within the innovation model Figure 9 can be described as the “idea management process”. In order to facilitate and manage knowledge creation, many of the respondents thought that there is a need to manage inputs and ideas for innovations in a systematic way to make sure that new knowledge from e.g. seminars or network meetings are integrated.

**Phase 1:** The SCM department has a need of managing the inputs for idea generation systematically within the innovation management process. Therefore, in collaboration with the SCM engineering manager, four sources for idea creation have been identified as suitable to start with. These are: Sales areas, strategic Accounts, environmental scanning and networks/conferences/seminars.

The strategic accounts are an important input thus it is often these customers that have the highest demand, which in turn can drive innovation. The sales areas will provide valuable insight from customers on a global scale.

Environmental scanning will provide ideas and inputs from the surrounding environment, and includes methods like; benchmarking, customer visits, supplier visits and so forth. The literature refers benchmarking and partnerships as good ways of learning from each other (Halldorsson & Larsen, 2004). The purpose is to help each other so that both parties will benefit from it. To get inputs and knowledge from external sources have shown being beneficial since new knowledge is faster conducted with help of external actors rather than just using a single internal source (Tidd & Bessant, 2014). Moreover, as stated before, “open innovation” where knowledge is gathered in and out from the company from different sources can enable and lead to competitive advantages.

Networks, conferences and seminars in subjects of interest will provide an input of new technologies, research and methods to the process. The sources above (among other) are also mentioned by McAdam & McClelland (2002) as common and valuable sources for idea creation.

Additionally, we think that the R&D department could provide with good insights of future customer demands and the latest technical trends (McAdam & McClelland, 2002). Inputs from this department should provide valuable information about this as well as bring yet another perspective of future demands and opportunities of the SC.

In accordance to ways of generating ideas as mentioned in the previous section 2.8, the R&D department has a way of generating new ideas called “idea challenge”. The R&D specialist gave an example of how they work to generate new ideas in a specific area of interest. The idea is to run an “idea challenge” where ideas within a specific area are
asked for. This helps them to focus the attention to a specific area and they can more easily make this work more legit by for example sharing why there is a need to develop new solutions here. According to Björk et al. (2010) methods as this could be a good way to involve more areas of the organization in order to make use of the knowledge the organization possess. Hence, this method could be considered by SMS SCM department as an approach for ideation in the future. Furthermore, this ideation approach can also foster motivation, described as an important factor for driving innovation (Kissi & Dainty, 2012). So this is definitely a method they can consider to use in the future.

Phase 2: Next step in the process is to implement quarterly held workshops, also conducted and formed after requirements from the SCM engineering manager. Using workshops for idea generation is an effective approach to generate new ideas according to (McAdam & McClelland, 2002). The purpose of having workshops is to e.g. brainstorm, discuss and convert the knowledge (received from the various sources) and develop them into more useful ideas. Furthermore, using workshops entails higher levels of collaboration and communication among the participants. The workshops are as mentioned assembled with representatives from different areas within SMS in order to cover a large number of different sources of knowledge. However, this fact also entails that good collaboration and communications between the company borders is maintained. Many authors argue about the importance of getting broad knowledge, from both internal and external sources. This is the purpose of using employees from different departments as well as inputs from networks, conferences and environmental scanning. The advantage of using both external and internal sources for knowledge gathering is beneficial since it is widening the firm's overall understanding (Bessant & Tidd, 2014; Chesbrough, 2007). Furthermore, Medina et al (2005) argue that communication and collaboration, and simultaneously having a clear strategy and approach, are important ingredients for managing and facilitating innovation. The results show that collaborations exists, both internally between the departments within SMS and externally to some extent towards collaborations with other actors. However, the collaboration does not fully reach throughout the whole organization. We therefore think that the workshops will enable them to collaborate more between the different departments within the organization.

According to the results, the R&D department at Coromant have reached a long way in collaborations with e.g. plenty internal and external sources of collaborations. Examples of these collaborations are a “Research collaboration” with a university centre, a mail inbox for ideas, own networks, a jammer page on Facebook as well as collaborations with machine suppliers using cutting tools. Reaching out to external sources for gaining knowledge is essential for the company's success in terms of keeping up with the market and not missing any chances (Chesbrough, 2007). The supply chain management however, mainly collaborate, in some occasions internally with the Product areas. In summary, the supply chain department have poor collaboration with external sources as universities and other actors. Nevertheless, the supply Chain department will by implementing our proposed model, need to start collaborate and communicate more with other departments. Having partnerships or gathering knowledge externally will give access to large amounts of information that will help them to develop the SC in the future. Another practical reason of collaborating with partners or universities is the benefit of taking advantages of already existing methods or technologies that already are in use by other companies (Tidd & Bessant, 2014). Having collaborations with Universities, like the R&D department at Coromant has, have shown being beneficial and a strength since new technology is constantly updated at the universities (Brettel &
Cleven, 2011). To not collaborate with the universities will contribute to missing chances as technical news and updates on the market (Brettel & Cleven, 2011).

As stated before, “open innovation” where knowledge is gathered in and out from the company from different sources can enable and lead to competitive advantages.

By implementing the proposed model will contribute that collaborations with universities will emerge.

**Phase 3:** involves the idea development is to create a one-page scoping of the idea. Results showed that the R&D department have a process for evaluating the idea with an 11 criteria model shown in table 2. However, since the SCM engineering manager implied that a desired model and process for managing innovation should be kept rather simple and manageable to start with, we reduced the number of criteria to evaluate the ideas from. Some of the dimensions are closely related to each other and therefore we reduced and merged them together. Further, when reviewing this model, there were suggestions that another dimension, describing the risks should be taken in consideration. Hence, the model ended up with 7 dimensions to evaluate the ideas from. The grading of the model should be carefully described in a way that minimizes the risk of people misinterpreting the grading. Moreover, Björk et al (2010) compared different approaches for how firms evaluate ideas and found in their study that there are improvements to do selection-part is challenging.

**Phase 4:** After developing the idea, it will move on to the decision point 1 (DP1 in Figure 9). This step works and functions as a stage-gate process with a Go/Kill decision point (Cooper, 2008), where a risk/opportunity qualitative analysis of the idea is conducted. Bessant & Tidd (2014) describes this technique as: “Fast and easy to share – provides a useful focus for initial discussions”, Which should suit this decision point perfectly. The drawback with this method however is described to be: “Lacks factual information and little or no quantitative dimensions”. Nevertheless, in DP2 a more meticulous.

The risk management involves a quick evaluation where a consideration of risks/opportunities is a made by a process manager to “give it a go or not”, for further evaluation by the management board. The ideas are thereafter taken further to DP2 where they are considered and evaluated at the management board meeting. Innovations that are passed on from DP2 are then developed further into a business case. The suggestion from the results is that the management board will get the ideas presented quarterly at the main meetings, make evaluations that correspond with the SCM strategy. Also, the existing projects will connect to DP2 and evaluated together with, and with same terms as the ideas forwarded from the idea generation process.

However, literature have shown that using a stage gate model for idea selection can eventually reduce the chances of creating radical innovations (Björk et al., 2010). Therefore, the risk management part of the evaluation should be considered carefully. To allow some radical innovations to be passed on, will require that the risk/opportunity-management gives room for more risk taking. For example, Björk et al (2010) argue that there is a need of protecting radical innovations, rather than always throwing it in the trash due to the high risk connected to them. Thus, coming up with ideas is the easy part, while managing innovation and deciding what to go further with it is the tricky part. Boer et al (2006) also address the need for firms to combine both incremental and radical innovations in order to develop their continuous innovation
capabilities. To go further with an idea can become costly if it is not managed correctly or the received return from it is lower than expected, (Bessant & Tidd 2014).

### 6.2 Supply Chain & Innovation strategy

To form strategies and continuously develop the supply chain has become increasingly important through the years. The SCM strategy at SMS includes according to the results several strengths, such as; 24-hour delivery worldwide, the DC setup, unique competences and the close collaboration with logistic providers. The strategy is also well linked to the theories concerning that companies have moved the focus from a cost reducing perspective towards more flexible chains, designed meets the customer demands (Christopher & Towill, 2002). Moreover, they argue that focus on the usage of partners and collaborations are getting more common. This correlate to what e.g. SCE manager stated; that one of their strengths are their close collaboration with their logistics providers.

When it comes to serving the customer needs, SMS have strategically placed distribution centres worldwide, in different regions, in order to be able deliver products to the customer within 24 hours in most cases. The results show that Coromant is generally good at meeting the customer needs and expectations. However, does every customer require a fast delivery or is it just an expectation? By getting closer to the customer, they might be able to address such questions and customize the supply chain to meet the customer needs even further. Moreover, understanding the customer needs will can help them to gain more competitive advantages (Woodruff, 1997).

As mentioned, supply chain strategies are moving towards approaches that focus more on customers. Hence, while the technology on the market is getting more advanced, so does the products and it will also result in more customized requirements from the customers, hence also on the supply chain.

The respondents argued that the supply chain has plenty improvement areas like e.g. working more organised with processes like benchmarking, more structured with communication and planning. With this in mind, developing an innovation strategy and process for managing innovation in the supply chain should probably get support from the employees. Moreover, this approach will help the SCM department to deal with identified issues and to become a method for gaining competitive advantages. Hence, Sandberg & Abrahamsson (2011) argue that a SCM strategy has become an important part in striving for competitive advantages.

As stated before, Boer et al (2006) defines that the customers are getting more demanding and require more customized solutions than before. This entails that companies must become more flexible and continuously develop their business models. Additionally, the changing demand and philosophies goes hand in hand with the results from the interviews, where the strategic accounts department have seen that their customers’ demands is getting more customized. Hence, in order to meet the demands concerning the supply chain, the SCM department need to get these input from the sales organization. Moreover, when asked if they thought the supply chain is performing and serving the customer needs, it became clear that some complications occurred regarding customized orders. Since the key customers often have customized orders, it entails that they also often have delayed orders and delivery’s. There are clearly a lot of valuable information concerning customer demands.
To become an innovative organization will require the ability to transform existing talent into new knowledge (Massa & Testa, 2004). One can come up a great idea but the next step to develop the idea and apply it to the market can be costly (Tidd & Bessant 2014). In addition, the supply chain strategy is important for gaining competitive advantages (Sandberg, & Abrahamsson, 2011). Furthermore, Roper (1997) argue that firms with innovation strategies gain competitive advantages compared to firms without an innovation approach meaning that the focus is on e.g. the efficiency, effectiveness and so on. Innovation does not only contribute to economic growth, it does also benefit the society by innovating new products (Ahlstrom, 2010). Moreover, by using the existing supply chain strategy as the strategy for innovation will work to start with, since their existing supply chain strategy include elements that support and facilitate innovation. For example, they strive to opening up for new innovations and new ways of collaborating and finding sustainable improvements to meet current and future business requirements.

Since the R&D-department have well-developed strategies (emerging from the SMS general strategy) to successfully work with innovation in their organization and are successful. This fact could be a reason for the supply chain management implement, if not fully, parts of this strategy into the SCM strategy. Implementing a method for managing innovation is nothing that is done over a short time; this requires a long-term commitment the task (Adams et al., 2006). Innovation is defined by Sandvik Innovation (2015) as:

“Innovation is people creating or finding insightful ideas and bringing them successfully to the market”.

This definition is perfectly in line with how many scholars would describe innovation. However, it is clear to us that the there are no outspoken overall innovation strategy or vision within the SMS. This can hinder the work with implementing a systematic way of working with innovation if the employees involved in it do not see it as important. However, in order for this new process to make sense, scholars argue that there is a need to create a vision and mission that makes this work legit. Moreover, by using more familiar terms, e.g. developing the SC or continuous improvements, might reduce the feeling that they are introducing a new way of working or an add-on to their current work.

6.3 Measurement

Another important aspect of the innovation management process is that it is crucial to measure and evaluate the results in order to find out whether or not they are successfully managing the innovation process or not (Swedish standard institute, 2013). Jalles (2010) e.g. states that measuring innovation correlates positively to economic growth and profitability. Further, Adams et a (2006) states that measuring the innovation process will enable firms to evaluate and develop the process continuously, i.e. making the process better and more efficient in the future. Many of the respondents pointed out that it could be of interest to measure both inputs and outputs. For example, the VP of SCM stated that the number ideas could be measured as an input. Additionally, the number of successfully implemented innovations could be measured as an output. Further, he/she argued that they might be able to measure the effect of the innovation. However, the effect can vary very much from case to case which makes it hard to use any standard measurement of the effects of each innovation. Our solution is to make this a part of the
evaluation process, were these measurements can be specified from case to case and set in the initial project plan.

The R&D specialist argued that it could be a good idea to measure innovation at different stages of the process. For example, measuring number of generated ideas, number launched projects, and finally number of successfully implemented projects. Also, he/she stated that one idea could be to set individual goals in terms of number of ideas is a good way to measure creativity. These goals should be set on an individual level in agreement with the employee. Hence, to measure the innovation process will enable to evaluate and continuously improve the innovation management process (Adams et al., 2006).

Measurements within the process of the stage-gate inspired model for innovation have after synchronization of both literature and the results, shown being a significant part to deal with in order for the firm to evaluate and see that the process is functioning. “Measurement-points” have therefore been developed and placed within the process. Exactly where in the process these measurement-points are going to be placed can be modified as the model is developed further. However, the measurement should at least consist of inputs, throughputs and outputs.

7 Conclusion
There has been little or no research in the past in how an innovation management model and process for creating and managing new ideas within the area of SCM should be configured in order to drive and manage new ideas. Our study shows that a generic model for managing innovation within the SCM department does not have to be so different compared to the models scholars are suggesting. Not even when we dig deeper into how the process to drive and manage innovation should look like, as Figure 9 shows. We can only identify minor differences in the configuration from the existing models. Most of the work with designing a process for managing innovation and ideation in the supply chain is about configuring it so that it suits the specific firm.

Nevertheless, it is also important that the supply chain strategies and vision are setting the direction and driving the innovation process. If not, there is a risk that many innovations are ignored due to a lack of insight of the importance be innovative within the supply chain. A suggestion for the future work is to evaluate the current strategy, using one or more of the tools mentioned in section 2.5 and make sure that the strategy is setting the direction and drives the innovation management process in the supply chain.

Another area to address is how to create a system that will allow some radical innovations to be developed further into business cases and projects. Normally, the risks associated with radical innovations often result in that they are killed before being developed into projects. Hence, there is a need to address how some more risks can be allowed in the idea selection process. A suggestion is to adjust the strategy so that more risks, to some extent can be allowed.

Contribution
The practical contribution of this thesis is to provide managers with a framework and process for how manufacturing firms in a similar environment as the case company can manage and facilitate innovation process within the supply chain.

The scientific contribution is that we can conclude that an innovation management process does not have to be very different constructed and managed from the processes normally described by scholars, i.e. product innovation.

**Further research**
This research has studied how a process in large manufacturing firms could be designed in order to facilitate and manage innovation in the supply chain. However, due to the time limit and resources in this research, there were no time to test the model in its intended environment. Therefore, it would be interesting to study this process further, after the implementation, in order to evaluate how the model works in reality.

Furthermore, a similar research in one or more firms in different industries should result in a more generalizable model that can be used as a framework for how an innovation management model within the supply chain can be configured and managed in large firms generally.

Another suggestion for future research is to evaluate the measuring approach. Even though our suggestion with using three measuring points will be good enough in the beginning, SMS might need to evaluate these measurements in the future to find out if they are measuring what they need to measure and if the suggested measuring points are placed in the best spots.
References


Web:

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Appendix 1

Interview questions

General Questions

1. Can you describe your position in the company?

2. What is your main tasks?

3. Do you think everyone within SMS understands the market needs?

Strategies

1. How would you describe the supply chain strategy at SMS?

2. Can you describe the innovation strategy at SMS?

3. What are the main strengths with SMS supply chain?

4. What would you consider to be the main challenges for supply chain management at SMS?

5. Do you think that there are commitment and support from Top Management regarding innovation?

6. Do you work with continuous improvements within the supply chain in a structured way?
   - If so – In what way?
   - If not – why?

Innovation Management (R&D Specialist)

1. What are the main strengths with how you manage innovation?

2. How would you describe the main challenges with managing innovation?
3. How do you come up with new ideas and improvements?

4. How does the selection process of ideas work?

5. How do you measure the results? What KPIs do you use?
Supply Chain Management & innovation

1. How would you describe the word innovation?
2. Do you think there is a need to become better in managing innovation within the supply chain?
   - If so – please describe why and how
   - What do you think would be the main challenge(s)?
3. Can you come up with any suggestions of how to measure innovation in the supply chain (useful KPIs to use)?
4. Can you come up with a general vision or mission for this work?
5. Do you think that the supply chain is performing and serving the customer needs?

Continuous improvements

1. Do you have systematic way to work with and come up with improvements in SMS?
   - If so, please describe this process
   - Is everyone involved in this process?
2. If you come up with ideas for improvements, what would you do with them?
3. Do you have any suggestions how to improve this process?

Collaboration

1. Do you collaborate with other departments within SMS in the development of new products/solutions?
   - If yes – In what way do you collaborate?
   - Have you been involved in the development of new products or processes?
2. Do you collaborate with any external partners in order to find new ideas and solutions?
3. Do think that communication works effectively within the organization, both top-down and bottom-up?