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Innovation process development and business process integration - a multiple case study

Examiners:

Professor Hanna-Kaisa Ellonen

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ABSTRACT

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The main objective of this study was to find out the bases for innovation model formulation in an existing organization based on cases. Innovation processes can be analyzed based on their needs and based on their emphasis on the business model development or R&D.

The research was conducted in energy sector within one company by utilizing its projects as cases for the study. It is typical for the field of business that development is slow, although the case company has put emphasis on its innovation efforts. Analysis was done by identifying the cases' needs and comparing them.

The results were that because of the variances in the needs of the cases, the applicability of innovation process models varies. It was discovered that by dividing the process into two phases, a uniform model could be composed. This model would fulfill the needs of the cases and potential future projects as well.

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Tämän pro gradu-tutkielman tarkoituksena oli tutkia innovaatioprosessin muodostamisen lähtökohtia olemassa olevassa organisaatiossa casejen pohjalta. Innovaatioprosessien malleja voidaan tutkia niiden tarpeiden ja sen mukaan ovatko ne liiketoiminnan kehittämistä vai yleistä T&K-toimintaa.

Tutkimus tehtiin energia-alalla, yhdessä alalla toimivassa yrityksessä sen projekteja caseina käyttäen. Alalle on tyypillistä, että kehitys on hidasta ja tutkittava yritys on viimeaikoina panostanut innovaatiotoimintaansa näkyvästi. Analyysi tehtiin selvittämällä casejen tarpeet ja vertailemalla niitä keskenään.

Tutkimustulos oli, että casejen erilaisuudesta johtuen prosessimallien sovellettavuus vaihtelee. Selvisi, että jakamalla prosessi kahteen vaiheeseen, pystytään luomaan yleispätevä malli, joka palvelee caseja ja on muokattavissa tulevaisuudessa.

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1 INTRODUCTION

The purpose of this research is to find an innovation process model for a situation where idea generation already takes place, but has so far had very little outputs to other processes of the company. The study discovers different ways to process the ideas and the applicability of different methods for innovation process definition. The study is done for a case company utilizing its development projects as cases for the case study and the output of the study is a model that would suit the cases.

1.1 BACKGROUND OF THE STUDY

Innovation has increased in importance when discussing the performance and competitive advantage of the companies, whether it is a product innovation or a business model related innovation. Especially this has proven to be the case when the companies have been followed for a longer period of time. (Alegre & Chiva, 2008, 316) Therefore it is interesting to see how companies in established fields of business are managing this requirement in their operations. As energy industry offers a fairly static environment, where changes seem to be slow and business models well rooted around the core competencies, it would be a suitable environment to research the reaction for demand for innovations (Bointner, 2014, 735). In order to facilitate innovating the companies should offer a framework which would facilitate innovating as innovation can be seen as a process of several activities (Bessant & Tidd, 2009, 19). The context in which the innovation process takes place can be considered relevant and thus an environment where changes are seemingly low compared to other technology related fields and investments large would act as interesting environment to position innovation process in. The interestingness of the environment is largely due to the process of adaption and reaction for demand. The companies in the field are facing a demand that requires development of a meta-process that could facilitate their need for innovation. An established framework of how to manage innovation would make coping with this

demand easier, as the procedures to be implemented could be verified from the model in use.

Adding to the research are the peculiarities of the field of business that is studied. Energy sector in general requires a selection of technologies to be applied in order to function. In this research the case company offers one of the technologies and in particular fuel and services. This business performs as an individual supplier for the national energy cluster and therefore is reactive for the changes in the cluster. Regardless, of this narrow field of specification, case company could seek to extend their core competencies by use of knowledge spill-over from similar fields of businesses such as chemical industries or other fuel related businesses. (Bointner, 2014, 735) All of this requires an innovation process that could enable such controlled development in the organization.

Generally the energy sector is viewed as a mature market, where economies of scale (Pindyck & Rubinfeld, 2009, 245) are in use. The technology markets in energy sector have been generally been referred to as being lowly competitive. Still niche markets are said to exist, thus while majority of demand may be served by old solutions new ideas may still bear fruit. After all, the energy markets are demand based and change in demand is therefore likely to open new possibilities for untested solutions. That being said, the changes are still going to be slow, as the technology diffusion in this field of business is dictated by the long life-time-periods of technological solutions and large investments. (Bointner, 2014, 735)

Taking these realities into consideration, companies operating in the field might benefit from diffusion of the existing technologies by introducing them to solutions and locations where they are not commonly witnessed. This kind of proceedings would be enabled by business model innovations that would allow the companies to exploit shortcomings in the supply. In order to accommodate business model innovation the company should have an established framework according to which the business process in place could be developed or new business processes created.

The problem in question can be considered significant in the case company. The problem also decreases the usefulness of the innovation activities and their outputs.

In the relevant literature it has been discovered that pretty much all of the aspects of the innovation process per se have been studied. However it was found to be difficult to find sources from the point of view of innovation processes position inside the organization and the relations to other processes. It is clear that innovation process overlaps with other processes and it is described as a core process by Bessant and Tidd (2009, 54-90), but there has been difficulties in finding a clear enough description of its position. This position could be illustrated using organizational maps and process flowcharts. It is also noteworthy that the most likely reason for not being able to find clear enough explanation of the position is due to the variances in innovation processes, contexts and organizations in which the processes take place. However, being able to model the pattern and contribute a study of interface connections inside the innovation process, could count as academic contribution and add to the something to the studies conducted so far.

1.2 RESEARCH QUESTION AND RESEARCH OBJECTiVES

The research question 1 is the main question that the study is aiming to answer, whereas the rest of the research question supplement the main question offering more insight on methods used in analysis and managerial viewpoints.

1. How should the innovation process be developed to support R&D projects?
2. What is innovation process in this context?
3. What are the differences between the case projects?
4. What are the points of assessment to be applied in decision making related?
5. What are the needs of the cases for the innovation process?

The research questions are in place in order to specify the study to serve direct purposes instead of having a general take on the research theme (Hirsjärvi et al., 2007, 121)

The subject to be studied relates to issues in connecting company's existing internal idea collection and evaluation process to other processes of the company. These processes include R&D, production and management processes. In innovation process terms this means that the first stage of the process (depending on the model) already exists, but it lacks connection to the further stages of the process. It is therefore somewhat useless. Establishing the patterns of innovation process, while using the existing processes of the company and its distinct context of operations would be considered as a preferred finding of the study. The actual action plan of implementation according to the findings will be delivered separately.

From this setting the objectives of the study can be derived. The objectives are formulated so that they should be specific enough to solve the problem, measurable in order to assess the result, achievable so that the study could be finished, realistic taking into account the factors related to the study and timely in a sense that the timeframe of the thesis process will allow the objectives to be reached (Saunders et al., 2009, 35-36). The objects are defined so that they will guide to research to answer the research questions. The objectives of this study are aimed at answering the research questions and therefore they are directly derived from them.

1. To discover a way of development of innovation process in a way that it would support R&D (Research and Development) projects.
2. To describe what is an innovation process in the context of the cases and the environment in which it is implemented in.
3. To establish the differences between the case projects for the use of model composition.
4. To establish the points of assessment for the differences that are being taken into account when composing the innovation process.
5. To establish the needs of the cases so that the model composed would serve them.

1.3 STRUCTURE OF THE THESIS

The report consists of eight main chapters that are named Introduction, Innovation Process, Innovation Project, Methodology, Findings, Discussion, Implementations and Conclusions. The structure of the thesis will be illustrated in figure 1.

First part after the introduction is the literature review in which the topic related literature is examined. This part is divided into two chapters that are narrowing down the units of measurement within the topic's theoretical frame. The first chapter looks into the innovation process that takes place inside the organization. Models will be presented and general information and characteristics of innovation processes discussed. The second chapter of the literature review will discuss the units that are processed with the innovation process: the projects. In the same manner as with the process scope of analysis the main project models are presented and their characteristics described.

After the chapters that form the literature review, the methodology applied in the research will be presented, justified and discussed. This chapter will also describe the case company on a generic level and have a look on the data and its collection. Also the case company's organizational structure will be displayed in the case description.

The Findings are presented after the methodology. This chapter will be divided into four main parts, three of them discussing the research cases one by one and the last part comparing them with each other.

The findings are then further discussed in Discussion chapter of the thesis. The cases are differentiated according to their needs and the key differentiators identified and evaluated. Also the needs are grouped into two main categories and evaluated. As the two main need categories pose different needs the inter-model actions are also discussed.

Based on the discussion and taking all the presented factors into account, an implementation is proposed. The implementation is a model that tries to take all the issues addressed in the cases into account as well as the ones that may surface when the model would be applied to other cases in the same field of business.

Finally, the research questions are answered in the eighth chapter Conclusions. Also the limitations of the study will be presented and potential subjects for future studies pointed out based on the issues discovered during the thesis.

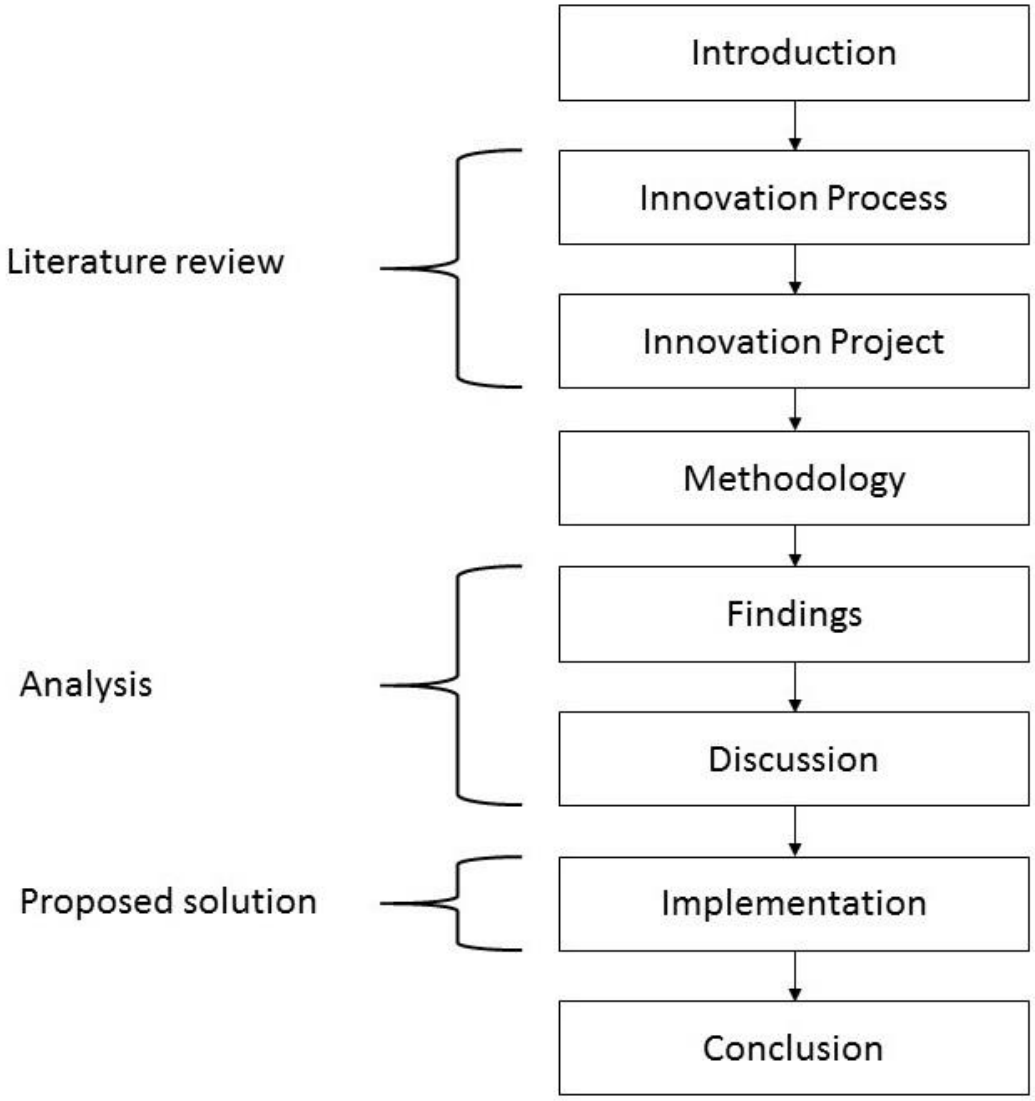

Figure 1: The structure of the thesis

1.4 INCLUSIONS AND EXCLUSIONS

Included in this thesis are the stages of the innovation process, systems integration, business process integration and innovation process development. The study also

tries to find out how can the already implemented stages of innovation process be integrated to other business processes and actions in practice,

Excluded from the thesis are Inter organizational innovation processes, as the innovation process discussed is using only established internal functions. External activities could be required, but they are not looked into in detail. Innovation systems as in national policies or ventures in innovating are excluded, since even if they had a role in the output they were not said to have any input in the cases that the study is based upon. Follow-up of the development, and social dynamics of the organization are also excluded in order to maintain the focus on the process structure.

2 INNOVATION PROCESS

Innovation process as such is not separated to be a business process on its own, but rather a meta-process that takes place in the parts of the organization that it currently involves. In this study it is considered to be a framework according to which the projects are implemented, and it is meant primarily to offer a code of conduct for innovation projects.

In order to establish the framework on which this study is based on, the term innovation needs to be established. Many authors have made their own interpretations of the terminology and no uniform understanding has been established. However, the terminology has common features that are present in most of the definitions. The definitions underline, that innovation is not only the invention of a new thing, but merely the exploitation of it commonly in a commercial fashion. In this study, innovation is referred to as being an idea of product or business that is implemented often commercially. (Tidd & Bessant, 2009, 16)

Innovation in an organization is currently seen as a process, braking the boundaries of other processes. It is seen as a core process, important for organization's renewal, however demanding management and a framework in which it takes place. This process varies according to the organization in which it takes place, but the general structure can be identified. (44) Most commonly the innovation model is presented in a linear model consisting of search of ideas, selection, implementation and value capturing. The creation of an innovation can also take place in several organizations, using knowledge transfer. (55) (Tidd & Bessant, 2009)

2.1 INNOVATION PROCESS MODELS

Innovation processes are commonly modelled in the literature. This gives the research a good starting point as the units of analysis are established and the subject is studied from several points of view. Utilizing these models will be the base of analysis in the thesis as they are readily formulated and discussed among with various examples available.

Tidd and Bessant (2009, 67) use Rothwell's five generations of innovation models to illustrate the evolution of innovation processes. However, Rothwell's five generation categorization, originally from 1994, seems to be a bit out of date since Katarzyna Kozioł-Nadolna and Arkadiusz Świadek (2011, 169) have argued that open innovation model would be the sixth generation of innovation models. This might be true and useful point of view when considering the case company's latest actions in the field of idea sourcing.

First and second generations of innovation process were linear operation on the principle of need pull and technology push. They relate to Schumpeterian model of economic cycles caused by pursuit of productivity (and profits) causing innovation to take place in side organization. (Tidd & Bessant, 2009, 15)

Third generation of the innovation model was concerned as a coupling model that took into account interaction between elements and feedback-loops. This generation already departed from the linear models. Fourth generation of innovation model involves other organizations attendance in organization's innovation process, since feedback from users and new kinds of demanded things from supplier side were included in the model. In the fifth generation the innovation as a process really starts to show, since it is considered as a continuous process, not like project that also has an end. Fifth generation also introduces systems integration and extensive networking into the model of innovation. The fifth generation is the one that this report will be most concentrated on, however the sixth generation that incorporates open innovation and self-learning systems into the model should be taken into account as well. (Kozioł-Nadolna & Świadek, 2011, 169-170)

Bessant and Tidd (2009, 79) have divided the innovation process into four chronological stages that form the continuum. Basadur and Gelade (2006, 178) have named as the basis for their study on the role of knowledge management in innovation process. The basic premise of Basadur and Gelade is that intellectual capital is turned into firm performance via the use of innovation. As a basic premise this is very relevant, however for this study the innovation as a process needs to be broken into stages. This should be done in order to name the interfaces after and before the stages that need to be integrated with other processes. The Bessant and Tidd's model offers a reasonably good premise for doing just that. The four stage

model of an innovation process is not the only one available as Desouza, et al. (2009,10) are using a five-stage innovation model (generation and mobilization, advocacy and screening, experimentation, commercialization, diffusion and implementation) to illustrate the process. The general idea of the process is the same as in Bessant and Tidd's model, however the process is further divided. The five stages are then further divided into seven well defined stages. And the pattern of actions on these stages are further evaluated according to the existence and implementation of company's innovation strategy.

The first stage of the process is named search and during this stage the environment is observed in search of signals of potential change. The gathered information can then be further used during later stages of innovation process e.g. in screening, but most importantly the search stage tries to define what to innovate. The crude model does not take a stand on the source of innovation, meaning if the pattern of idea generation has been open or more inbound, if there has been demand pull or technology push etc. (Tidd & Bessant, 2009, 79)

At the selection stage of the innovation process, following of the company's innovation and business strategy takes a more focal role. At this stage the inputs are evaluated and passed on to the developing processes of the company, if they meet the criteria set up in company's strategy. The inputs, i.e. the information from the search stage can be then further turned into products and services. This selection and screening is aiming to reduce the amount of ideas of high implementation costs or little likelihood of success to be further considered and tries to identify, refine and streamline those of larger likelihood of success (Desouza et al., 2009, 17). Among with company's strategy, the innovation idea, formed from the outputs of the searching stage, needs to match the resources and competences of the company. (Tidd & Bessant, 2009, 81-81)

Implementation stage follows the selection. In many cases the implementation is considered to be a combination of research and development and other forms of knowledge gathering that is needed in order to get hold of a product or service that would fill the need it was invented for. Knowledge gathering and inventing solutions takes place during this stage. The implementation stage should be viewed as a collection of multiple different actions that are done in order to make the selected

ideas usable for the purposes they are intended. The content of the implementation stage depends heavily on the type of the innovation in question. Incremental improvements may rely on the knowledge and prototyping done earlier, while radical innovations may require acquired knowledge from outside and extensive prototyping. (Tidd & Bessant, 2009, 81-83) The knowledge acquisitions and other help outside the organization hosting the innovation process is also emphasized in the five stage model. In the five stage model the implementation stage is covered within experimentation and commercialization stages. The experimentation stage is there to discover the ability to execute the idea and refine it, whereas commercialization stage will study the impact and potential benefits from the idea. (Desouza et al., 2009, 20-25)

In the last capturing stage of the innovation process, the organization is trying to benefit from the value created by the output of the innovation process. Formality of the value varies from patents to tacit knowledge. In real terms the value could be monetary gains, market share or in some cases changing the world into desired direction. (Tidd & Bessant, 2009, 85-86) Desouza et al. (2009, 25-27) are putting emphasis on more concrete aspects in their final diffusion and implementation stage and highlighting the end user or customer of the innovation. Change as a concept is also mentioned and proactive approach on development is promoted in order to gain full benefit from the innovation. Distractions and overlapping with previous solutions should be intentionally removed.

Other two models for innovation process are named by Nigel King in his 1992 paper “Modelling the innovation process: an empirical comparison of approaches” (92-93). First of the named models is Zaltman’s et al’s model using two chronologically positioned stages called initiation and implementation. The initiation stages is divided into three sub-stages (knowledge awareness, formation of attitudes and decision) and the implementation consists of two sub-stages (initial implementation and continued-sustained implementation).

Other model King (1992, 93) named was the Schroeder et al’s model which consists of six observations, of whose sequence is not necessarily fixed, although some of them have a logical chronological order. These observations were stimulation by shock, initial idea that accumulates into several ideas, unpredictable setbacks,

simultaneous coexistence of new and old, restructuring of the organization and top management involvement in the process.

These two models date back to earlier stages of innovation process studies and are therefore not necessarily in focal position of this study. Zaltman et al's model seems to be just an outdated version of models referred to earlier. However, Schroeder et al's model, while being more abstract and more loosely defined, may offer some views that can be utilized further in the study. This is because the study is not just about defining the innovation process, but also about integrating it to other processes. A wide scope of approaches can therefore be used in order to find the interfaces, stages and entities that are to be collaborating.

As the stages model seems to be the most commonly accepted way of illustrating a generic innovation process, it needs to be further explored. Mario Sergio Salerno, et al (2015) divided the innovation processes into eight different patterns that applied for their 132 cases studied. The main differentiating factors were related uncertainty management and the conditions in which company in question operates and to which it has to adjust its innovation process. (62-63) The structure of the process may reveal the organizations inertia and priorities towards the process. The stakeholder connections are also changing among the models, so connections inside the organization and outside the organization can be studied.

The first model of innovation processes was named "Traditional process: from idea to launch" and it was the most common of the models, since it was implemented by over the half of the sample cases. It is a linear model consisting of stages starting from idea collection and ending with the finalized product on market. The initial idea is said to come from inside the company. This model suffers from being weighted on the side of incremental innovations on the cost of radical innovations and this model is most commonly used in companies that have a well-defined and established innovation process. This model is said to be used commonly in established markets and usually the expenses and formality is high. (Salerno et al., 2015, 63) This is a similar model to those used by Peisi et al. (121) in their case study, where the management of innovating was studied. The main difference was within the development part, which was divided in two: concept implementation and innovation piloting.

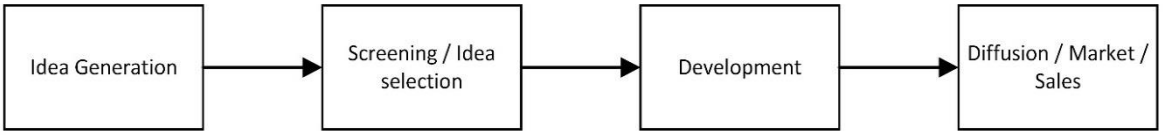

Figure 2: Traditional innovation process (Salerno et al, 2015, 63)

For the second model, the authors used a title “Anticipating sales: the tailor-made approach (open order)”. This model is characterized by fairly close cooperation with the client of the company, as it is involved in ideation, contact definition (sales/order in the process), product development and delivery in this order. The process ends when the product is accepted by the client. The client’s role is not just taking part in the process, but it also often includes financing of the stages and committing resources to the project. Company’s product requirements and pricing, affecting R&D, are often caused by client’s uncertainties. The examples of these processes ranged from industry to consumer goods, but were clearly business-to-business type of joint efforts. (Salerno et al, 2015, 63-64)

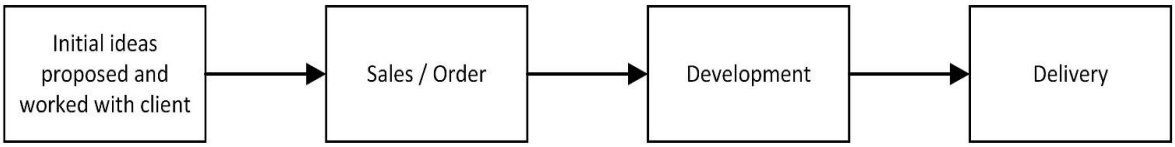

Figure 3: Anticipating sales: the tailor-made approach (open order) (Adapted from Salerno et al, 2015, 64)

The third model is called “Anticipating sales from given client specification (closed order)” by the author. Also this process starts with the client giving specifications or an initial idea for the product. Contract is then made and a product developed according to it. Finally the product is accepted by the client and delivered. Uncertainty is not considered as an issue in the idea generation and the process is therefore simpler than the previous one. The examples varied from IT to automobile industry. (Salerno et al, 2015, 64)

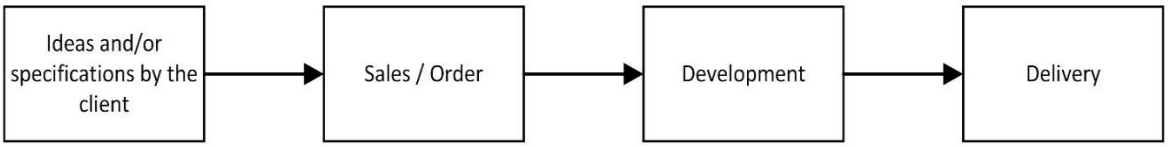

Figure 4: Anticipating sales from given client specification (closed order) (Adapted from Salerno et al, 2015, 64)

"Process started by call" was named as the fourth model of innovation process. This model is closely related to public procurement and the examples were industry related or projects meant to serve businesses' needs. As this model also is stage-based, the first action is the predevelopment of the product to be offered to the client. After this is done the company hosting the innovation process basically enters the competition between companies in order to win the call and be chosen as contractor. This stage involves companies' resources and effort, and since there is a chance of not winning the call and therefore mitigation of the work done, thorough assessment of the offer. If the company happens to win the call and sign a contract with the client, further development of the innovation will follow. Main part of the innovating takes place here and development can also involve the client. After the development is done the product is then delivered and accepted by the client. This model is dictated by the client, but it also lowers the risk of wasted resources by dividing the process into two stages of development. (Salerno et al, 2015, 64-65) These kind of innovation processes are likely to appear in the context of requires for quotations (RFQ), which often take place in business-to-business sales related to larger purchases and novel products.

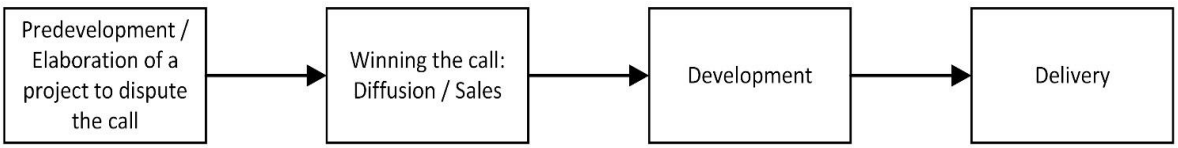

Figure 5: Process started by call (Adapted from Salerno et al, 2015, 64)

"Process with a stoppage: waiting for market" was fifth of the models introduced by Salerno et al and the first one to pose a stoppage and management of such. The basic structure is similar to the first "traditional innovation process", however this model has to deal with a stoppage that occurs after the diffusion stage. The idea is

first generated and selected, the product is then developed and after that the diffusion takes place until there is stoppage presented by the market uncertainty. The stoppage could be by the company or the markets and it could relate to scalability issues or mismatch of supply and demand. In practice this means a stoppage of the sales that have just started. Salerno et al also state that the sales occurring before the stoppage are not usually full-scale, but initial, more pilot-scaled sales. While the process is halted, the company hosting the process is reallocating their resources and redirecting the process in a manner that would be more suitable for the markets. This is basically a second stage of development during which the company tries to apply the market knowledge gained during the end of initial sales instead of abandoning the project. In some cases a potential client has been involved in the second stage of development in order to get a product that serves their needs to the market. After the secondary development a secondary diffusion takes place with an adjusted product intending to reach larger scale of production and sales. This type of model often takes place in an industry with a constant flow of production (e.g. chemical and component manufacturing industries). (Salerno et al, 2015, 65-66)

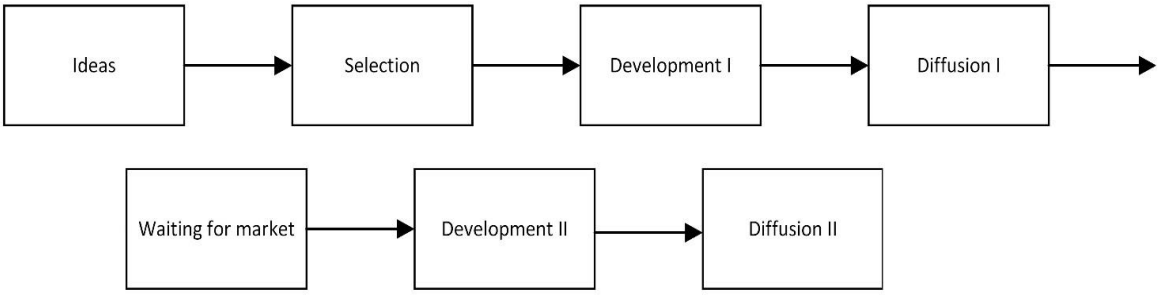

Figure 6: Process with a stoppage: waiting for market (Adapted from Salerno et al, 2015, 65)

The second model including a stoppage in the process was called “Process with a stoppage: waiting for the advance of technology”. By structure it is very similar to “Process with a stoppage: waiting for market”, however this time the stoppage is not caused by market uncertainties, but merely a bottleneck in the technological development of the innovation. Most commonly it is related to inability to scale up the production and the stoppage is largely involuntary. The stoppage may also be

caused by external parties (e.g. institutions, other companies) if they are involved in the innovation process. While the stoppage takes place, the company often searches for technological gaps and solutions in order to further develop the product or production and ultimately continue diffusion. (Salerno et al, 2015, 66-67)

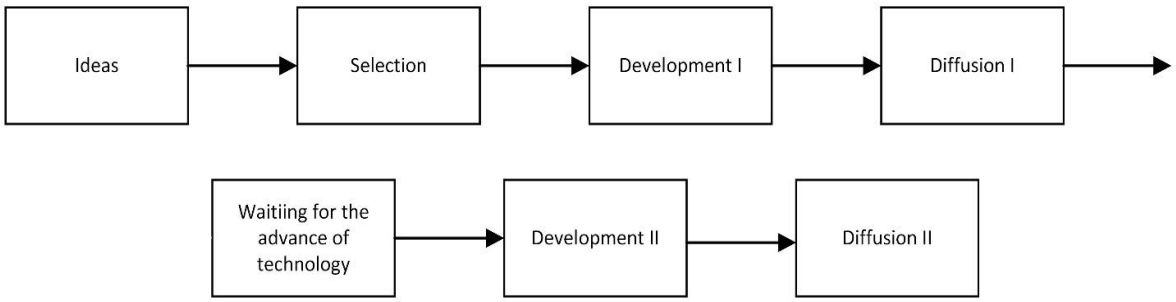

Figure 7: Process with a stoppage: waiting for the advance of technology (Adapted from Salerno et al, 2015, 64)

When the two innovation process models including a stoppage are combined, a rare, seventh innovation process model called “Process with a stoppage: waiting for the market and for the advance of technology“ takes place. As described the innovation project first faces a technological bottleneck after which the markets pose such uncertainties that the process cannot continue. The examples of this case show no consistency and the model is considered merely as a managerial task and opportunity to develop new stable markets from niches. The model is similar to those pictured above. (Salerno et al, 2015, 67)

The final, eighth, innovation process model is called “Process with parallel activities”. As the name states, in this model two of the process stages take place simultaneously. The overlapping stages are development and diffusion, and the idea is that while the product is not completely ready or lacks features and adjustments it can still be put to the market and be updated while it is being sold. The development is not halted because of market or technological uncertainties. This mode of operations does not suit all the companies and the examples were named to be in fashion and software industries. The main justification for adaption of this kind of innovation process is time advantage that may gain the company originality (not being pirated) or technology leadership. Especially in IT-industries the feedback

received from the users of beta-version of the software may be of high importance for the developers. (Salerno et al, 2015, 67-68)

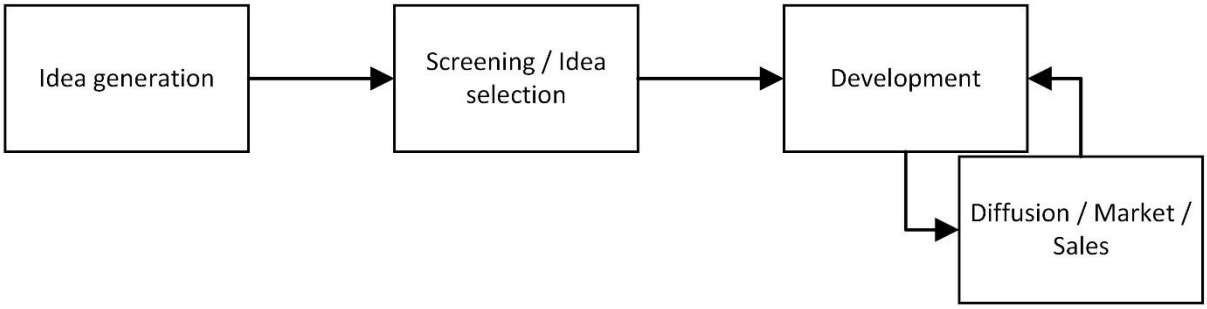

Figure 8: Process with parallel activities (Adapted from Salerno et al, 2015, 67)

2.2 OHTHER FEATURES OF INNOVAVION PROCESS

Innovation process has many peculiarities when compared other business processes. Innovation process can be seen from different points of view and analysis of it can be done based on variety of different theories and aspects. In the following some of the concepts and viewpoints are discussed.

2.2.1 CONTEXT EFFECTING THE PROCESS

According to Tidd and Bessant (2009, 65), the innovation management is affected by the context in which the innovation process takes place. The context is divided into six variables that are used to categorize the affecting dimensions.

Sector of the organization, in which the innovation process takes place is bound to have an effect on the innovation process due to varying priorities and emphasises of the field in which the organization operates. The mode of doing business as well as the desired outputs of an organization varies. Size of the organization affects the innovation process in terms of availability of resources and requirements for networking. National systems of innovation that vary according to the country hosting the organization affects the intra-organizational innovation process, since

the incentives and support may vary and be emphasized in a favouring manner. Innovation process can be looked at also at project level, which further highlights its context sensitive nature in practice (Ozorhon, 2013, 455).

The point on which the innovation is on its life cycle affects the emphasis on the innovation process. A general categorization of innovation life cycle in chronological order consists of fluid pattern, transitional phase and specific phase and they vary in means of emphasis, innovation stimulation, type of innovation, product line and production process. (43) Different things are given effort to depending if the innovation is new or if it is already in a more mature stage. (Tidd & Bessant, 2009)

Degree of novelty is also named as one variable when assessing the context of innovation process. Tidd and Bessant (2009) have categorized novelty between continuous and discontinuous innovations. They refer also to distinction between radical and incremental innovations and how they require different approaches in terms of innovation process. One of the suggested changes was to accommodate the radical enough innovation in an organization of its own in form of e.g. spin-off.

External effectors may also have a role in the context affecting the innovation process. These external effectors were defined to be a vast group of factors in the environment of the organization. Also the regulations are setting limitations for the innovation process, since the country hosting the organization may have legal restrictions concerning the field in which the innovation takes place. (Tidd & Bessant, 2009, 32-36)

2.2.2 RELATIONSHIP WITH KNOWLEDGE MANAGEMENT

The innovation process was discussed from the point of view of knowledge management by Min Basadur and Garry Gelade in their 2006 paper. This is a very relevant approach, since it is bound to analyse innovation process as a part of a multi-division organization and therefore to tackle issues of process integration. Knowledge management as a subject is more conceptual than the stages models and therefore it gives a holistic organizational perspective to the subject of innovation process. The knowledge management approach also presented a cycle

of learning and inventing in an organizational context. The knowledge management approach highlighted learning and unlearning as a central pattern of organizational thinking and renewal (49). To accommodate this approach the thinking behind the innovation process was displayed as a four stage process. The stages were: generating, conceptualizing, optimizing and implementing, in that chronological order (50). By using this approach the authors were able to justify innovation process in the organization and display its vitality in the development of business. (Basadur & Gelade, 2006) Knowledge has also been recognised to have an inertia to it that affects organizational innovations via organizational learning. The organization's learning performance can be increased by members that have high experience inertia (Shu-hsien et al., 2008, 186-193)

2.2.3 ROLE OF TRUST IN THE INNOVATION PROCESS

Trust in the context of innovation process differs from the commonly accepted concept of acceptance of vulnerability in exchange to likely positive outcomes. In innovation process the trusting party is expecting a reasonable and positive reactions by others in response of to that party's innovation attempts. The likelihood of positive reactions therefore increase people's efforts to innovate. (409-410) in their study, Clegg, C et al preferred the role of trust to be primarily a predictor in the innovation process. This was because they found people to engage in innovation process as they perceive the likelihood of reward being increased. The secondary role of trust was named to be a moderator of the process at different stages, since they found the trust to be in a moderating role between people's personal/job variables and idea suggestion. (411) (Clegg et al., 2002)

In the context of process integration trust might have a role that either restricts or increases the transaction between interfaces. Therefore the aspect of trust is worth of mentioning in this study, however it is to be seen, if such situation can be found during the research. In the very essence trust seems to be one of the focal building blocks of the process and according to Säfsten et al. (2014), the actions in most of

the aspects of managerial issues regarding interfaces are somewhat mutual, thus require trust (230-231).

2.2.4 TECHNOLOGY IN INNOVATION PROCESS

The likelihood of the case company's innovation process being a technological innovation process is high, due to the field the company operates in. Technology as such acts in an enabling role in the company's business to develop (Narvekar & Jain, 2006, 183) It is therefore justified to pay attention to literature related to technological innovation process as a concept and revise the related terminology.

In general terms the technological innovation process is said to consist of three phases: invention, innovation and diffusion. However, from another point of view, the technological innovation process can be seen as a process, that has technology as inputs and that produces technology. The technology itself is referred to as a stock of knowledge, whether codified or in an intangible form. (315) As per the technological innovation process itself, it is characterized to be of continuous nature, path dependent, irreversible and affected by uncertainty (316). All of these characteristics are defined and justified in detail. (Nieto, 2004)

Mariano Nieto (2004) also divides the terminology used in study of innovation process into two main categories: flow magnitudes and stock magnitudes. This relates closely to continuous nature of the innovation process, since the flow magnitudes are defined to be ones related to the innovation process, learning and knowledge gathering or creation, whereas stock magnitudes refer to inputs and outputs of the process i.e. in the case of technological innovation process, to technology and knowledge. (Nieto, 2004, 317)

Technology as a concept is characterized to be an information intensive good that is similar to knowledge. Technology is created by innovation process, of information, and it can be codified, transmitted, assimilated and appropriated. (Nieto, 2004, 319-320) Technology as a term is relevant for this study, since it is the input and output of the stages of the innovation process. It is therefore the thing to be transmitted

between the interfaces of the division or processes during the innovation process in the organization.

2.2.5 RELATION TO OTHER PROCESSES

As the nature of the innovation process further discovered and understood, it also becomes clear that entities of such kind do not exist in solitude. There are various factors affecting the nature of the process. Such factors are defining of what the process is like and where it takes place. Also the array of parties involved in the process are varying the form of the innovation process. Putting all this aside, the quality of inputs by the different factors tend to vary and this issue is addressed by Souza and Bruno-Faria (2013). In their paper they have managed to name 10 helping and 12 hindering factors of the innovation process.

There were ten categories that were identified as helping factors for the innovation process: 1) support of senior managers 2) support of mid-level managers 3) support of working groups and employees 4) diversity of competencies of the group responsible of implementation 5) disclosure of information regarding innovation 6) strategies for incorporation of innovation in organizational routines 7) participation of outside consultants and new employees 8) planning of actions necessary to implementation 9) recognition of the value and need for innovation 10) Systematic perspective of innovation and interactions of organizational units. (Souza et al., 2013, 115-117)

Perhaps the most relevant ones of these factors, in the context of this study, were numbers 4, 6 and 10. This is because those are the factors that have the closest relation with innovation process integration and the actual helping factors needed to take into consideration. Other factors mentioned are important in the context of the entire innovation process.

The hindering factors of the innovation process were listed as follows: 1) Scepticism about innovation 2) Difficulties of inter-functional integration 3) excess of activities and lack of time 4) lack of support from senior managers 5) limitations in terms of human resources 6) limitations in terms of financial resources 7) limitations in terms

of technological resources 8) obstacles from the external environment 9) prioritization of end and/or short term activities 10) fear of the consequences of innovation 11) resistance of innovation because of loss of power 12) resistance to innovation due to a sense of accommodation. (Souza et al., 2013, 117-120)

In the context of this research perhaps the deepest focus will be on hindering factor number 3, while other, surely important factors may be perceived as hindering as a proxy i.e. via some phenomenon that is not directly related to innovation process integration directly. It is to be seen in the further study if some of these problems pose major effects on the innovation process itself.

2.3 PROCESS INTEGRATION

The research question named in the introduction consists of both process integration and innovation process. The question is therefore closely related to interfaces of process inside and outside the organization. Säfsten et al. (2014) are discussing exactly on interface issues related to innovation processes in industrial organizations. In their paper they analysed three aspects (transfer synchronization, transfer management and transfer scope) related to industrial innovation processes against market uncertainty, technological uncertainty, product complexity, dispersion between technology development and product development, and dispersion between product development and production. This is very relevant to the topic of this thesis, since Säfsten et al. are seeing the innovation process as a holistic entity, which is managed in many perspectives and passed on inside a concrete organization. It involves variety of personnel operating in different functions, divisions and positions in an organization and is not a tangible entity in itself. However, needs to be managed by some instance and that instance is facing challenges posed by the fact that innovation process involves many parties that need to collaborate and interact, i.e. integrate in terms of the innovation process. (Säfsten et al, 2014)

Although the Säfsten, et al. paper is concentrated in the field of manufacturing industry, their research addresses the most suiting issues related to this thesis. The

interaction between the different parties inside the organization has been studied and the findings can most likely be applied to other kind of organizations as well.

The main issues related to timing of the transfer between the parties in an organization are named to be related to the readiness of the technology to be transferred. This may require flexibility from the management and if not dealt with in a correct way, cause issues with the final product launch. Another managerial issue that was addressed was related to transfer management. Management of the transfer inside the organization was dependent on multiple factors, such as complexity of the technology to be transferred and the parties in between which the technology in question was to be transferred. The issues in regard of high complexity of the technology were to be dealt with using structures and formalization and other managerial issues may be handled with extensive co-operation and preparations on both of the interfaces of the transfer. Third main integration mechanism that was mentioned was the thing to be transferred per se. The actual form of transfer is defining much of the issues related to the transfer. It affects both of the interfaces and pose several managerial issues. As a study of manufacturing industry, prototyping was named as a relevant medium of communicating and transferring the content between the sending and receiving parties. However, this may not be a viable option in all the industries and this poses a threat of severe communication defects. When technological uncertainty or complexity of the product increases, or when several changes are done to the product to be transferred, the role of verification of the technology increases. This was emphasized both in theory and practice. (Säfsten et al., 2014, 233-234)

The very essence of interface challenges were summarized to be when, how and what. These are the key factors affecting the inter-process transfers related to innovation process inside the organization. Solving these issues have much to do with the actual structure of the organization, context, industry in which the organization is in and the nature of the product being transferred due to innovation process. (Säfsten et al., 2014, 233-234)

Integration of knowledge and innovation processes of the firm is very relevant to the subject from the point of view of the case company. Guetat and Dakhli (2013) argue that the two subjects are often studied separately, but since innovation

process is heavily knowledge related, these two processes should be integrated. The efficient functioning of both the processes is vital for a business and they are considered to be one of the main sources of competitive advantage (1, 5). Guetat and Dakhli (2013) also take a look from the organizational viewpoint on the subject and find that The Leavitt Model of an organization has some weaknesses due to consisting of only four components (tasks, structure, people and technology), while falling short in describing the interaction between intra-organizational parties and disregards the role of information technology in adaption to changes in the environment. (3) These faults were addressed by the authors and they refined the Leavitt model by adding a new intra-organizational sphere consisting of four more components (strategy, innovation knowledge and information technology) that interact with each other as well as with the ones from the original Leavitt model. This model was labelled as SIKIT model of the organization. Although abstract, this model illustrates the means of an organization functioning in a changing environment and manages to give more detailed view on the intra-organizational connections. (3-4) The knowledge and innovation processes are further studied as a social-oriented, where the actors of the process are emphasized and from a synthetic viewpoint in which the processes are seen as outputs of the strategy implemented by the management (5-7). Lastly the effect of innovation process on knowledge process is studied. The theory is based on separate innovation and knowledge spaces (7) that have interaction in between them affecting each other. The authors also established five dimensions of organizational knowledge (knowledge nature, (organizational-) actor background, actor culture, actor's activity field and actor theoretical ability), that are used while operating in the innovation process. These dimensions are also used when illustrating the movement of the knowledge inside the process and in the way strong and weak ties, as well as structural holes emerge. (9) (Guetat & Dakhli 2013)

3 INNOVATION PROJECT

In implementation the innovation process per se would act as a framework that the projects would follow. It is therefore justified to have a closer look on the projects as units in the process. Given the prerequisites placed by the case company in question, the projects would in most cases utilize the case company's existing structure that has been discussed in the organizational chapter.

3.1 DIFFERENT INNOVATION MODELS

Innovations are not a homogeneous group, but have variance within them. These variances can be measured on various scales, but most commonly the innovations are differentiated either by their radicalness or their origin. By a radical innovation, an innovation is meant that has a severe impact on the market, product or the business model. Radical innovation is considered to be a breakthrough of some nature and to set a new trajectory for the business to pursue. The radical innovations are rare and incremental innovations are more common as they are improving something that already exists. (253) Other scale which is used for innovation differentiation is looking at the origin of the innovation. Literature refers to this approach as market-pull versus technology-push comparison. In essence the market-pull innovations are often incremental and initiated by some shortcoming identified by the market, whereas technology-push is more often an innovation that originates from R&D and the need it serves is not necessarily identified by the markets yet. (390-391) In addition to these ways of model differentiations, also innovations that have an impact on the business model could be named as a separate genre of innovations. (Tidd & Bessant, 2009)

Sometimes maintaining the expected level of growth requires the company to expand its operations to reach outside their core competencies and look for business opportunities in fields that they are not yet operating in. This means that new technologies, markets and customer segments looked at as possible solution for growth. The projects that require exceeding the core operations have the

potential of large success, but also pose high risks that the company undertaking the operations must manage. Often the operations outside the core competencies of the company are managed as ventures which can be implemented in several ways. (Bertels et al., 2015, 20-21)

For analysing and modifying the operations of the company the current position is often presented as a business model which can be presented in a business model canvas. It acts as a main tool for business model innovation analysis, since it gives a holistic view on the operations the company in question is undertaking. (Bertels et al., 2015, 21) By making changes the business model canvas, planners can visualize the extent of the change in their business model and how it will affect the existing business model as a disruptive innovation. Various kinds of coding can be used when planning the changes and the original business model canvas may need to be modified as a framework as well. (Bertels et al., 2015, 22-24)

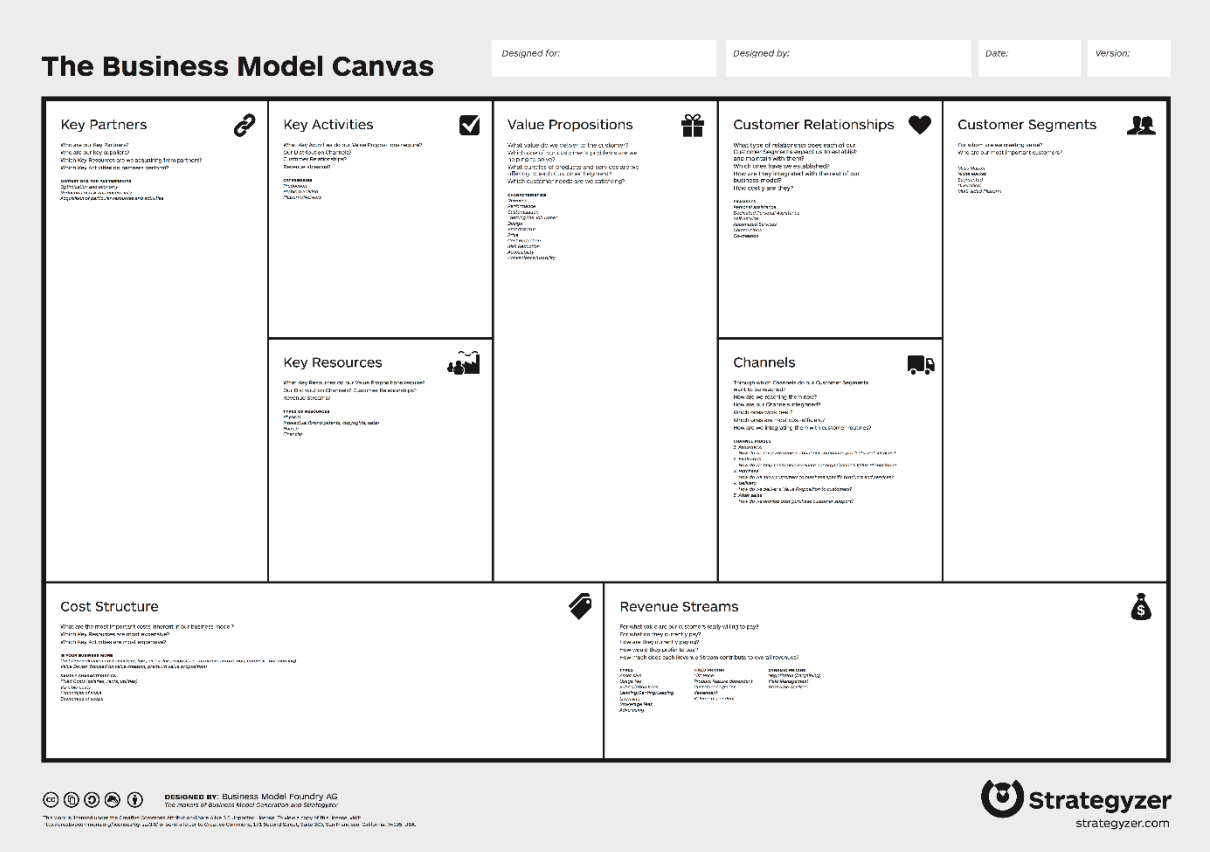

Figure 9: Business model canvas (Osterwalder & Pigneur, 2010, 44)

Business model canvas is a visualization tool that is used for formulating a complete picture of a business model based on categorization of the business model's information. It illustrates the most focal features of the business model in question and it is supposed to help the planners in understand holistically the business entity. Business model canvas consists of nine blocks that are customer segments (CS), value propositions (VP), channels (CH), customer relationships (CR), revenue streams (R$), key resources (KR), key activities (KA), key partnerships (KP) and cost structure (C$). By identifying these, a business model canvas can be filled and in essence the core mode of business defined. (Osterwalder & Pigneur, 2010, 15-42)

Main failure points of business model innovations need to be identified, since there is an obvious presence of high risks. In literature false assumptions were named as a relevant risk that the planners of a business model innovation might face even before the implementation of the operation. False assumptions can be made in all of the business model canvas's cells or components as well as on general level regarding timing of the operation or venture and the extent to which the newly introduced business model would depart from the existing model in use. (Bertels et al., 2015, 24-28)

The extent to which the company has to depart from its original business model is often not the only factor that affects the success or failure of business model innovation. The literature and research implies that often the companies are relatively familiar with the market they are intending to enter, however they tend to make false assumptions on distribution channels, cost structure units and velocity. This means that during the planning of the venture, the planners fail to make correct assumptions in the fields that they are familiar with, while putting effort and emphasis on elements that obviously need looking into. Also explicit organizational learning, well implemented adaption of business model changes and suitable leadership were mentioned as crucial factors for success. (Bertels et al., 2015, 28)

3.2 PROJECT ORGANIZATION

Since the innovation process often involves a single input and single output, it could be seen as a batch process. It creates pulses of action and each of them enter the process and is finally diffused more or less independently. This requires the company to create abilities to cope with a meta-process that operates on a principle of a batch process. One solution to this could be management of innovation related projects and therefore fostering of project organizations. Kai Ruuska (2005) has also put some emphasis on the issue in his book on project organizations. The amount of project organizations in companies is said to have increased as has their relation to innovations and the process behind the creation of innovations.

3.2.1 STRUCTURES OF PROJECT ORGANIZATIONS

In his 2005 book, Ruuska divides project organizations into two by structures. The structures serve a very different purpose and provide information relevant for different uses. The first of the presented models was a tree-model, in which the project organization is seen as a hierarchical and bureaucratic structure rather than an ad-hocratial entity of stakeholders. The tree-model is aiming to provide information on the official division of responsibilities and decision making power. In practice the project organization cannot be structured according to the tree-model due to lack of horizontal communication channels. The tree-model presents the relations between sub-projects, project management and project owners. (Ruuska, 2005, 114-115)

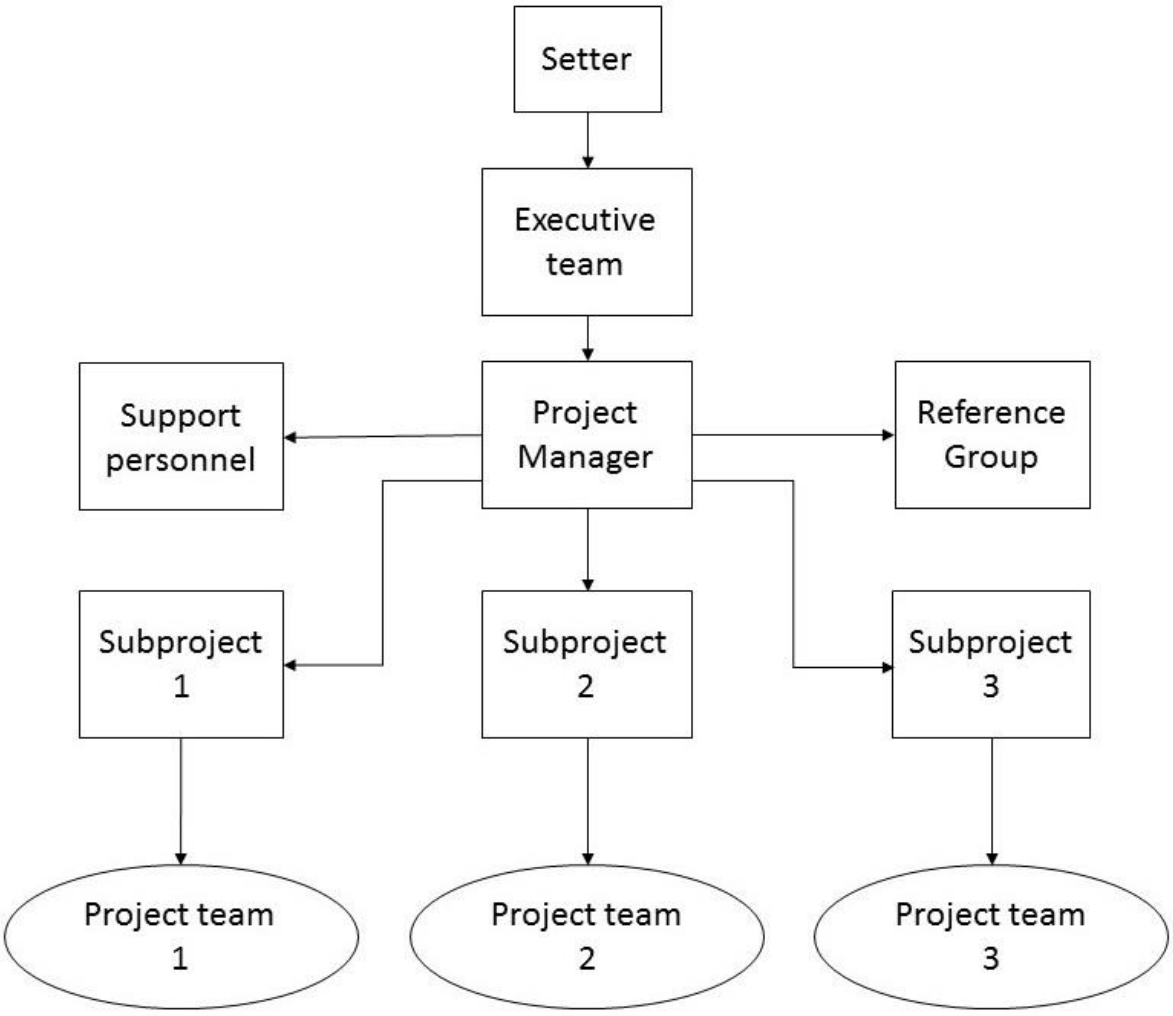

Figure 10: Tree model of project organization (Adapted from Ruuska, 2005, 115)

The other model is named as “the island model” and it is meant to display the project as an island in the organization hosting the project. The project is said to consist of groups of people and they do not necessarily follow the code of conduct of the line organization, but merely allow a lower hierarchy and freer communication in all the directions necessary. The low hierarchy is not the aim per se, but it adjusts according to the conditions in which the project organization operates. The functions related to the aim of the project are present in the island model, however some of the supportive functions may be attained from the line organization. The project organization would be, according to the model, able to solve the problems where they occur by having the resources readily available. This model seems to suit the

innovation process well and be possible to be implemented also in a meta-process context. (Ruuska, 2005, 115-116)

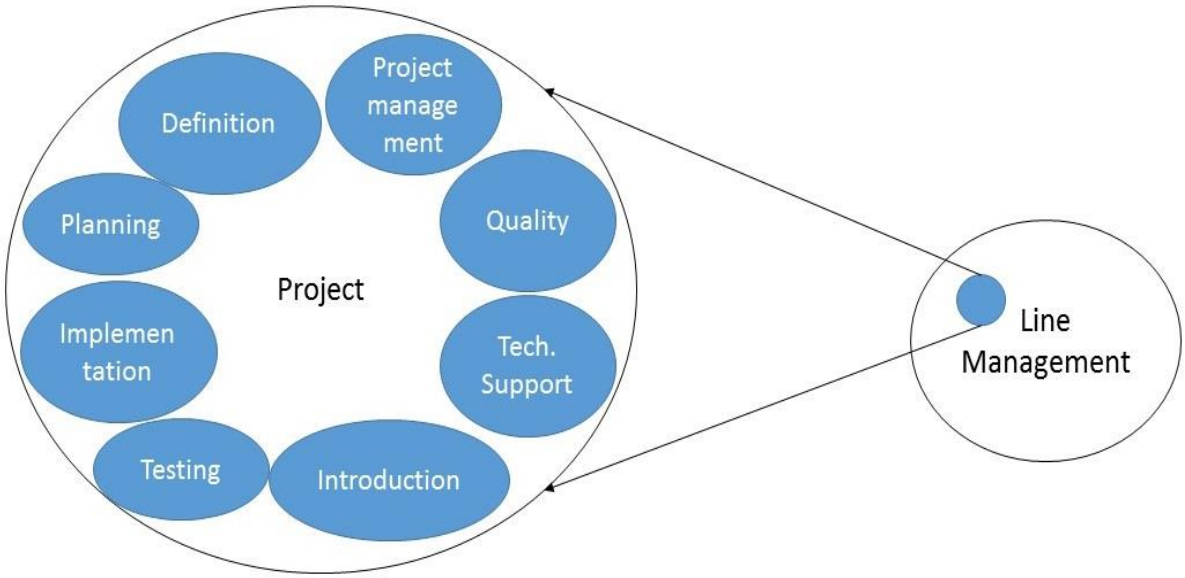

Figure 11: Island model of project organization (Adapted from Ruuska, 2005, 116)

These two models are rather generic, but they succeed in giving a general picture of project organizations' structures. However, studying the structures on this generic level would most likely not provide any applicable outcomes, since the models are mainly concentrated on intra-organizational relations and decision making. In order to make the models more applicable, they must be put into a context in which they would be used. Poli et al. gave this categorization a try in their 2009 paper, in which they divided the projects into four different types. These project types were presented in an illustration that positioned the types in comparison to each other. The project types were assessed according to process change and product change they present. In a similar manner, the proposed organizational structures into three different types. They hypothesized to be applicable in different types of projects.

First of the project type, referred to as "Internal versus external customer projects" evaluated the orientation of the project in terms of the customer of the project, which could be external or internal. Not all projects are commercial. The value addition in

these projects are either direct by sales of a developed product to the customer or indirect by developing or installing something for the use of organization itself to increase competitive advantage. (Poli et al., 2009, 1277)

The second project type called “Breakthrough project” is intended to execute radical changes in an existing product or process. For external customers these projects tend to create a strong advantage in comparison to rivalry, whereas for internal customers these projects tend to improve the organization’s value chain. (Poli et al., 2009, 1277)

“Platform projects” were mentioned as the third type of projects and they were characterized by the aim of creating solid basis for future development. These projects aim on creating modular platform which can be modified or which can adapt changes according to the prevailing needs. This would make future development or deployment easier since some of the basis can be reused and new products can be created by removing or attaching new parts. This type of project is said to be very heavy for the organization, since it requires thorough planning and execution. (Poli et al., 2009, 1277)

Somewhat related to “platform projects” are fourth kind of projects called “derivative projects”. In practice they are the platform mentioned before taken into use. These projects are said to be the least risky ones and easily implemented. By modifying, adding or removing something of an existing product, a new product is created. These projects are made to extend the product life and to avoid the need of undertaking a heavier project of new product development. (Poli et al., 2009, 1277)

As per the actual structures of project organization, the first project organization was identified as “functional organization”. In this structure the members of the project organization are grouped according to their specialization and are responsible of execution of their competencies as the project goes on. The role of functional managers was highlighted and they have the most of decision making in the project. (Poli et al., 2009, 1278)

The second structure of a project organization was called “Pure project organization”. In this structure the aim is to reach the output of the project effectively and a designated project manager is named. He/she is the one responsible of

conducting the project and he/she is the one making decisions in regard of the assembly of the organization. This kind of project organizations are said to often be separated from the core processes of the company and the authors find it to be suitable for new product development especially. (Poli et al., 2009, 1278) This model seems to have similarities to Ruuska's tree-model (2005, 114-115), since the hierarchy and independence of the project organization is highlighted.

The final model for project organization is called "Matrix organization", which takes the features of both of the previously introduced structures. In this model, the vertical hierarchy is more layered into horizontal communications and the project organization utilizes functions at different stages. This model is divided into two sub-models, first of which is labelled "strong matrix organization". In this model the project manager manages the project and reports only upwards vertically, while coordinating in both directions. The verticality of the hierarchy is highlighted where as in "weak matrix organization", the role of project manager is more as a coordinator of work efforts and he/she will be reporting to both directions. Here functional managers have more decision making power as they delegate the tasks given by the project manager. (Poli et al., 2009, 1278-1279)

The project types and project organizations' structures introduced above are proposals of Poli et al. They are suggested to be used as a framework when studying project organizations' composition and their suitability for different kinds of projects. Some hypothesis were named for the suitability, but they were not confirmed in the material.

After or during diffusion the project organization or the output of a project organization might become more static and established part of the organization. When the innovation is seen as a project created by the innovation process, the main variables of a project should be taken into account including risk management.

3.3 APPLICABILITY OF PROJECT RISK MANAGEMENT IN INNOVATION PROCESS

When the innovation is seen as a project created by the innovation process, the main variables of a project should be taken into account including risk management. The question of project risk management's methods' applicability in innovation processes has been discussed by John Bowers and Alireza Khorakian in their 2014 paper of the topic since the similarities in innovation process and projects in general are quite evident or they are strongly related by mode of operations.

Due to the high failure rates of innovations (up to 35%), risks should be taken into account when planning an innovation process. When developing something new the existence of risks evident and it belongs to the very fundamental characteristics of an innovation process. Failure could be even considered as one possible outcome of an innovation process in the models presenting the model in the first place. Risk management is therefore considered to be of high importance and should be implemented well enough so that it that the risks could be mitigated or the project abandoned in time. (Bowers & Khorakian, 2014, 26)

As managerial viewpoint on the projects; it is stated, that the way resources are allocated within the organization has an effect on the innovation process performance. The company might have a portfolio of innovation processes, among which the resources are allocated. The best of new product sales is said to be reached by allocating researches widely among the projects in the portfolio, but this works mainly on companies with novel products. This also reduces the resource commitment on a specific project and increases the company's ability to react to the markets. (246-250) Simply increasing the both amount and quality of innovation ventures is often not an option since the resources are ultimately limited (262). It is therefore stated that the breadth of the resource allocation is the generalizable key to success with innovation processes (266). (Klingebiel & Rammer, 2013)

4 METHODOLOGY

In this chapter the methodology used in this thesis will be introduced and justified. Their suitability will be assessed and the limitations of the use of methods described. Also the literature used for the study will be evaluated as will the reliability and validity of the research. The case company description will be located in this chapter in order to give the reader an understanding of the context of business in which the study is located.

4.1 CASE STUDY

The research is conducted as a case study for a Finnish company, since they are struggling with the exact problem of integration innovation process into the company's other processes. The research will be conducted as a comparative multiple case study and the possible solutions for the case company's issues will be presented separately to the company. The core idea is just to use the setting and available data in order to further define the research problem and describe the implication of the innovation process across the organization. There will be three different cases presented by the company that are selected among the cases of the idea collection blog portal. The cases will differ in terms of process model structure, resource allocation and other features. The cases will be studied in the light of the theory and the differences in between them will be identified. Also the difference in reaction to context presented by the company hosting the projects will be studied. The interactions between company's function will be established and the general pattern of the process identified. This will be done according to the models presented in the theory part or by adapting some of them and establishing the actual pattern.

Case study research was chosen because it would present the most realistic application for an innovation process. By studying the topic based on cases the true variance and practical difficulties with model composition were brought to light. Also the cases gave a realistic position for the process in the industry. By positioning the

innovation process into a realistic context with its limitations, the study increased in depth as many of the possible solutions for issues faced would otherwise been discarded.

The company has presented three cases that are in very essence innovation ventures to be undertaken by the company. All of the three ventures or projects are at a very early stage and have basically just passed idea generation phase and preliminary screening. The future of these projects remain unknown.

The nature of the cases vary providing the research a wide spectrum on the issue of innovation process integration with just three cases. The level of required resources, severity of possible risks and expected timespan varies from opposite to another as does the involvement of external stakeholders and parties.

The cases will be compared according to their characteristics. Needs that the cases or projects present for the owners will be used as differentiators. Cases will also be analysed according to their basic features and by the categories they fit in.

A case study was considered to be the best way to study the formulation of an innovation process, as the examples are real both in substance and nature. The wide array of different cases will put the framework in which they are processed into test and therefore it is justified to use cases that present the extremes that the innovation process might be facing in the future. By using a uniform innovation process for the purposes of developing ideas onwards in the case company, the aim must be related to the pursuit for convenience.

4.2 CASE DESCRIPTION

The case company is north-European Company that has already been operating in the fuel business for more than 20 years. It is largely state-owned, but also foreign companies have ownership in it. The company provides fuel for businesses, private and public transportation and households, as it imports fuel and distributes it. Also related services are offered. The case company operates as a group consisting of seven limited companies including the parent company. These limited companies

serve different purposes for the group as they are specialized in their own narrow fields. The group employs less than 500 employees and it also carries out research in the field of fuel industry and related business. (Company website, 2015)

The case company presented their organization with a visualization of their organizational structure done earlier. The company is managed as a matrix organization that has four main business processes that are using seven functions presented horizontally. A matrix organization presents the structure of the company as vertical and horizontal blocks, in this case the vertical blocks being the business processes that company runs and horizontal ones being the functions of the organization that the processes utilize. This enables the business processes to utilize field specific knowledge while maintaining its focus on the business it is running. (Karlöf & Lövingsson, 2006, 33)

The case company's organizational structure is managed by a CEO positioned to have control over all presented functions and business processes. All the functions are utilized by business processes, while one of the functions acts as a separate business process in itself. In addition to the main business processes also one separate form of business was presented to exist among other business process, but without connections to the functions that were utilized by the others. This business process seems to operate as a separate venture and its manager is not a part of the case company's executive group. Neither is function number five (marketing, corporate responsibility and communications) a part of the executive group unlike all the other functions.

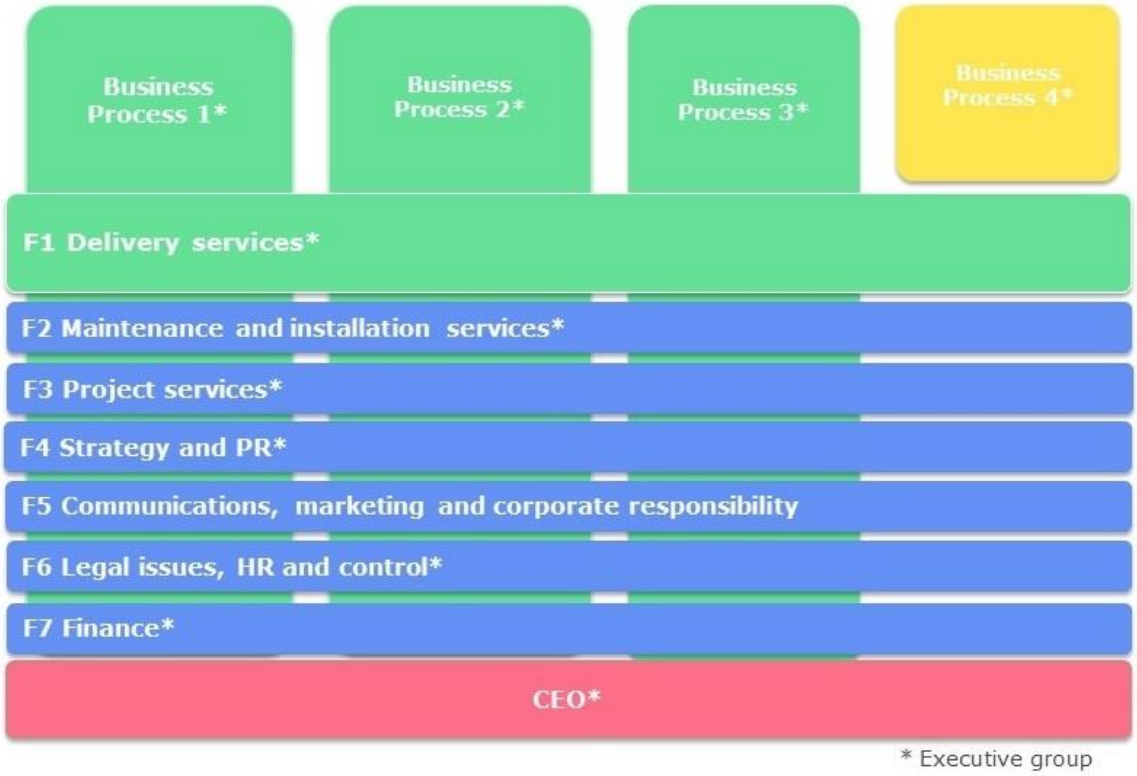

Figure 12: Case Company's organizational structure, a matrix (Adapted from company's internal materials, 2015)

A matrix organization benefits from being able to focus on two dependencies that are crucial to the business. Matrix organization as a structure forces an intensive dialog to take place, since the business processes need to be in close connection with the functions they are utilizing. This crosses the internal borders of the company increases knowledge transfer. Also, since the functions are separated from each other, the resources can be efficiently divided to fit the needs presented by the business processes. (Karlöf & Lövingsson, 2006, 35) Matrix organizations are also mentioned to be a good match between project objectives, systems and procedures and the members within the organization. (Troanca, 2011, 191)

There are also disadvantages in the use of a matrix organization as the structure with which the company is managed and operates. The main disadvantage is the division of responsibility. This was said to cause absence of responsibility, since the structure is based on transfers between entities within the company. Also some

competition for power may take place and since the structure involves large number of employees some group effects might occur. The total costs of a matrix organization is also said to be higher due to having function and business process personnel and management. At the point of dialog, the twofold management may also cause problems, since double-reporting is required and managers may be focusing on their personal business unit instead of looking for the greater outcome of the interaction between business process and function. In contrary also lack of decision making may also take place. (Karlöf & Lövingsson, 2006, 36) Also it is said that the outcome of the interaction may suffer from lack of holistic management, since the functional manager specifies in decision making related to the functions operations and the manager of the business process is duly concentrating on business process related decision making (Troanca, 2011, 191).

4.2.1 DESCRIPTION OF THE CURRENTLY USED INNOVATION MODEL

Currently the innovation process in place has been defined to consist of an idea collection tool that includes peer evaluation of the idea and open discussion related to the idea. From there on the ideas would be refined and screened and placed in to the case company's venture portfolio if they are considered worthy. From there the ventures would be taken under if by the usual project management of the company. So far no ideas are said to be developed from the idea collection tool to an implementable venture. (Interview with decision makers)

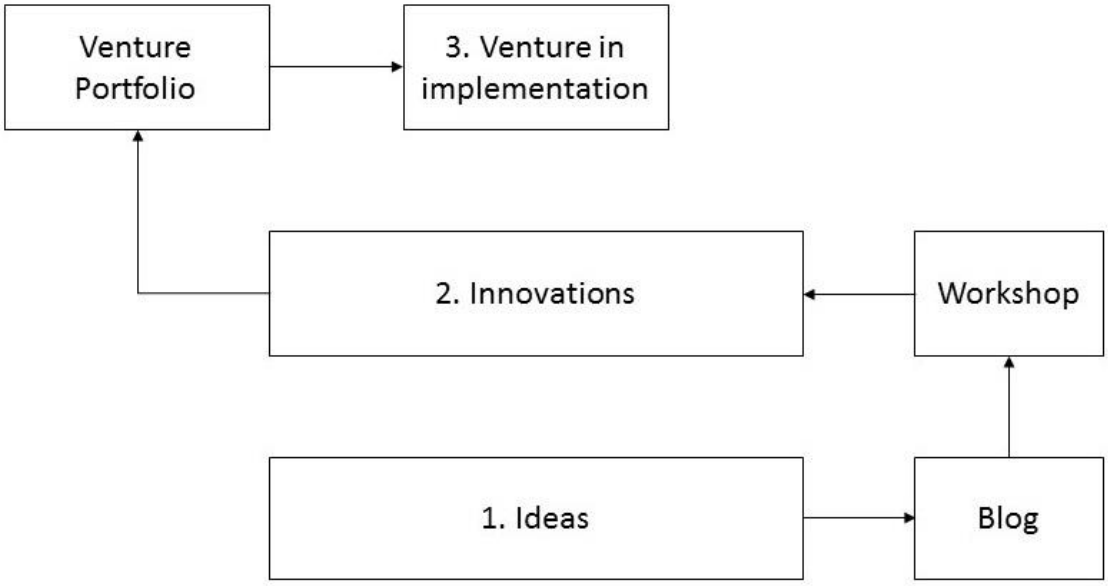

Figure 13: Innovation process as presented by the case company (Company's documentation, 2013)

The idea collection tool is implemented as a web-based blog where anybody within the case company is able to initiate an idea. The idea would then be visible for everybody and the idea would be subject to comments or further development in the comment section of the blog-post. The most prominent ideas would then be picked up by a commission that would further analyse the potential of implementation and start researching the subject in question in further and more practical detail. The innovation process is internal and the by the presented model no direct outside input is processed. In addition to this the company has had other efforts for idea generation from outside the company.

4.3 DATA COLLECTION

A qualitative approach was chosen to be used in this study. When discussing integration of processes and something this abstract, it is hard to come up with variables and their correlation that would contribute to the research. In addition to that, valid quantitative data on this particular topic might be difficult to gather and the benefits of doing so may be outweighed by the effort. However, the research

could be supported by numeric data, even if it is not used as a solution for the research question itself.

While being a case study involving three cases from one company, no quantitative measures were considered relevant. No sample that could have been formulated from the data available related to the topic would have been large enough on by studying causalities and relations the results would neither have been reliable enough nor been usable for formulation of even this generable model. Therefore the qualitative approach was chosen to be used.

4.3.1 INTERVIEWS

For finding a solution for the case company's problem, the operators of the existing innovation process were interviewed. Since they have experience on operation a process of that nature, they provided some insight for the research itself. The interviews of professionals facing the problems related to transfers between parts of the organization and process integration in general, is gained access to relevant and valid data. This required consistency for the research question when planning the interview. Due to the fact that the research is qualitative and the topic is of a specific, but highly abstract phenomenon, the interviews used were semi-structured and allowing to further deepen understanding on topic discussed if needed. Semi-structured interviews provided the content with enough depth, while maintaining the focus on the topic, while unstructured interviews pose a risk of loss of efficiency in data collection due to side-tracking. (Saunders et al., 2009, 318-321)

Interviews were recorded and extensive notes were taken. Interviewees were also asked to fill a numeric evaluation tool in order to visualize the differences between the cases and viewpoints of the interviewees (Appendix 2). Neither further numeric comparison, nor other quantitative methods will be used in analysis. The interviews were based on a loose guideline of guiding questions while the discussion itself was free and allowed minor side-tracking every once in a while. The topics discussed were not of such nature any reading between the lines would have been needed and the discussion during the interview remained substance oriented. See appendix

1. The level of analysis of this study does not require transcriptions of the interviews, since no repetition or tones of voice played a relevant role. Instead the content of the discussions was explicit and the questions presented were given coherent answers.

Interviews will be the main source for need identification that will be used as the basis for analysis of the innovation process that takes place or needs to be formulated in the case company.

In total there were four interviews conducted. Three of them were done with the writers of the blog-posts and one of them was held with the decision makers that are doing the evaluation of the blog-posts. The writers of the blogposts were interviewed individually, while the decision makers were interviewed in a group interview that was guided using the criteria of the numeric tool that the writers of the blog-posts were asked to fill. The decision makers were also asked to fill the same question from a different viewpoint and giving their evaluations of based on consensus reached among them.

Writers of the blog-posts were located all around the case company's organization in variable positions. Only one of them worked at the headquarters in Espoo, while one of them worked in company's Hyvinkää office and another one in their Kouvola facility. The interviews were held on their premises and on separate days. The details of the interviews are displayed in appendix 3.

Both the decision makers and idea generators (A, B and C) were interviewed separately in order to get different viewpoints of the studied cases. The idea generators, who had originally written the blog-posts had a lot of insight in their cases and in some cases had conducted studies and research related to the cases they had initiated. The work done related to the cases gave practical viewpoints and outlined the actual pattern of the projects, if they were taken into implementation. The interview with the decision makers was structured so, that it took all of the three cases into discussion and their position, ownership and criticality for the case company was discovered. Also, since the interview with the decision makers was a group interview, the statements that were made in the numeric comparison tool were based on consensus of professionals of different fields.

The interviews with idea generators consisted of a predetermined structure. The guidelines for the discussion were the same for all the three cases and the interviewees were also asked to evaluate their case on numerical scale according to different criteria roughly divided into input and output of the case in question. This same numerical evaluation was then used as a framework for the interview with the decision makers. This was not a perfect fit, as the criteria was questioned and presence of a different viewpoint showed that what had worked with the individual cases did not necessary work as an evaluation scale when comparing the cases with each other. The evaluation criteria worked as a framework for discussion and provided different viewpoints on the process as well as evaluations for the individual cases. In addition to the evaluation and comparison, a general discussion was also held related to the company's innovation process and the structural issues related to the process were further discussed. The structure of the interviews with the writers of the blog posts can be seen in appendix 1.

4.3.2 SECONDARY DATA

There seems to be a relatively wide base of literature in forms of articles and books written about different characteristics and functions of an innovation process, however the interface phenomena between the stages of an innovation process seems not be thoroughly covered. (273) the secondary data and sources will mainly come from the literature and earlier documentation of the case company. Researcher's ability to collect data on this topic is fairly limited and the reliance on secondary and proved data will therefore be heavy. (Saunders et al., 2009)

As the researcher is not involved in case company's operations, nobody has been in a position to do testing or otherwise effect the cases first-handily. It is therefore justified to use secondary sources for data collection as they were the only feasible mean for me to access the case related information. Secondary sources offer the study comparative and context related information that is required in the results, while being in access and trusted to the level that no bias or purposefulness in data will be expected (Saunders et al., 2009, 268-272). Also testing and collection of first

hand data would have been too difficult and necessarily useful for the purposes of the study. Interviews were directed to relevant parties and data was first collected in a rather wide scope in order to enable narrowing down. The interviews themselves were semi-structured, since it was considered to be the best way to get the most out of the interviews on case related topics that were generally out of the research scope of this study.

4.4 DATA ANALYSIS

This study is constructed according to the basic premises of deductive research, however without naming hypothesis based on the literature. The closest description of the research approach would be pattern matching, which in essence requires development of an analytical framework and then testing it with the data. (Saunders et al., 2009, 500) This was in many ways the case, since the basic concepts are first opened to the reader, after which it is applied to the three cases that form the setting of the study. When establishing patterns and frameworks to be used in a process, modelling is commonly used as a method of illustration due to its readability and tendency to simplify otherwise complex issues.

Modelling is needed in order to illustrate the process and its stages. This may come useful when trying to understand the case company's innovation process and its distinct features. While the case will become the main target of modelling, it is likely that some of the connections between process stages as the interfaces that are in need to be accommodate transactions may need to be illustrated. The patterns, structures and entities described in this work are of fairly abstract nature. It is therefore worthwhile of presenting the structures in a form of picture due to the assumption that written form of presentation would fall short in substance. Pictures have their limitations as well, since they are not able to exceed their ability to present the substance, but they will support the written content and illustrations have been found to be suitable for presenting the structures of this sort. The structures presented may or may not be true, however their supposed composition will be presented with illustrations. (Wittgenstein, 1984, 9-12) Modelling of an innovation

process is seen as a scientific challenge as the organization implementing the innovation process is seen to require changes in order to facilitate the innovation process that is important in the contemporary global economy (Grabara et al., 2011, 107-108).

4.5 RELIABILITY AND VALIDITY

Data saturation is considered as the first criteria for the reliability of the study. Multiple sources of information were used and as many interviews were conducted as there were parties involved with the cases individually and as the main concept of innovation process in general. The same issues were looked up on from different viewpoints within the organization and during the group interview the answers were based on consensus in order to reach consistency within the group of interviewees. This means that the evaluation is not based on means or averages. The variance within the group was therefore minimized. By conducting the interviews this way, there is no potential reason to doubt the reliability of the information. (Alasuutari, 1999, 111) The reliability of the study is also traditionally measured with repeatability of the study. When it comes to case studies the repeatability is depending on the documentation of the conducted study and if a different researcher would arrive at same conclusion as the first one. (Yin, 2009, 45) This aspect is taken into account while conducting this study and sufficiency and quality of documentation is maximized within the framework of resources and a signed NDA. Given the access to all used material (e.g. notes, documents and recordings) a future researcher should be capable to arrive at the same findings and based on those to suggest a similar conclusion and implementation as has been done in this study. Material triangulation also took place as same cases were analysed based on data gathered from several relevant sources such as interviews (Hirsjärvi et al., 2007, 228).

Validity of the research shows if the correct thing was measured. In qualitative research, such as this, validity is a question of description being compatible with its interpretations and explanations. (Hirsjärvi et al., 2007, 227) In the context of case studies, validity can be considered to consist of construct validity, internal validity

and external validity. Construct validity of this this study means that several sources of information in regard of the cases were used and as per the logical approach, the terms used were defined and the matched with the operational measures. Internal validity of the study on the other hand is mainly a question of inference, as logical connections between concepts and data are needed. The connections are explained and the pattern of identifying needs and then building the discussion based on that supports internal validity. External validity is perhaps the trickiest of the three categories, since the case study is based on three cases in one specific company that operates in one specific industry. The generalizability of the conclusions can therefore be questioned, albeit the implementation shows attempts to create a model suiting for cases in excess of the needs of those studied. No real generalizable model is created that would be applicable for other companies or industries without modifications. (Yin, 2009, 41-44)

5 FINDINGS

The study and theory is put into context by presenting three cases of innovation projects taking place in a case company. The cases vary by several different variables and they are presented as observed in this chapter. The cases are introduced separately from each other and then compared based on findings.

5.1 CASE 1

5.1.1 DESCRIPTION

The first case is about an incremental innovation that took place on field during the company's operations. The innovation was first issued by A, a work safety manager via the company's internal web-based safety-portal. This portal was considered relevant, since the innovation in question was related with reduction of accidents caused by clients. The accidents themselves were said to be fairly rare and harmless since other active safety mechanisms are in place. However, the lack of passive safety mechanisms is causing the accidents to occur in the first place. A pointed out that these accidents may damage the reputation of the business that the case company is running and therefore hinder future development if not solved. The accidents are reported in the portal mentioned above and all of them are researched. A common pattern with these accidents was identified and possible solution for the problem studied. This was then reported according to the standard investigation protocol for safety improvements in a document called "Tutkintapöytäkirja 19.6.2011". After not being successful to find a solution for the problem, the problem was issued into company's idea generation system, which is a blog-portal. So far no solutions for the problem has been found and the solutions that were considered most promising could be implemented mainly by parties outside the case company such as equipment manufacturers. Although the technological innovation in this case would be just a minor change in the existing

technologies, it is not implemented by any of the relevant parties. (Interview with A) (Blog-post in INTO-portal)

Potential stakeholders of the innovation process of this case would be the end clients, equipment manufacturers and the case company (safety functions and F2, F4, F5 and business model development in figure 12). As per the structure of the innovation process, A suggested “Anticipating sales: the tailor-made approach (open order)” or Anticipating sales from given client specification (closed order). However these are not necessarily fully suiting for the case, but they were the ones that could be applicable since they offer the option for the client, i.e. the case company, to address their needs and co-develop the solution (e.g. by fostering prototyping). (Interview with A)

Value would be created improved image and possible marketing related to the improvements in the equipment. Also the reduction of the accidents would enable more value to be created by decreasing downtime and repair costs of the equipment. (Interview with A)

As the project is all about an incremental innovation to improve safety and make the implementation of an existing business model more convenient, no business model canvas can be utilized for illustrating the changes created by this project.

5.1.2 NEEDS

Looking for a solution to a safety issue, regardless of by which party the solution is delivered. Requires inputs from outside the case company, since all the technical solutions could most likely be implemented by others. This becomes difficult, since the case company has not found a way to effect the equipment manufacturers’ research and development and because the demand from other clients of mentioned equipment manufacturers has not shown any signs of similar accidents occurring or being considered relevant elsewhere. The equipment used by the case company is wide in use around the world and according to A case company was considered to be way too small client for equipment manufacturers to be taken into account. (Interview with A)

The use financial resources would be fairly low as the actual development of the innovation would be done outside the organization. Requirement for an additional feature would need to be addressed by the procurement when acquiring new equipment for the case company's use, however the actual amount of money spent on the improvement would remain low. (Interview with A)

Technical difficulty was not consider to be a threshold for neither the equipment manufacturers nor for the case company by A. The issue is merely of the research for the correct solution to be used in order to prevent the accidents from happening. There would be little new to be created, however the solution should be selected so that it reduce the amount of accidents without making the process of using the equipment unpleasant for the customer of the case company. The amount of solutions possible for the case company to apply are limited and they were considered likely to be un-effective by A. It was therefore assumed that the likely workload posed by this innovation remains low for the case company. The manufacturers would have scale benefits in addition to the benefit of working in their core competence.

5.1.3 SUMMARY

The first case presents a problem relevant to case company that should be solved. The solution most likely requires an unidentified incremental change to the equipment used by case company's clients in order to reduce the amount accidents that take place on dace company's premises. The demand for resource was considered to remain fairly low, however, the solution would need to be discovered and it should be effective. The case company has limited capabilities to affect the technical side of the problem and the suppliers are not offering suiting solutions for the problem. The innovation would still most likely take place outside the company, while being initiated by the company's demand for it. The accidents have been reported to the case company's system and the problem has been studied without finding a solution. The case calls for incremental product innovation and is likely to require testing and follow-up.

5.2 CASE 2

5.2.1 DESCRIPTION

This case was about creation of new business process outside the core competencies of the company accommodating the process. The process would be a process of chemical industry and it would be utilizing the good the case company is dealing with as a raw material in order to produce another chemical that would be sold to the markets. A market of a similar good exists, but the good could be substituted by this new good that the process would produce. C justifies establishing of the new business process producing the substituting good with potential for changes in regulations regarding the production of the good that it would be replacing. This could potentially make the existing good more expensive or not available. The blog post of C describes multiple uses for the new good, but in very essence the market for the good would need to be created in order to commercialize the business process. Also some potential industrial clients were named as they would provide the basis for the new business process to be viable and engage the business process readily with long-term accounts. Also a fact to consider is that the chemical process that would need to take place is commonly in use and the technology is scalable and readily available. The innovation in this case would be a business model innovation. There was also a potential named for the chemical process to be located outside the case company with a joint venture or partnership option if it is seen as the most viable mean to create and capitalize on a newly created market. (Interview with the decision makers). (Interview with C) (Blog-post in INTO-portal)

The set of potential stakeholders would most likely consist of the case company with its new business process involving all the relevant existing functions, equipment manufacturers as the suppliers of the process equipment and constructing the required facilities, possible business partner in case the process would take place

outside the organization and large industrial clients that would form the suggested customer base in the beginning. (Interview with C)

C suggest in the interview, that the new business would create value by creating and accessing a completely new market with a good that is created from resources that are readily available.

Out of the innovation process models established by the literature, C considered the first two models “Anticipating sales: the tailor-made approach (open order)” and “Anticipating sales from given client specification (closed order)” to be most suiting for this kind of business model development, since they had the closest relation to the client and the business model would be built according to their needs while creating commitment to the project from the clients side. (Interview with C) Also the client by its existence would take part in value co-creation by providing the business model with markets that would not otherwise exist (Witell et al., 2011, 89). While this was a relevant point, the decision makers also pointed out that due to somewhat scalable nature of this particular chemical process, also an innovation model with parallel activities could be used as it would enable the business model to be developed while it has already been taken into use (Interview with decision makers).

A new business model canvas would need to be created, but the some of the content of the canvas would change according to the mode implementation of the project. If the project would become a business process implemented in the matrix structure of the case company the business model would differ significantly from partnerships or joint ventures. Key partners, key resources and cost structure would perhaps be most strongly affected parts of the canvas according to the mode of implementation.

5.2.2 NEEDS

Market development and identification are the core needs that need to be fulfilled before the business model can be further developed. Acquiring of the process or establishing a partner to host the process. Creation of a new business model that would run as fifth business process in the organizational chart. (Interview with C) The actual implementation would also have an option to take place outside the case

company as being hosted by a partner. This option was highlighted in the group interview with the decision makers. In order to reach such a setup there would be a definite need for business model development as well as market development.

Financial resources would need to be fairly extensive according to the decision makers interviewed. The amount of market research would be large and creation of a new business process would most likely require help from outside the organization in form of outsourced market research and other project related studies and planning. There are also large insecurities related to the augmented accounts that the process would serve.

Technically the project would not be difficult, since an applicable process exists and is readily available. C also states in the interview, that the actual process would have modularity of some nature and therefore be scalable if needed. This would be beneficial as the demand remains unsecured. All in all, creation of new operations would take place on company level and on national level, however internationally this would not be considered anything more than introduction of one more process to the company's portfolio. Though neither being unique as a chemical process nor as a business model, when located in Finland, where such markets do not readily exist would be a laborious project. Market research, negotiations and planning would be the most demanding parts according to both C and the decision makers. Partnership would though change the parties that would be needed to undertake the workload. (Interview with C) (Interview with decision makers)

5.2.3 SUMMARY

Second case is a rather radical business model innovation that has two different paths of being executed; inside the case company or via a partnership or joint venture. If executed inside the company, the project would expand the company's offerings portfolio and require major investments. The key need for the project would be to create the markets it would be serving and establish key accounts to secure operations. The chemical process that the new business model would be using would use such raw material that is readily available for the case company and

technology that is already operational in other parts of the world. Some research has already been done for this project, but has ended due to various reasons. External knowledge and outsourcing would be required for the project and the innovation process should be such that it would make the key clients commit to the business.

5.3 CASE 3

5.3.1 DESCRIPTION

Third case was also closely related to business model, but merely as incremental changes in distribution channels of an existing business process in order to facilitate and enable future growth. In this case, by engaging into partnership with companies from roughly the same field, mutual benefits would be gained. Currently the good is distributed via a distribution network created by the case company itself with remarkably fewer resources than the potential partners. The idea would be to sell the company's product via the same distribution network that is used and developed by the potential partners. Both have the same general field of customers, although the products sold would not be substituting each other. The partners would gain higher customer volumes for other goods and services sold by their distribution network while case company would have an easy platform for extending their business in the field as they would gain visibility, ease of access and the presence of the other goods and services supplied by the partner. So far the biggest obstacle with this incremental business model innovation has been the unwillingness of the potential partners that would accommodate the distribution of case company's product. The major hindrances have been identified to exist within the partners' decision making and lack of vision of potential benefits. Also the organizational structures of the potential partners are such that the control over their distribution network varies. The incremental innovation would be easily scalable by copying as soon as a business model platform is created. (Interview with B) (Blog-post in INTO-portal)

The potential stakeholder of the project from inside the company would be F3, F4, F5, F6 and F7 in figure 12. Also business process 1 would be involved in establishing the partnerships with the distribution channels (see figure 12). Although the innovation process would just be an extension to an existing business process, it would internally involve many parts of the organization. Externally the implementation of the of the project would have municipal planners, governmental institutions related to safety, emergency services and the business partners with their distribution networks as stakeholders. (Interview with B) The extension of the existing business model would create value to both the partners and the case company.

In the interview B stated that out of the innovation process models introduced by the literature, model called “Anticipating sales: the tailor-made approach (open order)”, would be the most suiting, as it would highlight the partnership with another operator in the industry, however as with the case number two the decision makers saw the innovation to be merely of a development project of the business process and therefore pointed out that “Process with parallel activities” would be a suiting model for the innovation process. It would enable the business process to react to the feedback and by doing so scale up in a dynamic manner. (Interview with B) (Interview with decision makers)

As the case company already has operations around the business process case 3 would be developing, the business model canvas already exists. It would therefore only need to be modified to facilitate the actions proposed by case three. It is also worthy of mentioning, that the outcome of case 3 has always been the vision in business of this nature by the case company. So far it has faced too strong opposition from the potential partners and pursuing of the vision has lacked accomplishments. (Interview with B)

5.3.2 NEEDS

This case requires development of a platform for new business model. The innovation would be an incremental business model innovation implemented in an

existing business process. Concrete needs are related to reaching a consensus with a partner network in order to create a scalable model of operations. (Interview with B) The decision makers mentioned in their interview, that the use of partner's distribution system would be more cost-efficient. While there would be major synergy benefits, also the investments needed for proper utilization of distribution network would be remarkable. As per the workload, the situation is the opposite since the input in the beginning of the project would be labour-intensive when the partnerships would be established and the distribution network taken into use, but when the platform would be created the duplication would commence and the once "platform project" would become a "derivative project" (Poli et al., 2009, 1277-1278). Similarly to case 2, the technology required is readily available and in use by other companies and no research and development was said to be needed. Furthermore, the case company has another project in implementation that provides technology that would support the implementation of case 3. Also a business model of this nature was said to be in use abroad, so the project would be novel only domestically. There would be a definite need for partnerships and also the infrastructure for the implementation would need to be acquired. (Interview with B) (Interview with decision makers)

5.3.3 SUMMARY

The third of the studied cases presented an incremental business model innovation that would develop the distribution network of an existing business process. The process would in essence make use of existing distribution networks of partners offering mutual benefits and creating a platform for business expansion. The project has so far been held back the unwillingness of the business partners to engage in the project. The project would be laborious in the beginning as the platform for the business operations and the use for distribution network would need to be crated, but after that the amount of labour would decrease as the mode of operations could be duplicated. The project would be scalable and the investments required would vary according to the scale on which it would be implemented. The outcome of this

case has been the vision of one of the existing business processes since the beginning.

5.4 COMPARISION

When examining the cases described above, it is easy to see the whole variety of features that the projects being processed in the company's innovation process would pose. The differences and similarities need to be addressed in order conclude the needs that the operations case company is conducting pose towards the innovation process.

The differences were highlighted in the numeric comparison (Appendix 2), where all of the projects were given values according to their features. Cases 2 and 3 were seen as financially most demanding, while case 1 was only seen to occupy little financial resources. According to the second evident resource, requirement for labour, cases 1 and 3 were considered as the least laborious, while case 2 as a new business process would require the most. Cases 1 and 2 were seen to be the ones require the most creation of new, since case 1 needed to solve a safety issue and a new business process with new business process would be required for case 2. Case number 3 was considered to be an issue that would start to unfold when the negotiations and planning would have reached a certain status. None of the cases were considered technically demanding and all of the cases were considered to be such that they would not necessarily face too steep internal rivalry, but merely they would support each other (e.g. cases 1 and 3). When interviewing the decision makers, the interviewees proposed introduction of two new criterion, which were not requested from the idea generators. First of the criterion was the requirement for strong project ownership. The decision makers concluded that dedicated project ownership was crucial for all of these projects. The second criterion for the projects was the measure of how critical the projects were for the case company's continuity of business. None of the projects were ranked high, since the company already operates in an established field of business and the projects were considered to be additions to that according to their outputs. All of the case projects were considered to be heavily dependent on external suppliers, partners or subcontractors. (Appendix 2) (Interview with decision makers)

The outputs of the cases were also evaluated by the idea generators and the decision makers. Cases 2 and 3 were generally seen as having the biggest potential for high profits, although the profitability of case 2 was not evaluated by the idea generator as it was said to be impossible to evaluate with no thorough enough research conducted and while being unaware of the scale of the new process implemented. Also the mode of implementation (partnership, joint-venture) would affect these figures. The risks of cases 3 and 2 were seen to be high whereas it was considered by the idea generator of the case 1 to be risky not to implement the project (Interview with A). There was a general consensus among all the interviewees that all of the cases would be beneficial in long term. (Appendix 2) (Interview with decision makers)

While the idea generators may have had field specific knowledge and having been involved in the case related research already conducted earlier, they had an emphasis on practical issues related to the cases in their answers. On the other hand the decision makers seemed to show more emphasis on the business processes and holistic operations of the case company. In practice this was demonstrated with discussions of the comparability of the cases chosen. While presenting the extremes of innovations presented in the blog-portal, the scale of the cases varies hugely. They are unrelated to each other and there is no interchangeability. (Interview with decision makers)

The stakeholders of the projects would also be very different according to the interviews with the idea generators. The internal stakeholders were often identified by naming different functions and the business process in which the project would be located. The external stakeholders had a larger variance including suppliers, municipalities, business partners and key accounts. The level of involvement of both internal and external stakeholders would vary according to case and only their necessity vas evaluated. It was implied in all the interviews, that transactions that would take place in the projects would bee of such nature as they usually are within a matrix organization that is undertaking a development project of business or a product. The projects would be owned by the business process they would be decided to belong to and they would utilize the functions and external parties according to their needs. This would apply to cases 1 and 3 since case 2 would

have a wider distribution of the possible patterns in which the project could evolve. However, if the project would stay within the case company, and possibly form a new business process with its newly defined business model, it would be likely to utilize the functions available from the case company.

6 DISCUSSION

In order to make use of the gathered data, the pattern of analysis is presented. First, the needs of the cases are identified and evaluated in order to define if they present similarities or differences between the cases. After this assessment is done, some differentiators will be identified from the differences and similarities. The differentiators are further evaluated according to their relevance for model formulation. Irrelevant differentiators are dismissed, while relevant ones are considered as the basis for model formulation. The structure of the analysis is presented in figure 14. It is to be noted that all needs are not differentiators, as some of them do not present the differences between the cases. These non-differentiating needs are dismissed, although it is not illustrated in figure 14.

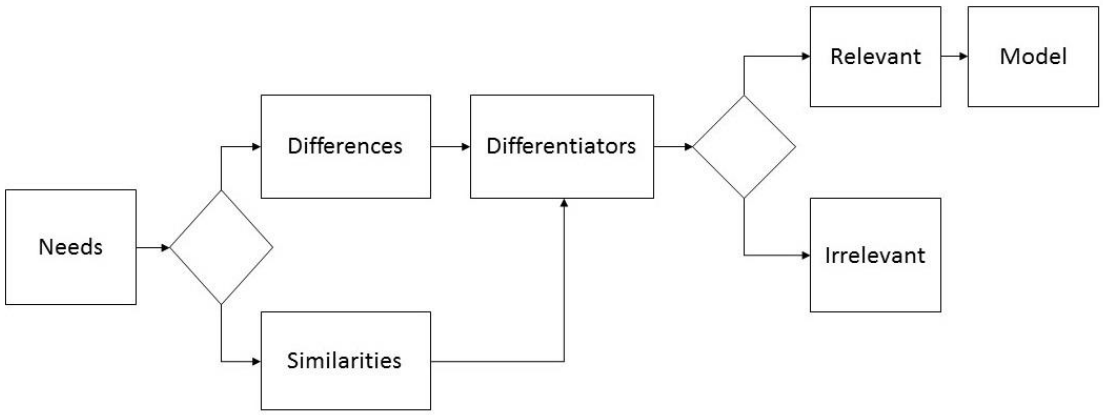

Figure 14: Structure of the analysis

The literature offers different models for innovation processes and the results part has clearly shown that the projects that fall under the innovation process vary vastly on many measures. The innovation process needs to be therefore structured so that it could cope with the variances posed by the projects. As it has been stated by Salerno et al. (2015, 69), one model alone is not necessarily enough to serve all purposes. The models presented in the 2015 work were seemingly observations of different patterns that the innovation process took when the needs of the project and environment were taken into account. The process seems to be reactive.

As the crudest division the cases could be divided into two main categories: the ones that do have a business model element to them and the ones that do not. By the definition of innovation itself, it was stated that innovation would need to have a business effect of some nature as well. Otherwise it would just be an invention. In essence all of the cases had a business aspect to them, which would qualify them to be innovations. However, the innovations were positioned in very different scales and parts of the core business of the case company, case 2 even having potential to take place outside the company. In order to make any conclusions the criteria needs to be set for division between innovations related to business process and those that are not. From the three cases presented above, one of the clearest differentiators was the applicability of the business model canvas for visualizing the change caused by the innovation. Whether it is a change in a readily existing business model or a completely new business model that is used by a new business process does not necessary pose a difference. The connection between the innovation and business model changes were present in cases 2 and 3. Case 1 falls under into technical development without a direct business implication, although the development per se might be executed outside the organization by the equipment manufacturers or other parties.

6.1 NEEDS

Needs of the cases could be used as indicators of what is demanded from the innovation process. By filling the requests posed by the cases the process might gain the correct prerequisites to cope with them and further more with other projects entering the process in the future.

6.1.1 SIMILARITIES

The common factors among the cases were high demand for ownership, generally low technical difficulty and heavy dependence on external suppliers. All of these factors can be used to give direction in the formulation of the innovation process’s

further steps after the idea collection and preliminary screening. However, it is not necessarily wise to disable the other factors, since the study took only three cases into consideration. Some organizational and process related conclusions can still be made.

Firstly, it had been witnessed by the decision makers, that the case company is such that projects can get easily stuck and therefore in order to reach the intended outcome a serious inertia is needed to drive the project onwards. The project needs a dedicated project manager that reports to the executive team or owners of the project. The person initiating the idea originally does not need to take the position of the project manager, since he/she might be occupied by his/her current position. Also, since the idea collection portal is open for all the employees, the initiator does not necessarily have the competencies or interest to fill the position. All of the case projects were considered to need dedicated ownership. (Interview with decision makers)

Secondly, since the case company operates in an established field of business that exists as such all around the world, many of the solutions have been tested already and are readily available for implementation. In the interview, the decision makers highlighted, that a radical innovation is a rare occasion in the field of business they operate in and the technical difficulty lies in the incremental changes, such as scale and adjustments to the environment. The difficulties that the business faces are not necessarily technical, but merely business model related as has been indicated by the cases. Execution of a business process that is already in use elsewhere can pose severe difficulties due to the environment.

The existence of the technology justifies the third similarity, which according to the numeric evaluation tool was the dependence on external suppliers. The case company operates in fuels industry and therefore their core competence is more related to energy trade and fuel related solutions than equipment development. This was also declared in company's strategy (Company strategy, 2015). The cases underline this since the equipment of cases 2 and 3 would be readily available nearly as off-the-shelf solutions. Technical development needed for case 1 would not require creation of anything new, but adaption of technology that is already in use into a new context.

6.1.2 DIFFERENCES

Many of the differences between the needs of the cases seem to be firstly of scale related nature. Money and workload are such factors that vary according to laboriousness of the project and the scale of investment. While projects of incremental nature, whether being business model related as in case 3 or technology related as in case 1 require less inputs in forms of man hours and investment, the more radical one(s), in case 2 of this study, the demand for both inputs are high. The establishment of new business process with all the research required, discovery of key accounts, possible partnering and investments for process facilities was the case that required of the most of labour and money. As a breakthrough project (Poli et al., 2009, 1277) utilizing the matrix organization's functions, it would put stress throughout the organization.

Apart from the scale related needs of the case projects, also the need for creation of new varied. Cases 1 and 2 would pose incremental changes to the existing operations, while case 3 would introduce a new business process to the case company. In this very fundamental radical versus incremental setting, the need for creation of new was brought to light. Also the differences in the nature of the new thing to be created differentiates the cases. Case 1 demands a technical solution, while cases 2 and 3 are trying to create new in form of modifying existing business model or creating a new one.

Main differences	Main similarities
Money	Requirement for ownership
Workload	Low technical difficulty
Creation of new	Dependence on external suppliers
Incremental vs. Radical	

Table 1: Differences and similarities of the cases

6.2 DIFFERENTIATORS FOR MODEL FORMULATION

As the needs are established, the characteristics of the cases have started to be identified. From there on, the needs need to be further evaluated, so that the correct ones will be taken into account when formulating the model of the innovation process. There relevance of the needs should be evaluated so, that the needs that have the most effect on the process would be considered relevant, whereas the needs, that occur due to the case-specific features would be considered to be of less relevance.

6.2.1 RELEVANT DIFFERENTIATORS

First of the differentiators considered relevant is creation of new. The need in itself consists of two main variables: what and how much. As discovered earlier, in these cases the amount can be divided into two main categories; incremental innovation presenting the lesser need of creation of new and radical requiring more of creation of new (Tidd & Bessant, 2009, 23-25). In the cases, radical innovation took place in the business model creation (case 2), while incremental innovation was demanded both on business model (case 3) and process or technological development level (case 1). This points out the second variable that is quality. The creation of new in the cases took place in two different levels that were business model and technological development. Regardless of the quantity related to the creation of new, the development can take place on two levels that are different from each other. In traditional innovation process modelling the levels are in chronological order, when the innovation is related to new product. First the idea is created and developed and then it is commercialized. In business model innovation the idea of a new business model or a change in an existing one can be initiated in the beginning of the innovation process and then be enabled by application of technology developed by oneself or applied from existing solutions.

Second of the relevant differentiators would be the technical difficulty and involvement of research and development in the innovation process. It is unlikely,

at least in this field of business, that the same process that hosts the business model innovation process could be applied to fundamental research, as the interview with decision makers revealed the option of parallel activities. The technological development may be initiated by a demand posed by markets and therefore have a business interface, but same mode of operations as in e.g. software development cannot be used (Salerno et al., 2015, 67). Technological testing in the markets was ruled out by the decision makers, as the technological product is hard to update, often requires large investments and is regulated by safety authorities among others.

In this discussion also service innovations should be considered relevant as services are in many cases the business of the case company. They either supplement the product sold to the customer or they represent the entire business process. Also the service offerings could be seen as an increasing competence for the company if developed. (Kinnkel et al., 2011, 264)

6.2.2 IRRELEVANT DIFFERENTIATORS

Needs that are considered to be characteristic for specific cases were considered to be of lesser relevance in model formulation as they vary and the innovation process model needs to be so generic that it can be applied for all of the cases. The first need of lesser importance was the dependence of external suppliers. It is dictated by the business model of the case company that they are not likely to be eager to get involved with equipment or process development in major level as it is outside their core business. It is more likely that since most of the process are readily available, the incremental changes to them are most efficiently executed outside the case company by an initiative. Neither was the need for basic resources such as money and labour considered relevant for the model, since they are used according to the availability. The company either has or does not have the resources to cope with the project and the projects should be evaluated accordingly during the screening of them in the earlier phases of the innovation process. Screening does not exclude the situation when unexpected need for additional resources occur, but

this was not considered to be a determinant differentiator when examining the innovation process per se. However, the innovation process model should take into account, that such projects may occur and offer an opportunity for iteration or dismissal of the project. The last differentiator considered to be of lesser importance is the need for ownership, since it was uniform in all the three cases. It is evident that in the practical execution of the projects, in the case company or the field and scale of business they operate in, declared ownership and management of the projects and the project portfolio is crucial.

The outputs and the criticality of the project for business continuity of the cases were evaluated as well, but they turned out be of lesser importance when defining the innovation process. They paint a picture of differences between the cases and the differences of viewpoints between decision makers and idea generators. They also help to further indicate the differences between the cases, but they do not contribute much to the innovation process.

The criticality of the case for business continuity was a subjective measure addressed by the decision makers and there were little differences between the results of the cases. The potential profitability on the other hand indicated larger differences between the cases, however it remained such a qualitative measure that would rather belong to managerial decision making that is done during the innovation process rather than the description of the innovation process. The same applies also to the potential risks levels of the cases. Long term benefits of the cases, aside for being a measure for managerial decision making in strategy development, also acts as a supportive measure for the criticality of the project for business continuity. Especially this could be true with the incremental innovation proposed in cases 1 and 3. Since the process already exists, it is easier to estimate how this kind of changes would benefit the company in the long run. However, as case 2 is radical and even the mode of implementation and location of execution remain undefined, it would be hard to give this kind of evaluations. With case 2 this also applies to potential profitability and only evaluation that is possible to give at this early stage is that it would carry a large risk.

6.3 BASIS FOR MODEL FORMULATION

The model of innovation process needs to take the characteristics of the cases into account. Due to differences in project needs, the R&D (research and development) derived projects require a different approach than those that are derived from business model development or direct development ideas for the business processes of the case company. These two entities of development need to have links in between them so that business model development would be able to address its needs for development for the R&D process and the R&D's projects could be realized in commercial means though business, thus forming an innovation. The origin of the idea is not necessary relevant as the idea collection tool is open for everybody's use. The development project start either as business development idea or technical development idea, but in any case in order for the idea to become an innovation it needs to go through the business model development i.e. have an effect on the business model canvas that presents the business model of one of the business process the company is hosting. The idea can iterate between technical development and business model development for adjustments in both, but to reach the markets or implementation the business model development is the final step. Also the very natures of the of the different innovation processes related to business model development or innovation and technology suitable to be used in this field differ in the sense that the business model related issues can be tested with the markets and adjusted according to the feedback they receive. Adjustments can be done by modifying the business model, using R&D or scaling. Also, if the innovation happens to be related to software or other solutions of updatable nature, the adjustments could be done as the same way Salerno et al. (2015, 67) propose in their model of "process with parallel activities".

6.4 PROJECT ORGANIZATIONS

Projects are in essence the units of innovation in this study's presentation. Therefore the projects should be identified to assess the practical scenario that would take place when the innovation process would be functioning.

Case 1: It is questionable if there is a need for a project organization as the case poses only a small point of improvement and it has been already discovered that there are very few means for the case company to solve the problem internally. The project would be an internal customer project (Poli et al., 2009, 1278-1277). (Interview with A)

Case 2: Since the project would creation of a new business process, with nearly no relation to earlier business model, the organization would most likely be a "pure project organization" as it is the project organization mode most separate of the line management (1278), however also the matrix organization of the case company could be used by the project in order to utilize the existing functions when creating the new business process. If the process is implemented internally, the project organization could also be composed on the basis of "Breakthrough project", as the process is completely new to the organization. In this case it would serve the internal customers by radically changing the value chain (1277). The form the organization is hard to define at this stage due to lack of consensus of the location of the project. In essence it could be an internal project, joint venture or external partnership, which all would need a different approach on the composition of the project team. (Poli et al., 2009) (Interview with C)

Case 3: This kind of business model development would need a project type that would most likely be similar to that introduced as a "Platform project" by the literature (Poli et al., 2009, 1277). This would be justified by the characteristics of the case that first require establishment of partnerships and a mode of co-operation after which the concept can be duplicated within the premises of the distribution network and adjusted if needed. The actual implementation of operations with partnership would evolve gradually. If needed, the case would be projectized in order to establish ownership, while the project organization would employ the functions of

the organization. The sphere of influence of the project would evolve, since at the beginning the project would only need the members that are creating the partnerships, but at the point when the platform would be set, the project would employ the functions that the business process to be modified utilizes. At this stage the case would not be a project anymore, but implemented incremental business model innovation. (Interview with B)

7 IMPLEMENTATIONS

In essence the situation described above requires two separate innovation process models. According to definitions of innovation they should be in chronological order, as one of them would be the model used by R&D projects and another by business development. Usually the R&D and commercialization are included in one process, but as the cases posed a demand for business model development they are separated into two processes that co-exist and have a chronological order. This does not disable the opportunity for iteration and adjustments as described in the discussion. The model applicable for all the cases presented in a study would be a hybrid model that takes into account both business model development as R&D in separate interlinked processes.

The idea for a hybrid model rose from looking at the models presented by the literature and comparison of them with the needs of the cases. Falling short in ability to facilitate the cases, the models where in need of adjustments or modifications. When considering all the aspects that are needed to take into account for model formulation, it was soon realized that even if modified, one process would be a victim of its own structure. When modified, the structure would most likely become complex and fall short in some abilities. It would also be difficult to draw and its ability to facilitate iteration and two types of innovations with their peculiarities was questionable. It was therefore discovered that the model would consist of two entities that would both have their own abilities to host a certain type of innovation. By interlinking the two process a hybrid process was created, that both fits the definition of an innovation as well as the need of the cases even with some thought being given for the possible future cases in form of giving the model possibilities to adjust its R&D side according to the case.

7.1 R&D PROCESS

The innovation process model of the R&D process could vary as the basis for the development process are not uniform. In case 2 the model would most likely be

“Process with a stoppage: waiting for market” (Salerno et al., 2015, 64) as the markets intended for the developed business process do not exist yet. However, this case is at the core a business process development project and does not necessarily have a R&D phase at all. Also the stoppages can hardly be planned, but merely anticipated as they would qualify as risks rather than process stages. It is to be debated if anyone would start a development project with acknowledging the lack of technology that would be required for finalizing the project. In the interview C proposed the use of models “Anticipating sales: the tailor-made approach (open order)” (Salerno et al., 2015, 64) and “Anticipating sales from given client specification (closed order)” (Salerno et al., 2015, 64) due to their applicability for client commitment. Positioning it in the R&D process was conceptual as the related R&D would take place outside the organization.

This would also be the case with case 1, since the development of equipment is outside the core of the case company’s operations and therefore the company’s ability to affect the solution are limited. Also the case 3, where incremental changes to the business model canvas were basis of the innovation, would use the R&D outside the organization.

While the cases themselves did not require a direct R&D innovation model for the hybrid model to be constructed, they pointed out that due to the variance within the scope of innovations, the R&D process cannot be specified. The process could be any of the ones proposed in the literature including the “process with parallel activities” if the R&D is developing something that could be presented to the markets before being finalized. Nonetheless, some of the key characteristics of the process could be identified. Firstly, the process should be capable being initiated from external sources of ideas as well as ideas sent to it from the screening phase of the idea generation tool. It should have internal screening stages that could be able to dismiss the idea if it is proven to be not worthy. If the idea would be initiated by the business development, the reporting and justifications would need to done for the parties where the idea originates from. The development stage of the process should be capable of receiving development ideas from business model development’s iteration stage from between its development stage and diffusion stage. The R&D process should also be capable of a level of diffusion in form of

piloting or demonstration plants. Finally the R&D process should offer their results for the use of business model development.

7.2 BUSINESS MODEL PROCESS

The business model development process should use the “process with parallel activities” process model named by Salerno et al. (2015, 67). This is because unlike the R&D model, where the diffusion in this field of business can mainly be done with piloting, the business model can be adjusted by redevelopment while having already entered the diffusion stage of the process.

The first stage of the process would be the actual idea collection tool; a blog-portal in this case. The ideas contributed to the portal would then be screened and according to the results either sent to R&D process, dismissed or forwarded to business model development stage of the process. The development stage would be the development of the business process and formulation of the exact business model canvas. Also if seen necessary, R&D process could be employed to solve problems in the early stage of development. At the stage in which the business model would be considered to be ready for implementation the market entry would be done and the diffusion stage of the process entered while still having simultaneous development going on. The development after the market entry would be reflective to market feedback and it would be going on while the business model would be in use. The feedback based redevelopment could also lead to use of R&D function that would have a posed solution to present the screening stage of the business development process. As the necessary adjustments for the business process would be completed the business process would exit the innovation process. In incremental innovations this would merely be a change in the development stage of the business process as the development idea would be accepted in the screening and then be applied while the business process would still be running.

7.3 ESTABLISHING THE INTER-MODEL TRANSACTIONS, ITERATION AND PROCESS PATTERNS

As a generic description of inputs and outputs of the hybrid model, it could be declared that two sources of ideas exist. Idea generation tool on the business development side of the process and external ideas directly fed into the R&D process. However, internally the hybrid innovation process could also produce ideas when the development stage of the business development could also produce inputs for the R&D side of the process. The outputs are simply the ideas that have gone through the process and reached the diffusion stage of the business development side of the hybrid innovation process.

In some sense, this could be considered as a method of knowledge management, as it refines and evaluates ideas fed into the process. The learning witnessed in the innovation process's research and development stages as well as in the feedback during the market entry are in a focal role in organizational development. Also the stages of innovation process could be presented from the knowledge management point of view as presented in the literature, although is not done in this thesis. (Basadur & Gelade, 2006, 49-50)

7.4 CREATION OF A HYBRID MODEL THAT WOULD BE APPLICABLE WITH THE CASES PRESENTED AND POSSIBLE FUTURE CASES

The model proposed to be used would be a hybrid model that would incorporate two functions in separate phases that are positioned in indicative chronological order. The basic mode of operation is illustrated in the figure number 15 that displays interactions between the processes and their inputs and outputs. It is to be remained, that the process model of the research and development function is subject to changes as explained earlier and the process model in the figure number 15 is only for illustrative purposes.

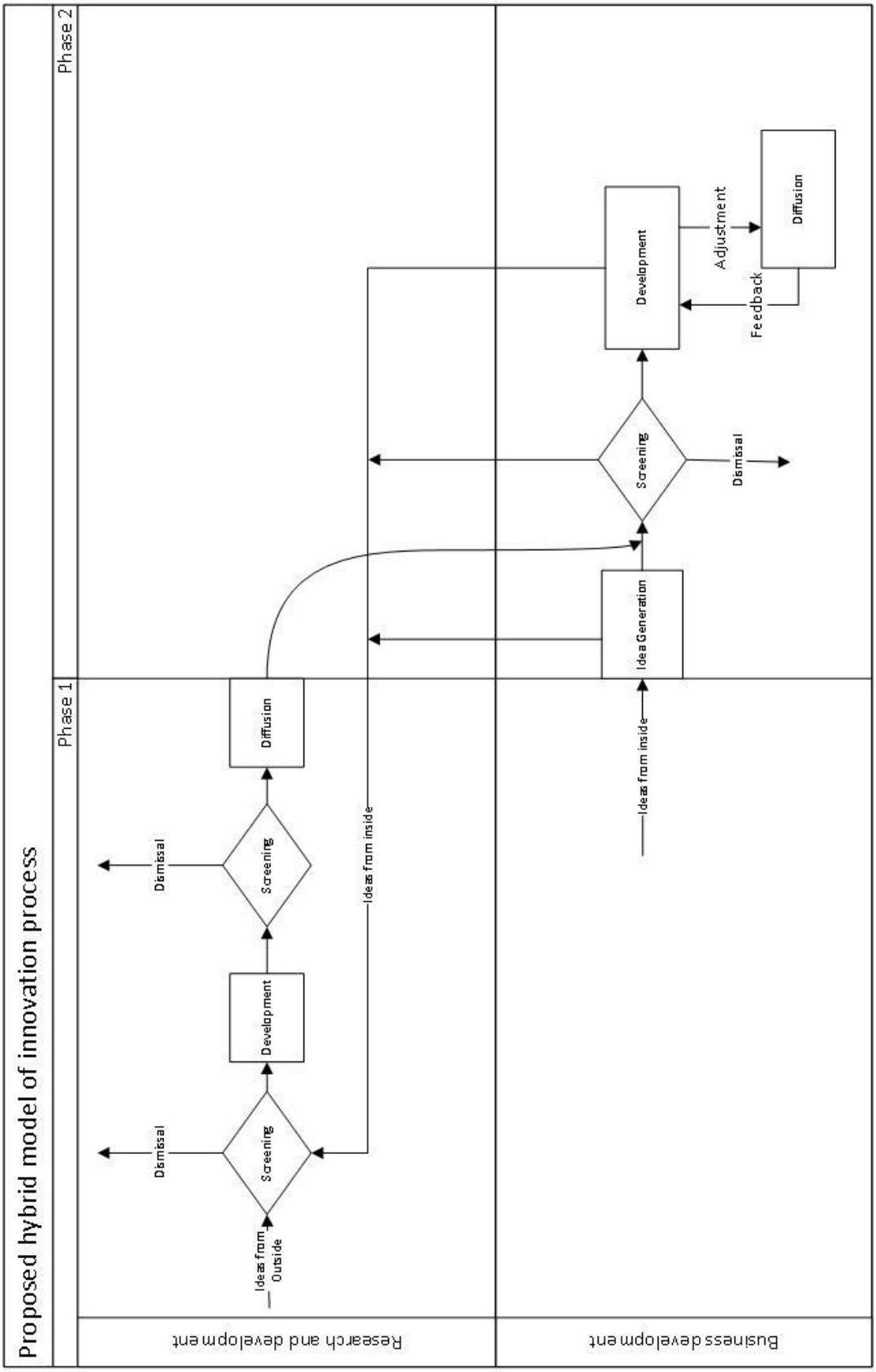

Figure 15: A proposed hybrid model of innovation process

8 CONCLUSIONS

Objective of this study was to find out what kind of innovation process could be applied according to the cases. The conclusions of the thesis consist of two types of different contributions, limitations and suggestions for future studies. The limitations of this study will compass the basic requirements for future studies and the managerial contributions will hopefully be useful for the operators in the energy sector and fuels industry.

8.1 RESEARCH CONTRIBUTIONS

The research contributions can be divided into two main categories. First of them are the research questions that are answered according to the results of the thesis. In this thesis the research questions consisted of one main question and four sub-questions that support the main question. By answering the questions we can contribute to the research related to the cases in question. The other part of the research contributions is the contributions to the academia. In this part the scientific contributions of this thesis are discussed.

8.1.1 RESEARCH QUESTIONS

The first of the sub-questions was about the actual definition of innovation process in this context. Referring to the definition of innovation (16), innovation process in this thesis was considered as a process of creating or modifying business based on a new idea (Tidd & Bessant, 2009). As a process, an innovation process could rather be seen as an established pattern or code of conduct according to which development projects are dealt with within the organization. The process itself does not exist physically, having e.g. an own depart and facilities, but merely it exists within the organization using the functions of the matrix organization in pursuit of the change in business processes or creation of new.

After the process has been defined, the identification of differences between the case projects going through the process are addressed in the second sub question. The main differences between the projects were identified to exist in needs. The needs are discussed in further detail in chapter 7, but as a general differentiation tool the similarity and differences of needs were applied. Furthermore the differences between cases were visible also in the case descriptions as two of the cases were either radically or incrementally related to business models, whereas one of the cases was strictly an incremental product development need addressed by the case company. The case selection in the beginning was aimed at creating as large variation as possible within the limits of the blog post accumulated in the idea collection portal that has been in use of the case company.

Different points of assessment could be applied when making decisions related to the cases. The third sub-question was about identification of those points based on which the cases are assessed. In order to utilize the needs as information of the cases in innovation process composition the needs of the cases should be categorized. In this thesis the mode of categorization was chosen to be the relevance of the needs for innovation process composition. The relevance was based on the justifiability of the needs in that use. Some needs were considered to be merely case related in the sense, that the actual implementation of the project would pose the needs to the project organization, whereas some of the needs were considered to have an impact on the process structure. The needs impacting the process structure were considered relevant and the process formulation should according to this thesis be based on them. Furthermore, the differentiators needed to have differences in them to contribute to the specific innovation process model composition, as some otherwise relevant needs such as strong ownership apply for all of the cases and has therefore little contribution in taking the differences of the cases into account when creating the process.

In order to be able to establish an innovation process based on the cases, the relevant needs of the cases would need to be addressed. The cases per se posed two different relevant needs to be considered as the basis of innovation process: creation of new and technical difficulty. Out of the data gathered for the thesis, these were the final needs contributing to the innovation model. While two of the cases

would fit the hybrid model's business development side as the main innovation process and the third one would just address external parties to contribute in problem solving, the model needs to take research and development into account. The cases do present a wide array of different needs, but they fail to address the need for ability to host research and development inside the case company. Ability to host both R&D and business model development would therefore be the core needs for the case company's innovation process.

The main research question "How should the innovation process be developed to support R&D projects?" sums up the sub-questions. The question is of a wider scope and asks for general solutions above the context of individual cases. The question asks for a method of development as well as the implementation in a process form. The proposed direction of development should take the definition of innovation process into account as well as notice the presence of pure R&D functions, that are not necessarily business oriented enough to fit the model alone.

The innovation process should be developed in a manner that suits most of the cases that the organization will be facing. The developers of the innovation process should identify common differentiators and similarities between the development projects of the organization and formulate the process accordingly. As pointed out by the literature as well as this thesis's analysis, there is no general model that would suit all the projects, even if they would be only projects of one single company (Salerno, M, et al, 2015, 69). Innovation as a concept could consist of so wide variety of different projects that forming a uniform model to be used as an innovation process would not be convenient neither to design nor use. Either the development of innovation process should consider the organizations ability to use several models offered by the literature or create a model than allows adjustments and iteration if the project needs them.

8.1.2 CONTRIBUTIONS TO ACADEMIA

As a research the contributions of this thesis to academia are fairly limited as it only consisted of three different cases that were bound to one case company. Also the field of business in which the case company operates poses severe limitations to the academic contributions as certain rules apply that would not necessarily apply in other fields of business (good sold, position in markets, position in society etc.). The generalizability of the results is therefore low.

On the other hand this thesis worked as a good exercise for innovation process modelling and evaluation. It created a demand for assessment tool creation and funnelling of cases related data. The objectives of the model creation needed to be clear in order to be able identify the relevant features of the cases and the framework for model composition based on cases like these was established. By applying the determined criteria for different cases the required extent of the model to be proposed could be defined.

8.2 MANAGERIAL CONTRIBUTIONS

A new approach the demand of varying cases processed by the innovation process was proposed. On theoretical level the solution could be usable, but the organization's capabilities to implement the proposed model remain unknown. The implementation chapter of this thesis should be viewed as a proposed framework or pattern that the projects undertaken by the case company would follow. Also the proposed model leaves the R&D side of the hybrid process open in the sense, that in order to suit most of the projects going through the model, no specific model can be defined to be used in that particular part.

In addition to the implementation proposed by this thesis, the method applied in case differentiation and labelling might be proven useful when managing the innovation process of the company. The used criteria for case differentiation may contribute for the use of process model. However, in order for this to work, also the differentiators considered irrelevant should be taken into account, as the company's resources and other features related to the practical implementation are surely relevant.

8.3 LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

The generalizability of the results of this study are fairly low on practical level, however the thesis proposes a framework for process development and names some of the usable means for the task.

As there were only three cases used for the analysis of the innovation process needed, the sample size poses a great limitation for the study. This was due to lack of suitable cases, but ideally the study should have consisted of at least six cases presenting the incremental and radical cases of both business model and R&D based innovations. Also some cases selected according to their disruptiveness could be used as the basis of analysis as they might have posed a new perspective on the issue in hand (Tidd & Bessant, 2009, 237). This could address underlying routines that are company specific, but when applied with a large enough sample, some generalizable patterns could be identified (Bessant, 2008, 38).

Second considerable limitation of the thesis was the field of business in question, as it is domestically in a fairly unique position. The selected field of business restricts the applicability of the results and puts such strong contours to the relevant models that cannot be exceeded. There are only a few operators in the same field domestically and elsewhere the same field of business might be facing strong regional characteristics that are shaping their mode of operations. Also the field of business suffers from relatively slow pace of renewal due to various reasons, meaning that the implementation and follow up are likely to be lengthy (depending on the nature of the innovation in question).

Innovation studies are seemingly increasing in public interest and therefore contributing into that general pool is considered to be worthy (Shafique, 2013, 62). However, studying this particular field of business for same purposes may not contribute that much to academia, but merely as consultancy work done for a company. Applying the methods used in this study to several fields could strengthen the pattern of innovation process formulation and cover the areas left untouched in this work. As general recommendations it would be suggested that the future

researchers would select a field that has a healthy Herfindahl-Hirschman index and a faster pace of innovation (Matsumoto et al., 2012, 181).

The first suggestion for future studies would in essence to tackle the same issue as was done in this thesis, process formulation based on real world cases, but in a wider scale as the sample size and business field selection were obvious shortcomings in this study. In order to create an applicable model for innovation process composition the innovation projects need to derive from wider array of contexts and be differentiated on several other measures presented by the literature.

For the applicability of the proposed hybrid model the study should be revised with such cases that would present strong iteration and would involve the R&D innovation process to its fullest extent. This would then be repeated with cases as many times as needed for the project to pass all the intra-process screening stages and be put in the market test. Future cases would therefore also need to be such that utilize something novel created and developed inside the process rather than acquiring it from the markets. This was said to be rarely the case in this field of business.

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APPENDIX 1

Structure of the interviews for idea initiators:

- Description of the idea.

- Is the idea new, or could existing technology be applied?

- How does the idea affect the company?

- How was the idea processed and how was the decision making done?
- Ideas for the use of feedback

- Could something in process be done in another way?
- Proposal of an ideal idea collection process.
- Vision of how the idea would be processed if it was further considered or implmented? Stages in practice, research etc.

- How would the innovation process be started and which functions of the organization would take part in it? How about related parties outside the organization?

- Naming of the relevant stakeholders of the project.

- Evaluation of the suitability of the innovation processes named in the literature for this case.

-Would there be a service viewpoint in the case?

-How much outside input would be needed for the implementation of the project and what kind of entities would be outsourced? Would the outsourced parts be subcontracting/using subcontractors or consulting used for. e.g. market research?

-Filling of the numeric evaluation table.

-Schedule:

-Permit matters:

-Possible benefits for the stakeholders:

-Declaration of internal and external customers:

-Declaration of subcontractors/suppliers:

-Would the project face internal rivalry from other projects?

-Other positive and negative factors:

APPENDIX 2

	Case 1		Case 2		Case 3	
Input	Initiator	Decision makers	Initiator	Decision makers	Initiator	Decision makers
Money	2	1	3	5	4	2
Labour	1,5	2	3	4	2	2
Creation of new	5	2	2	4	3	1
Technical difficulty	2,5	1	2,5	3	3	1
Need for suppliers	5	1	4	2	4,5	1
Criticality for the continuity of business		1		2		2
Need for ownership		5		5		5
Implementability simultaneously with other projects	1	3	5	1	3	5
Output						
Potential profitability	2	1		4	4	2
Level of risks	1	1	4	4	4	1
Long term benefits	2,5	3	4		5	5

1= not at all

5= very much

APPENDIX 3

LIST OF INTERVIEWS

Interview 1

Interviewee: A, work security manager.

Place: Kouvola, Finland

Date: 5th if March, 2015

Duration: 1h 35min 43sec

Interview 2

Interviewee: B, Development manager.

Place: Espoo, Finland

Date: 9th of March, 2015

Duration: 1h 52min 42sec

Interview 3

Interviewee: C, Regional manager.

Place: Hyvinkää, Finland

Date: 6th of March, 2015

Duration: 1h 9min 53sec

Interview 4

Interviewee: Decision makers, six experts who are focal to the innovation process related decision making.

Place: Espoo, Finland

Date: 25th of March, 2015

Duration: 2h 50min 44sec