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Intellectual asset management approach to service-based offerings

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Abstract

To stay competitive in today's market where tangible products are becoming more and more commodified, some companies are choosing to adapt a business logic where the focus are both on the tangible product dimensions and service dimensions simultaneously, since this allows for a company to exploit and leverage the existing knowledge-base to create service-based value propositions along with their tangible offerings from their intangible resources, bundled together in a package or as stand-alone service offerings. This thesis discusses how companies more efficiently can utilize its intellectual resources to create new service-based offerings. A proposed model for how companies can exploit and leverage their knowledge base and intellectual assets have been presented in the thesis. The model's four blocks can be used to deconstruct value propositions to see what resources in form of technical intellectual assets that have been used, and how these have been packaged and transacted, to see the assets impact and contribution in relation to value creation for companies.

The empirical material derives from two case studies performed at SKF. Qualitative interviews have been the main method for collecting the empirical data complemented with internal material from SKF. Value propositions from the cases have been applied and analyzed in the new model to see how intellectual assets have been utilized in service-based offerings. The theories presented in the thesis have been used to analyze the material from the two cases. A description over how SKF works with exploiting and leveraging its intellectual resources is provided as an introduction to the area. Thereafter the first and the second case illustrate how technical intellectual assets have been used within the area of SKF simulation tools and lubrication.

The results showed that by objectifying knowledge and intellectual resources as technical intellectual assets, these could be exploited and leveraged by creating different ways that the assets could be used. The new model can help to increase the efficiency of companies intellectual resources, since the value creation process of how the technical IA contributes are made explicit through the applied examples. Furthermore the results showed that from an IA management perspective a company could leverage it's knowledge base and intangible assets where there is a capacity to build new service-based offering, and by identifying different ways that the assets could be used, by considering different factors that influences the way that the assets can be deployed and configured in relation to the intended use of the assets.

Keywords: Technical intellectual assets, Business modeling, Intangibles, Tangibles, Packaging, Transactions, Services, Products, Resources-based view, Business Model Canvas, Innovation.

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Gothenburg, Sweden. July 2015

Emma E. Wikström

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List of abbreviations

BMC - Business Model Canvas
IA - Intellectual Assets
IAM - Intellectual Asset Management
IC - Intellectual Capital
SKF - Svenska Kullagerfabriken

Vocabulary

Intellectual Assets - *"Intellectual assets, the second component of IC*, are the codified, tangible, or physical descriptions of specific knowledge to which the company can assert ownership rights and that they can readily trade in disembodied form."*[1]

Intangible Resources - *"Intangible resources, for their part, are those assets that have no actual physical existence and are based mainly on information and knowledge."*[2]

Tangible Resources - *"Tangible resources are those company assets that have an actual physical existence and can be touched and grasped in a material sense."*[3]

Tribology - *"The study of friction, wear, lubrication, and the design of bearings; the science of interacting surfaces in relative motion."*[4]

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[1] Edvinsson, Leif, Sullivan Patrick. (1996) Developing a model for managing intellectual capital. *European Management Journal* Vol 14 No 4 p.359
*The first component of intellectual capital according to the author is called human resources in the article
[2] López-barajas de la puerta, Aurelio. (2011) The management of intangible assets and resources. An opportunity for companies, risk managers and the insurance market. *Gerencia de Riesgos y Seguros N 110.* p.33
[3] Ibid p.33
[4] http://www.oxforddictionaries.com/definition/english/tribology

1 INTRODUCTION

1.1 Background

1.1.1 Value creation and intangible assets

Due to the fact that markets are becoming more open, companies are increasingly relying on their intangible assets to create value and sustainable competitive advantage. Since non-material assets often are hard to replicate this enables for companies to differentiate themselves and use the capabilities and specialized assets as a foundation that can contribute to their value creation processes.[5] Intangible resources can be described as assets that are mainly based on knowledge and information, intangibles have no physical existence in contrary to tangible assets that can be seen and touched.[6] "*For example, intangibles can refer to: the capacity for innovation of a company, the intellectual capacity of employees, the know-how, the management practices, the organization within a company, the human resource management, the owned patents and technologies, the technological skills, the trademarks, the awareness of each brand, the internal goodwill, the relationship with customers, the customers' loyalty, etc.*"(Dumitrescu, 2012 p.170)[7]

1.1.2 Growing service market

Hahn & Morner (2011) argues that as an effect of the growing service market, an increased demand for solutions has emerged. Leading to the fact that the majority of large companies are now offering customer solutions. To meet customer requirements, companies bundles products and services together rather than offering services and products separately as a way to differentiate from competitors.[8] Carlborg, Kindström & Kawalkowski (2014) argues from a similar view, that service innovation is increasingly arising in manufacturing firms, where integrated product-service bundles and services are created as a part of a solution or wider function.[9] Goods manufacturers that have a strong position on the market can take advantage of this increased service focus as it opens up new

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[5] Lapointe, A. & Cimon, Y. (2009) Leveraging intangibles: how firms can create lasting value. *Journal of business strategy* vol. 30 No. 5 p.42

[6] López-barajas de la puerta, Aurelio. (2011) The management of intangible assets and resources. An opportunity for companies, risk managers and the insurance market. *Gerencia de Riesgos y Seguros N 110.* p.33

[7] Dumitrescu Adriana-Sofia (2012) Intangible assets: are these resources sufficiently visible and properly controlled? *Accounting and Management Information Systems,* Vol. 11, No. 4, p.170

[8] Hahn, Alexander, Morner Michèle, (2011) Product service bundles: no simple solution. *Journal of business strategy*, Vol. 32 No. 6 p.14

[9] Carlborg Per., Kindström Daniel and Kawalkowski Christian. (2014) The evolution of service innovation research: A critical review and synthesis. *Service Industries Journal, (34), 5.* pp.2-3.

opportunities, and by using their profound and substantial product knowledge respectively long product life cycle.[10]

1.1.3 Knowledge as an intangible resource

Kahin & Foray (2006) argues that knowledge has always been at the center when it comes to economic growth, where ideas and knowledge generated from e.g. innovation processes, have contributed by being embodied in processes, products and used in organizations. Kahin & Foray also argue that there has been a change in the economy, the recent term that corresponds to this change is called the *Knowledge Economy*.[11] One description of the knowledge economy term, described by Powell and Snellman (2004) ''*We define the knowledge economy as production and services based on knowledge-intensive activities that contribute to an accelerated pace of technical and scientific advance, as well as rapid obsolescence. The key component of a knowledge economy is a greater reliance on intellectual capabilities than on physical inputs or natural resources*''[12] According to Kahin & Foray the knowledge economy is characterized by a strategic focus on allocation of resources in areas such as, knowledge and information management, R&D, knowledge creation, the formation of human capital through training and education, forms or for e.g. investments to build social networks. When it comes to information technology it is seen as a powerful tool that opens up opportunities in relation to knowledge-driven activities and increases productivity in the knowledge economy.[13]

1.1.4 Leveraging the knowledge base

Teece (1998) reasons that one of the core fundamental aspects of a company, is its ability to create, assemble, transfer, exploit respectively integrate knowledge assets, since knowledge assets constitutes as a part of competences which enables companies to create service offerings and products for the market. It is therefore essential that a company can be dynamic and acknowledge its capabilities, so that it can seize current and future potential opportunities, select an organization form that is appropriate,

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[10] Kowalkowski Christian, Kindström Daniel. (2009) Development of industrial service offerings: a process model, *Journal of service management*, (20), 2, p.2

[11] Kahin, Brian. Foray Dominique (2006) Advancing knowledge and the knowledge economy, Chapter 2: Optimizing the Use of Knowledge. p.9 MIT Press Books, Massachusetts Institute of Technology, (1st Edition)

[12] Powell, Walter W, & Snellman, Kaisa. (2004) The Knowledge Economy Annu, Rev. Sociol. 30 p.199

[13] Kahin, Brian. Foray Dominique (2006) Advancing knowledge and the knowledge economy, Chapter 2: Optimizing the Use of Knowledge. p.9 MIT Press Books, Massachusetts Institute of Technology, (1st Edition)

allocate the resources in a efficient way, reconfiguring the knowledge assets and pricing offerings strategically.[14]

The capability of a firm to be innovative and manage its intellectual assets is two aspects that influence the value of an organization. It is through the process of knowledge management that a firm can benefit from and leverage both tacit and explicit knowledge, and then through innovation processes the knowledge can be transformed into value propositions with commercial value in form of services and tangible products. Having a good knowledge management process in place facilitates for a firm to utilize its knowledge base in an optimal way. A part from the fact that a firm needs to manage its knowledge in a adequate way, its also important to link knowledge to the firms abilities to innovate, since a firm can refine its knowledge base through different innovation processes.[15] However it is not sufficient to only manage and develop intellectual assets, one also needs to package and transform these into property in commercial transactions and also into different offerings, "*Inventions, designs, brands, patents, copyrights, licenses, etc., are all intellectual building blocks that must be exploited in the construction of innovations, companies, and network-based markets and platforms*" (Petrusson & Heiden, 2008 p.3).[16]

1.2 Problem statement

1.2.1 Need for extended service oriented value propositions

Many manufacturing companies in different industries are increasingly extending their product offerings with services, since "Competition from, among other things, low-cost countries decreased margins for traditional product sales due to commoditization, and increased customer demand, drives companies to extend their business with new service offerings" (Kowalkowski & Kindström, 2009 p.2).[17] Research implies that manufacturing industry companies are going in the direction of servitization, where they are extending and augmenting their tangible offerings with services, and/or develops offerings where the tangible product isn't in the center of the offering necessarily. However due to the fact that manufacturing companies often are built and evolve around products and technologies, where certain tangible value propositions has traditionally carried most of the core value

[14] Teece, David J. (1998) Capturing Value from Knowledge Assets: The new economy, markets for know-how, and intangible assets. *California Management Review,* Vol. 40, 3. p.75
[15] Desouza, Kevin, C. (2011) Securing intellectual assets: integrating the knowledge and innovation dimensions. *International journal of technology management*, v 54, Nos. 2/3 p.170
[16] Petrusson, Ulf. & Heiden J. Bowman. (2008). Assets, Property, and Capital in a Globalized Intellectual Value Chain, chapter 15 Assets to profits, John Wiley & Sons, Inc p.3
[17] Kowalkowski Christian, Kindström Daniel. (2009) Development of industrial service offerings: a process model, *Journal of service management*, (20), 2, p.2

for the companies, service development can therefor be more complicated in manufacturing companies compared to pure service firms. To manage this process, manufacturing companies needs to adapt a business logic that can manage both the industrial product dimensions and the service dimensions.[18] In many industries it is also becomes problematic with the fact that customers view several services such as training and installation etc., as add-ons that should be included when buying a tangible goods, which becomes a problem for industry companies since this reduces the profitability, or they could loose the customer to a competitor that gives away the service for free, which makes it difficult for industry companies to create service bundles.[19]

1.2.2 The challenge of developing products and services simultaneously

The definition of service innovation is quite an ambiguous term in research literature. Service innovation could be considered as both a process and an intangible product. "*For example, a manufacturing firm can sell a service agreement as a supplement to its tangible products, whereas a service firm may introduce new service products. Both are, however, innovative in the context of services*" (Durst, Mention & Poutanen, 2015, p.66).[20] For many industrial companies it's a challenge to balance both developing products and services simultaneously according to Kowalkowski & Kindström (2009). When trying to create a complete offering that are widened to solve more then one part of a customer need, that implies that companies need to focus on both new service development respectively new product development simultaneously, since these offerings often includes higher levels of service components.[21] Furthermore Kowalkowski & Kindström argues that to obtain an offering that are functioning optimally, products and services needs to be developed in conjunction with one another. When creating new industrial offerings by bundling products and services, the processes of creating new product development and new service development are becoming increasingly interdependent. Other factors that are important in the development process of service innovation are for e.g. having multiple actors involved, enabling the codification of knowledge and the organizational innovation capacity.[22]

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[18] Kowalkowski Christian, Kindström Daniel. (2009) Development of industrial service offerings: a process model, *Journal of service management*, (20), 2, p.2
[19] Kowalkowski Christian., Brehmer Per-Olof., Kindström Daniel. (2009) Managing industrial service offerings: requirements on content and processes. International Journal of Services Technology and Management, (11), 1, p.9
[20] Durst Susanne., Mention Anne-Laure., Poutanen, Petro. (2015) Service innovation and its impact: What do we know about? Investigaciones Europeas de Dirección y Economica de la Empresa 21. p.66
[21] Kowalkowski Christian, Kindström Daniel. (2009) Development of industrial service offerings: a process model, *Journal of service management*, (20), 2, p.5
[22] Ibid p.20

1.2.3 The challenge with value extraction from intangibles

"Knowledge assets are increasingly important in the modern knowledge economy. Effective development and deployment of knowledge assets is at the basis of organizational value creation capacity. However there is still a lack of applied models and tools to assess the mechanisms through which these assets take part in value creation dynamics" (Schiuma, Carlucci & Sole, 2012 p.8049).[23] Since intangibles are based on knowledge and information they are difficult to measure and quantify, furthermore defining the scope and how much the assets are worth therefore becomes challenging (López-barajas de la puerta, 2011).[24] "Value conversion is one of the most challenging questions for those trying to understand the economic principles of creating value from intangibles" (Allee, 2008, p.19).[25]

1.3 Aim of the thesis

The purpose and the contribution of the thesis is to:

1. See how industry companies more efficiently can utilize its intellectual resources to create new service-based offerings.
2. Create a model that can be applied as a way to see how technical IA contributes to value creation and to see how the assets can be used in different ways to create and configure new service-based offerings to facilitate for companies to exploit and leverage their technical IA.

The research questions will be explored from a empirical viewpoint and analyzed from a theoretical perspective by analyzing real cases from the industry company SKF to see how value have been created from the technical IA, by deconstructing different value propositions (both tangible and intangible) that the company SKF provides, to identify what kind of knowledge in form of technical IA that can be derived, and to distinguish how the technical IA have been used, packaged and transacted in the process to create different commercial value propositions.

1.4 Research questions

To be able to narrow the scope of the thesis one main research question with four sub questions have been used. The main research question was discussed in the analysis after having explored the 4 sub

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[23] Schiuma, Giovanni. Carlucci, Daniela. Sole, Francesco. (2012) Applying a systems thinking model to assess knowledge assets dynamics for business performance improvement. *Expert Systems with Applications* 39: p.8049

[24] López-barajas de la puerta, Aurelio. (2011) The management of intangible assets and resources. An opportunity for companies, risk managers and the insurance market. *Gerencia de Riesgos y Seguros N 110.* p.34

[25] Allee Verna, (2008) Value Network Analysis and value conversion of tangible and intangible assets. *Journal of Intellectual Capital* Vol. 9, No. 1, p.19

questions, and analyzed in relation to both the empirical material and the theoretical model. The first sub question is defined through the literature review. Sub question 2 and 3 have been explored through the two cases and analyzed with theories. Sub question 3 has also been addressed in relation to the proposed adjusted model, and sub question 4 has been discussed in relation to how SKF works with IAM from both the empirical findings and the presented theories.

Main question

1. How can a company more efficiently utilize its intellectual resources to create new service-based offerings?

Sub questions

1. How can a company's knowledge and intellectual resources be objectified?
2. How have intellectual resources been utilized in service-based offerings?
3. How can the impact of intellectual assets be made explicit in service-based offerings?
4. How could the new model help to increase the efficiency of intellectual resources?

1.5 Delimitations

Since the focus of the thesis is to identify how companies can use their technical intellectual assets efficiently to create new service-based offerings, the thesis will only focus on how an industry, manufacturing company works with creating value from it's intangibles. The thesis is only focusing on none product based use of technical IA, and how these assets can contribute to value creation when configured into different service-based offerings. The presented model can be used in different ways, however in this thesis it will only be used to deconstruct value propositions from SKF to see what type of technical IA that these offerings are based upon and how the assets have been packaged and transacted, to illustrate how intangible resources can be exploited and leverage by configuring technical IA into various offerings that can be commercialized.

Since the focus is to identify how value can be created from technical IA only two cases will be addressed to be able to analyze how the technical assets have been used and packaged in different ways to create value propositions. The thesis will not address intellectual property rights or brand assets. There are some factors that are mentioned in the empirical material that influences the value creation processes and the configuration of the technical IA into offerings, that influences the outcome, however these factors will only briefly be discussed in relation to the main research question in the

analysis, due to the fact that these factors could each be a subject for further research in relation to creating value and exploiting IA.

2 METHODOLOGY

In following chapter the research process will be described, how the data was collected, and what kind of research consideration and limitation that has been made. Furthermore this section will describe how the case's where selected and why these where relevant for the research questions in relation to this context.

2.1 Research considerations

Both a deductive and inductive research approach has been used in this thesis to create the adjusted model proposed in the thesis. Deductively an hypothesis derived from theory of how intellectual assets can be configured into service-based offerings have been tested by looking at two cases from SKF by deconstructing value proposition to illustrate the theory. Thereafter an inductive research approach has been used to draw conclusions that possibly could add parts to existing theory, based on the observations.[26]

2.2 Research approach

Since the purpose and the focus of the research was to see how IA have been used and in what way these had been used to create service-based offerings, a qualitative research approach have been used to conduct the study.

2.2.1 Research strategy

To be able to answer the research questions, sub question number, *how a company's knowledge and intellectual resources can be objectified*, had to be answered primarily to the other questions. The answer to this question was established and based on a theory from the literature review, and through guidance from the supervisor, the author of this thesis has chosen to define knowledge in form of technical assets described by a Swedish researcher. Furthermore to be able to answer the main research question, three additional sub questions where used in order to analyze. The theories was used to analyze the empirical findings, and thereafter an adjusted model based on Alexander Osterwalder's Business Model Canvas was used to see how IA can be exploited and how the assets contributes to value creation by applying value propositions into the model.

[26] Bryman, A & Bell, E (2011). Business Research Methods, 3rd Edition. Oxford: Oxford University Press pp. 11-15

2.2.2 The model

The adjusted model with the four categories that derives from Osterwalder's BMC was identified in discussion and by guidance from the supervisor from Chalmers as a explicit way to illustrate a process in relation to value creation from technical IA, based on SKF's request to explore ways to utilize and exploit it's intangible assets and create service-based offerings. The decision to use the BMC was primarily based on the famous simple design of the framework, since it provides a quick overview over different areas, and it can be used as a flexible tool, that addresses important elements depending on the perspective and intended use of the BMC. The canvas can therefore serve as a foundation for input that facilitates discussions. The BMC also constitutes as a good basis for creating an adjusted model, in relation to the purpose of this thesis since it could be used as a tool to illustrate the value creation process from intangible resources.

The new model will be used to deconstruct value propositions exemplified and illustrated through two SKF cases within two different areas, to identified how technical IA have been configured into different value propositions and how these have been transacted to the market. The model could also be used without deconstructing value propositions, since it only requires for the identification of technical IA that a company has to its disposal, which then can be configured and packaged into new offerings. However in the thesis the model will be used as an analysis tool applied on two cases with various value propositions examples that will be deconstructed. The focus of the proposed model will primarily be on the first resource block, where discussions will be from a resource-based perspective to see how technical IA as an intangible resource can contribute to the value creation process for companies that want's to exploit and leverage its intangible resources. Furthermore there is also a focus on the specific characteristics of knowledge as a non-rival source, since this implies that knowledge assets can be utilized in different ways repeatedly and concurrently without being depleted.

2.2.3 Research design - case studies

To be able to answer the research questions, two cases from the industry company SKF have been used to explore and illustrate how the company has used its technical IA to create different offerings. According to Bryman & Bell (2011) a case study design is frequently used in business research, and is suitable to obtain a detailed and intensive analysis of an area.[27] To obtain a deeper understanding of the areas and the cases different people that knew the area well was interviewed. Furthermore the author

[27] Bryman, A & Bell, E (2011). Business Research Methods, 3rd Edition. Oxford: Oxford University Press pp.59-60, 62-63

has had access to specific background material from SKF in regards to the cases that have been used to understand the area better and analyze, in addition, available information at SKF's official webpages where both products and services has also served as a foundation for the thesis.

2.3 Method for collecting data

2.3.1 Literature review

The conducted literature review served different purposes for the research. The literature review contributed to a basis and a deeper understanding of previous research in the specific field to see the dynamic of goods and services, tangible and intangible, and how intangible resources and technical IA can be used to create value for a company. Secondly the literature review provided theories that where used to analyze the collected empirically data.

2.3.2 Primary data collection - Semi-structured interviews

Since the aim of the thesis was to see how technical IA contributes to value creation embedded in value propositions, two cases from SKF was chosen to constitute as a foundation to see how the assets have been deployed and used in different ways to create offerings. The two cases where selected from guidance with the mentor at SKF to find suitable cases to analyze, and discussed beforehand to see if they met certain criteria.

2.3.3 Sampling method

The different cases where selected by two screening criteria, and by guidance from SKF to find suitable cases to analyze. The following criteria had to be met:

1. Technical IA that have been use to create offerings both in form of a tangible product and service offerings.
2. Technical IA that have been used in different ways both externally and internally to create value offerings.

After having selected the two cases, and having gone through the case material and information about the cases, suitable people to interview were selected. Thereafter semi-structured interviews where performed to clarify the case material from SKF, to see the process behind the different offerings, to identify how technical assets had been utilized, packaged and transacted into value propositions. The length of the 4 interviews that where conducted where two at 60 minutes respectively two at 90

minutes. All the interviews where recorded and transcribed, and thereafter sent back to the interviewed person to reassure that the formulated text was interpreted in the right way.

2.4 Analysis of collected data

2.4.1 Academic rigor

Multiple cases studies on how SKF have done in certain cases to create value by packaging and transacting technical IA in a certain way have been used as a research material to analyze the research questions. According to Bryman and Bell (2011) a case study is focused on a bounded situation or system therefore the author of this thesis is aware of the fact that this limits the generalizability of the presented conclusions on how to use and create value from technical assets. To evaluate and ensure that the research process is reliable and that it can be repeated in the future the model from Guba (1981) has been used below to describe certain factors.[28] However in relation to the generalizability of the results, any company that wants to exploit and leverage its IA could use and apply the reasoning and the proposed new model to create new offerings from their intangible resources. The resources doesn't need to be identified as technical IA, it could be any assets that a company wants to exploit, and by evaluating different options from the packaging and transaction examples etc. that have been included in the thesis, companies can find different ways to create value from the intangible resources in relation to a companies strategic objectives.

2.4.2 Credibility and Transferability

To ensure a reliable and transparent research process, a detailed list of the used references are included, furthermore a table of who was interviewed and when. People suitable to interview regarding the cases was discussed with the mentor at SKF in beforehand. To make sure that the collected empirical material corresponded to what was said during the interviews these where recorded, transcribed, and once formulated the material was sent back for the interviewee to be able to comment and thereafter parts that where vaguely formulated where rewritten where needed.

2.4.3 Dependability and Confirmability

A descriptive part of each of the cases has been given to enhance the understanding for the relevant area and for the purpose of replicability of the research, furthermore a detailed description over how

[28] Guba E.G. (1981) "Criteria for assessing the trustworthiness of naturalistic inquires" Educational Communication and Technology Journal 29, 1981, 75-91

the collected data has been analyzed in relation to the theoretical model is provided. When describing the cases from the SKF material and the interviews the focus was strictly to illustrate the way that the technical IA have been used, to ensure objectivity. However a certain level of subjectivity is difficult to avoid since parts only parts of what emerged during the interviews had to be selected to be an appropriate amount of material to include in the thesis.

3 THEORETICAL FRAMEWORK

In this chapter previous literature that are relevant for the research will be presented in following order:
Section 3.1 discusses how value propositions can be created from intangible resources, and how IA can be used as building blocks to create value, by exploiting and leveraging the IA's. In this section the first sub question, how a company's knowledge and intellectual resources be objectified, will be described. Section 3.2 addresses the dynamic of services and products. Section 3.3 discusses the concept of utilizing a business model canvas in relation to value creation, thereafter value creation will be discussed from a service-based perspective respectively an intellectual asset based approach.

3.1 CREATING OFFERINGS FROM INTANGIBLE RESOURCES

*"The capability of companies to create economic value, i.e. customer value, shareholder value, and stakeholder value, is increasingly dependent on intangible assets – on immaterial resources and production factors"(*Daum, 2005 p. 2).[29]

3.1.1 What is a resource?

Instead of seeing resources as only tangible things that often are fixed or limited in form of natural resources, a broadened description of resources can be found from a service-dominant perspective, which defines resources as anything that can be used as a support, whether it is tangible or intangible, externally accessible or internally controlled. Lusch and Nambisan also reasons that "*Resources are a function of human appraisal and thus are often dynamic and potentially limitless; resources are a function of how something (tangible or intangible) is or can be used and not a function of things per se"*(Lusch and Nambisan, 2015 p. 159).[30] Resources can also be defined as tangible and intangible factors that are controlled or owned by a company and that can be used and converted, through different activities to products and services in an efficient way (Julienti, Bakar & Ahmad, 2010).[31]

3.1.2 Defining intangible and tangible resources

Intangible assets (IAs) are increasingly seen as critical drivers for knowledge creation, innovation and consequently economic growth. These assets can be defined as *"all non-material factors that contribute to the*

[29] Daum Juergen H. (2005) *Intangible Assets-Based Enterprise Management - A Practical Approach*
[30] Lusch, Robert F. & Nambisan, Satish (2015) Service Innovation: A Sevice-Dominant Logic Persepctive *MIS Quarterly Vol.39 No. 1,* p.159
[31] Julienti, L. Bakar, A. and Ahmad H. (2010) Assessing the relationship between firm resources and product innovation performance - A resource-based view. *Business Process Management Journal.* Vol. 16 No. 3. pp.421-422

performance of firms in the production of goods or the provision of services, or that are expected to generate future economic benefits to the entities or individuals that control their deployment" (J.-P. Kramer et al., 2011 p.447)[32] When it comes to intangible resources, they can be described as assets that are mainly based on knowledge and information, intangibles have no physical existence, whereas tangible resources are those assets that are physical in a material form that can be grasped and seen. Tangible assets can be quantified and identified easily. Tangibles are often divided into three categories *"fixed assets (land, buildings, machinery, plant, computing equipment), stock (raw materials, finished products, semi-finished products) and financial assets (capital, reserves, rights to receivables, shares of other companies)"* (López-barajas de la puerta, 2011 p.33).[33] Looking at the term resources from an industrial perspective, resources are often defined in form of tangible goods and factors of production, whereas the definition of resources from a knowledge-based perspective could be described as intangibles such as intellectual assets that come in the form of for example know-how, inventions and relationships.[34]

3.1.3 The value of IA resources is contextual

Tao, Daniele, Hummel, Goldheim & Slowinski (2005) reasons that the value of intellectual assets can be seen as contextual, since IA are intangibles they are often defined by, and dependent of the context of their use. Considering the context it can be seen from an internal perspective such as in form of a service or a tangible goods, or externally for example in form of a relationships, spinouts or licenses.[35] Harrisson & Sullivan (2000) shares a similar view and argues that, the value of intellectual capital can be put in relation to both the firm's context but also to the desired outcome of the intangibles. The value of firm's innovative ideas can be seen as dependent on how a company perceives its business, and in relation to what's seen as valuable in the context where it operates. According to Harrisson & Sullivan the context can be divided into two perspectives, internal and external realities. The internal realities refer to resources, directions and constraints and these internal aspects define a firm's weaknesses, strengths and its potential to stay competitive in the external environment. Whereas the external

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[32] Kramer, Jan-Philipp., Marinelli Elisabetta., Iammarino, Simona., Diez Revilla Javier. (2011) Intangible assets as drivers of innovation: Empirical evidence on multinational enterprises in German and UK regional systems of innovation. *Technovation 31*

[33] López-barajas de la puerta, Aurelio. (2011) The management of intangible assets and resources. An opportunity for companies, risk managers and the insurance market. *Gerencia de Riesgos y Seguros N 110.* p.33

[34] Heiden, Bowman J., Petrusson, Ulf, Assets, Property, and Capital in a Globalized Intellectual Value Chain, From Assets to Profits: Competing for IP Value & Return, 2nd Edition, John Wiley & Sons Inc, New Jersey 2009, p.6-7

[35] Tao, John. Daniele, Joseph. Hummel, Edward. Goldheim, David. Slowinski, Gene. (2005), *Developing an effective strategy for managing intellectual assets.* Industrial research institute p. 53

realities are in relation to opportunities and threats, and driving forces that concerns and influences immediate opportunities and the long-term viability of a firm in a certain industry.[36]

3.1.4 Defining knowledge - the foundation of intellectual assets

When looking at industrial knowledge, two different types of categories are commonly used, tacit and codified knowledge. Examples of tacit knowledge can be know-how, skills, and abilities that reside within an individual, whereas codified knowledge has been committed to any type of communication medium.[37] *"Knowledge that is codified can be written down, transferred, and shared"* (Edvinsson & Sullivan, 1996, p.357).[38] Once the know-how and the knowledge of a firm's human capital become codified it can be seen as the firm's intellectual assets (Sullivan, 2005).[39] Since *"Intellectual assets are the source of innovations that the firm commercializes"* (Sullivan, 1998, p.23)[40] it is important to acknowledge the distinction between human capital (people) and intellectual assets, since intellectual assets are interchangeable and owned by shareholders, which is not the case with human capital. Therefore Sullivan (1998) argues from a right of ownership point of view, that it is beneficial that a firm transform innovations produced by the employees into intellectual assets.[41] Another aspect of knowledge is that *"…knowledge and information possess a specific characteristic that economists refer to as 'non-rival in use': the same idea and its expression may be used repeatedly and concurrently by many people, without being thereby 'depleted'"*(Foray & Paul, 2003, p.38).[42]

3.1.5 Objectifying knowledge as technical IA

According to Petrusson (2015) knowledge can be described and objectified in the form of technical intellectual assets. Based on years of research and evaluation, a number of categories have been formed which can be used as a way to define knowledge in the objectified form as an technical IA.[43] (*See examples in table 1 below)*

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[36] Harrisson, Suzanne. Sullivan, Patrick H. (2000), *Profiting from intellectual capital.* Journal of intellectual capital. Vol 1 No. 1 pp. 36-37 MBC University Press, 1469-1930

[37] Sullivan, Patrick H. (ed.) (1998), *Profiting from Intellectual Capital: Extracting Value from Innovation.* New York: John Wiley & Sons Inc pp.20-21

[38] Edvinsson Leif, Sullivan Patrick (1996) *Developing a model for managing intellectual capital.* European Management Journal Vol 14, No 4 p.357

[39] Sullivan, Patrick H. (ed.) (1998), *Profiting from Intellectual Capital: Extracting Value from Innovation.* New York: John Wiley & Sons Inc p.174

[40] Sullivan, Patrick H. (ed.) (1998), *Profiting from Intellectual Capital: Extracting Value from Innovation.* New York: John Wiley & Sons Inc p.23

[41] Ibid pp.20-21

[42] Foray D, Paul, A. D. (2003) Economic Fundamentals of the Knowledge Society, Policy Futures in Education, Vol 1, Nr 1. p.38

[43] Petrusson, Ulf., (2015) Forskning och Nytta, Tre Böcker Förlag AB pp.(294-296)

Figure 1 - Technical IA categories, definition and examples

Technology asset categories	Definitions	Examples
Data	Potentially very useful but unprocessed, raw information which can serve as a source for future insights or solutions.	- Measurement or test data - Results - Experiments - Notes and journals
Database	Structured and searchable data, which is collected, ordered and accessed in a systematic way.	- Electronic databases (MS Excel and Access files, etc.) - Matrices
Data correlation	Conclusions derived from analyzing empirical data or databases such as problem insights, design and process parameters.	- Optimizations - Trends and ranges - Cause/effect and connections - Dependencies - Findings
Theoretical framework	Generalized theories explaining technical phenomena, causes and effects.	- Models - Theories - Understandings and realizations - Abstractions - Knowledge - Schemes
Technical solution	Solutions to technical problems and core unique underlying ideas of new technologies.	- Methods and processes - Devices, units and apparatuses - Compositions and designs - Configurations and systems - Technologies, inventions and solutions
Visualization and simulation	Static or dynamic visual representations, which go beyond typical drawings by being valuable in themselves.	- Designs, drawings and sketches - CAD/CAM and prototypes - Diagrams, graphs and photos - Simulations, models and demonstrations
Instruction	Instructions providing concrete directions to execute a specific procedure, e.g. a technical operation.	- Algorithms, routines and procedures - Guidelines, manuals and SOPs - Recipes - Recommendations
Software	A computer implemented and organized collection of data and automated operations, performing specified tasks.	- Systems, suits and platforms - Programs, applications, client/servers - Drivers, plug-ins, engines and GUIs - Libraries, algorithms and scripts

3.1.6 Defining value propositions and offerings

One could argue that what enterprises essentially are offering, are different kinds of value propositions. However a value proposition whether its in form of a service or a tangible product embedded with knowledge, is not embodied with value (utility) per se, according to Vargo & Lusch (2004) the value is determined in the coproduction with the consumer where there is a potentiality to fulfill a customer need and therefor becomes valuable.[44] Looking at the concept of a value proposition from a more general perspective, an offering could be seen as constituting of different elements through which companies can utilize to provide value for customers. *"Examination of the various definitions for the concept of offering indicates that most authors agree on the obvious role of goods and services in an offering"(*Pekkarinen and Salminen, 2013, p.14*7),* however there are various opinions on what kind of other elements that should be included when describing an offering, depending on what the context are. There could be for examples elements such as information, technology, quality, financial elements, risk sharing, brand image, benefits and sacrifices and capabilities (Pekkarinen & Salminen, 2013).[45] Skålén, Gummerus, Von Koskull & Magnusson (2014) reasons that when it comes to successful service innovation having the right resources are one critical part, however one also need established methods and ways to generate attractive offerings from these resources.[46]

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[44] Vargo Stephen L. & Lusch Robert F. (2004) Evolving to a new dominant logic for marketing. *Journal of marketing* Vol. 68 p.11

[45] Pekkarinen, Olli. and Salminen Risto T. (2013) Developing industrial solution offerings: a framework and management guidelines. *J Bus Mark Manag 3:* p.147

[46] Skålén Per. Gummerus Johanna. Von Koskull Catharina, Magnusson, Peter, R. (2014) Exploring offering and service innovation a service-dominant logic study. *J. of the Acad. Mark. Sci. 43:* p.137

3.2 THE DYNAMIC OF SERVICES AND PRODUCTS

3.2.1 The dynamic of services and products

Lusch & Nambisan (2015) describes that for a long time the goods-dominant logic of innovation has been one of the most influential views in the field of innovation, where focus has been on optimizing and managing tangible outcomes by creating a control position and separating actors, to produce standardized goods, and deliver the goods to the customer and market at a certain time.[47] Another dominant view is the service-dominant logic of innovation, which could be seen as transcending the dichotomy between services and goods, since once could argue that service are "*sometimes provided directly [through services], and sometimes it is provided indirectly, that is, through the provision of tangible goods; goods are distribution mechanisms for service provision*" (Skålén, Gummerus, Von Koskull & Magnusson, 2014 p.140) With this perspective on innovation this view could be applicable for both the manufacturing sector and the service sector (Skålén, Gummerus, Von Koskull & Magnusson, 2014).[48]

Furthermore Vargo & Lusch (2004) provides an interesting view on the dynamic of services and products however in the context of marketing, where they discusses the evolution in the field towards a new dominant logic, they argue that "*marketing has moved from a goods-dominant view, in which tangible output and discrete transactions were central, to a service-dominant view, in which intangibility, exchange processes, and relationships are central.*"(Vargo and Lusch, 2004 p.2) Instead of seeing goods embedded with value, where service(s) only are add on to the production of products, Vargo and Lusch describe services as application of knowledge and skills that manifests through processes, performance and deeds. They argue "*Knowledge and skills can be transferred (1) directly, (2) through education or training, or (3) indirectly by embedding them in objects."* (Vargo and Lusch, 2004 p.9) With this view one could say that tangible products are embodied with activities or knowledge. Vargo and Lusch describes an example in form of a wheel where the tangible object could be seen as encapsulated with knowledge and functioning as a distribution channel for services. A tangible object could be described as an appliance for the performance of services, as an indirect service where a direct service has been replaced with a tangible outcome.[49]

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[47] Ibid p.156

[48] Skålén Per. Gummerus Johanna. Von Koskull Catharina, Magnusson, Peter, R. (2014) Exploring offering and service innovation a service-dominant logic study. *J. of the Acad. Mark. Sci. 43:* p.140

[49] Vargo Stephen L. & Lusch Robert F. (2004) Evolving to a new dominant logic for marketing. *Journal of marketing* Vol. 68 pp.2-9

Petrusson (2004) addresses the importance of the value-generating dimensions in contracting, in relation to business transformation. By objectifying for e.g. knowledge and information, this creates building blocks in the construction of intellectualized business. Petrusson argues that *"Through the usage of these building blocks, the main value propositions in the industrial economy, i.e. physical products and services, are complemented by virtual products and mere intellectually conceptualized object transactions, e.g. license offers"* (Petrusson, 2004, p.79). According to Petrusson this development process in relation to business transformation indicates that companies are increasingly leaning towards the direction of intellectualized business, where value steams from an intellectual value chain.[50]

3.2.2 Innovation processes and offerings

Lusch and Nambisan (2015) describes the fundamental shifts that has taken place in the way that enterprises view the process of innovation, starting of by acknowledging that innovation processes are becoming more network-centric, where there has been a shift from value creation steaming from within an individual organization, to value creation that evolves from different actors joint together in network constellations, constituting of for e.g. actors such as different partners, suppliers, customers and independent inventors. Furthermore Lusch and Nambisan also acknowledges the shift to a information-centric view of innovation, since the innovation process are not only focused on and related to tangible goods, since it also has grown to be concerned with intangible offerings associated with tangible goods or stand-alone intangible offerings that are characterized by high content of information. Another fundamental shift is that, instead of focusing on features and attributes output of the innovation process, there is a focus towards the value and experience that are created together in a network with other actors in the process of utilizing resources and innovations (Lusch and Nambisan, 2015).[51] Looking from a resource-based view upon ideas, opportunities and resources that are generated from a collaboration that has access to an external network, these exceed the potential to explore them, compared to what a individual organization could do on its own (Shum & Lin, 2010).[52]

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[50] Petrusson, Ulf. (2004) Intellectual Property & Entrepreneurship Creating Wealth in an Intellectual Value Chain, 1st Edition, CIP Working Paper Series, Gothenburg pp.77-79

[51] Lusch, Robert F. & Nambisan Satish (2015) Service Innovation: A Sevice-Dominant Logic Persepctive *MIS Quarterly Vol.39 No. 1,* p.155-156

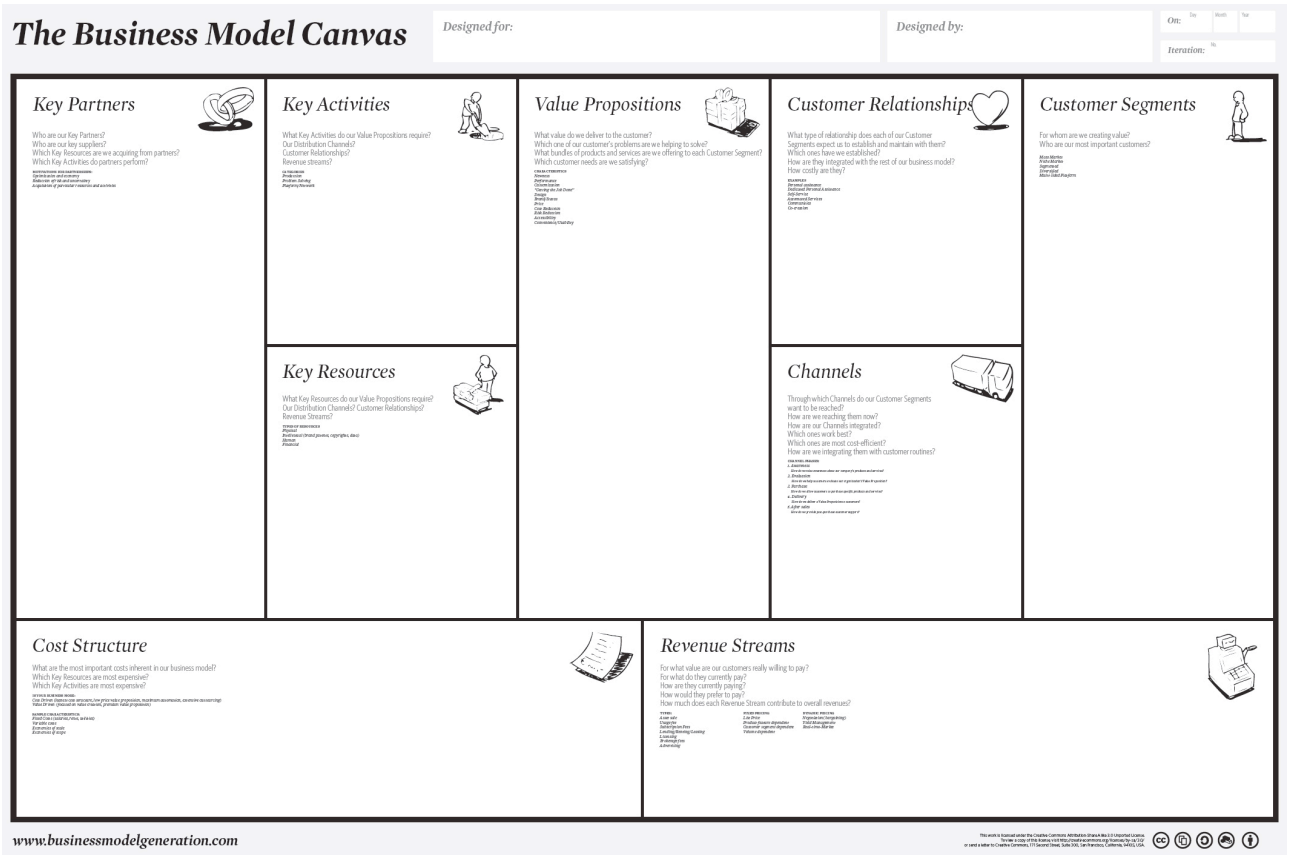
[52] Shum P. and Lin, G (2010) 'A resource-based view on entrepreneurship and innovation', *Int. J. Entrepreneurship and Innovation Management*, Vol. 11, No 3, p.267

VALUE CREATION PROCESSES; THROUGH BUSINESS MODELING

3.2.3 Introducing the Business Model Canvas

According to Osterwalder & Pigneur (2010) one can describe a business model with the use of nine different building blocks that can show how a firm aims to generate financial value. The nine building blocks consist of the following categories that can be seen in the illustration in figure 2. And a short description of the characteristics of the nine building blocks can be seen in figure 3. Osterwalder & Pigneur defines a business model in following way "*A business model describes the rationale of how an organization creates, delivers, and captures value*" (Osterwalder & Pigneur, 2010 p.14)[53]

Figure 2 - Business Model Canvas



[53] Osterwalder, A. and Peigner, Y., (2010). Business Model Generation. Chichester: John Wiley & Sons Ltd. pp.4-15

3.2.4 The purpose of the Business Model Canvas

The Business Model Canvas (BMC) serves as a tool that can be used when companies are designing their business models. The BMC can be used as a method to identify the key elements that are part of a company's current business model. It can also assist as a creative visualization tool for future business model innovation. The essence and the outcome of the BMC can differ depending on the context, the person who is creating it and if its done to illustrate the past, current or a future business model. "*The BMC has achieved widespread adoption not only is it used to model the current state of companies' business models, but also any future business model innovation*" (Fritscher and Pigneur, 2014 p.151). Furthermore they argues that for skilled users of the BMC, the tool can enable people to see how the elements interacts with one other and identify and vision multiple business models. When adding or changing certain elements this could have an impact on other relevant elements. Identifying and exploring the dynamic and the interactions between the elements could also generate new business models with potential.[54]

Five out of the nine original blocks in the BMC will be used in the thesis and adjusted into another model presented in the analysis, which consists of four blocks. A short description of the nine blocks will be described in the table below (*see figure 3 below*) with their original meaning, and the five blocks that the model concerns are marked in grey and will be illustrated and described in section (5.1) in the analysis.[55]

Figure 3 - Description of the 9 building blocks in the BMC[56]

Nine building blocks	Definition based on Osterwalder and Pigneur's (2010) concepts.
Customer Segments	The different people that a company seeks to create value for and reach with offerings.
Value propositions	Companies offer value propositions to solve customer problems and customer needs.
Channels	The way that a company delivers and communicates value propositions.
Customer Relationships	The type of relationship that a company establishes with its customers.
Revenue Streams	The type of revenue streams that are generated by offering value propositions to customer.
Key Resources	The assets needed to be able to offer the value propositions to customers.
Key Activities	The type of activities that a company performs to be able to offer different kinds of offerings.
Key Partnership	The network and business partners that a company has build up to perform the business.
Cost Structure	The different cost structures that the business has.

[54] Fritscher Boris, Pigneur Yves (2014) Visualizing Business Model Evaluation with the Business Model Canvas: Concept and Tool. *Business Informatics (CBI), 2014 IEEE 16th Conference Vol:1* p. 151

[55] Innovation and Business Model: a case study about integration of Innovation Funnel and Business Model Canvas. (2014) *Review of business management, Sao Paulo, Vol 16, No 53,* p. 623

[56] Innovation and Business Model: a case study about integration of Innovation Funnel and Business Model Canvas. (2014) *Review of business management, Sao Paulo, Vol 16, No 53,* p. 623

3.3 VALUE CREATION FROM A SERVICE-BASED PERSPECTIVE

"customers do not buy goods or services: they buy offerings which render services which create value" (Gummesson, 1995, p. 250).[57]

3.3.1 Service-based business model innovation

Lehtonen & Kostama (2014) provides one definition of the concept of services from a rather narrow view, that are, services are intangible assets, in contrast to produced products that are tangible. From a broader perspective one could say that services includes both tangible and intangible components when offered as product-service systems or as bundles with different components.[58] According to Chesbrough (2011) a lot of the different existing perspectives on innovations have emerged from the view of business models that are focused on manufacturing and product based thinking.[59] In these models one look at business as a chain of economic activities, where different elements adds value to a process, which results in a tangible product. From this classic formulation view of a business, the product is the core of the process, and the perspective of service is being added at the end of the process, a service could be for e.g. installation that is performed in relation to the sold goods.[60]

3.3.2 Business models and the service innovation dynamic

Chesbrough (2011) reasons that for a company to move towards a more service business, one needs to step away from the classical product-based thinking, and reasons, "*Effective services innovation requires new business models that profit from internal innovation initiatives and stimulates external innovation activities that add to the value of their own business*" (Chesbrough, 2011, p.4).[61] Chesbrough also refers to a statement made by Peter Drucker *"What the customer buys and considers value is never a product. It is always utility - that is, what a product does for him"* (Chesbrough, 2011 p.34).[62] With a utility perspective in mind this would imply that a customer doesn't necessarily want a specific tangible product, instead what's valuable is the effect that a product can produce. The offering could therefore be seen as a service enabled through a physical

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[57] Gummesson, Evert (1995), "Relationship Marketing; Its Role in the Service Economy," in Understanding Service Management, William J. Glynn and James G. Barnes, Eds. Dublin, Ireland: Oak Tree Press.
[58] Lehtonen, Heini. Kostama, Hanna (2014) A Novel Categorization of Industrial Services - Analysis of Service Offerings of Manufacturing Companies. *The Journal of Applied Management and Entrepreneurship,* Vol. 19, No 3. p.9
[59] Chesbrough, Henry. (2011) Open Services Innovation - Rethinking Your Business to Grow and Compete in a New Era. (1st Edition) Jossey-Bass, A Wiley Imprint. p.4
[60] Ibid p.33
[61] Chesbrough, Henry. (2011) Open Services Innovation - Rethinking Your Business to Grow and Compete in a New Era. (1st Edition) Jossey-Bass, A Wiley Imprint. p.4
[62] Ibid p.34

goods. For example looking at a customer that buys a car from this perspective could be seen as a transportation service, for which different options could be possible that could enable the same effect, where other options could be considered instead of actually buying a car.[63]

Chesbrough (2011) argues that service innovation applies and could influence all of the different parts of a business model, which ultimately can alter the value proposition that companies are offering and creating new opportunities.[64] Chesbrough uses the term open innovation, which he defines as "*the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively*" (Chesbrough, 2011, p.69).[65] Openness can improve service innovation for a company and by innovating the business model; this process could be even more powerful. New innovative business models could enable for e.g. the possibility for a company to redesign products and services to create new offers, and reaching new markets for using the firm's assets. Different ways on how to innovate business models, could be for e.g. redesigning the value chain that creates and delivers the service so it becomes more efficient, changing the target customer for the service, creating a business network or connecting to already existing ones or changing the way one charges for the business model which often affects other parts of the business models in particularly the value propositions that are offered.[66]

3.3.3 Value creation through innovation and intellectual assets

Intellectual assets can be seen as one part of companies most valuable assets where companies are relying on the IA's to create value for the company, however the process of how the assets are created and should be managed are not always easy to grasp.[67] In a model for managing intellectual capital Edvinsson & Sullivan (1996) describes two sources that they consider are fundamental for value creation in a knowledge firm. The first source is innovations that are generated and evolves from a company's human resource. Once the innovations are converted into intellectual assets they become company property where certain assets can be defined as intellectual property once obtaining legal protection. Furthermore Edvinsson & Sullivan argue that there is a delicate balance in having a

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[63] Chesbrough, Henry. (2011) Open Services Innovation - Rethinking Your Business to Grow and Compete in a New Era. (1st Edition) Jossey-Bass, A Wiley Imprint. p.34-35
[64] Chesbrough, Henry. (2011) Open Services Innovation - Rethinking Your Business to Grow and Compete in a New Era. (1st Edition) Jossey-Bass, A Wiley Imprint. p.90
[65] Ibid p.69
[66] Ibid. 89-93
[67] Tao John., Daniele Joseph., Hummel Edward., Goldheim David., Slowinski Gene. (2005) Developing an effective strategy for managing intellectual assets. *Research Technology Management,* Vol. 48, Nr 1. p.51

reasonable amount of innovations, so that a firm can focus on the once that are believed to generate most value, or having certain processes in place that can stimulate the generation of new innovation within certain areas such as highly important technologies. The second fundamental source lies within the conversion of a firms structural business assets such as distribution, processing and sales since these contributes with value to innovations when these are converted from intangibles into services or products (Edvinsson & Sullivan, 1996).[68]

[68] Edvinsson Leif, Sullivan Patrick (1996) *Developing a model for managing intellectual capital.* European Management Journal Vol. 14, No 4 pp.361-363

3.4 VALUE CREATION FROM AN IA MANAGEMENT APPROACH

3.4.1 Key resources - knowledge assets as a key resource

According to Desouza (2011) ”An organisation's innovation processes are critical to the generation of intellectual assets. Innovation allows an organisation to use its knowledge-based assets in a creative manner so as to invent products and services of commercial value” (Desouza, 2011 p.169).[69] Furthermore Desouza highlights the importance of obtaining a balance between protecting a firm's innovation process in relation to the risk of hindering the process.[70] Knowledge-based assets can be defined as both knowledge-based 'processes' and 'knowledge-based resources' that enable an organization's resources to be utilized and leverage in different ways. Since it can take a lot of time and resources to develop these assets, it is critical for a firm to make sure that valuable assets remain within the firm. Many knowledge-based assets are build over time and if a firm would loose out of some assets this might lead to a void that is hard to make up for.[71] An organizations ability to secure its intellectual assets depends upon the way that the organization can recognize and manage the process where the intellectual assets are created and used.[72] Looking at the life cycle of intellectual assets, Davenport, Thomas & Desouza (2003) reasons that it's comparable to any other resource that a firm uses in the production of services and goods, since IA can be improved, transformed and redefined by for example additional investment and use. Even though knowledge can be seen as eternal, this does not imply that knowledge are eternally valuable, therefore intellectual assets might be devalued and rendered obsolete due to other techniques and knowledge when outperformed.[73]

3.4.2 Leveraging value with innovativeness and knowledge management

The capability of a firm to be innovative and manage its intellectual assets is two aspects that influence the value of an organization. It is through the process of knowledge management that a firm can benefit from and leverage both tacit and explicit knowledge, and then through innovation processes the knowledge can be transformed into offerings with commercial value in form of services and tangible products. Having a good knowledge management process in place facilitates for a firm to utilize its knowledge base in an optimal way. By managing knowledge this often refers to the whole process of

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[69] Desouza Kevin, C. (2011) Securing intellectual assets: integrating the knowledge and innovation dimensions. International journal of technology management, v 54, Nos. 2/3 p. 169
[70] Ibid p.169
[71] Ibid p.170
[72] Ibid p.199
[73] Davenport, Thomas H. Thomas, Robert J. Desouza Kevin C. (2003) *Reusing intellectual assets.* Industrial Management; May/June ; 45, 3 p.15

"...enabling of the codification, storage, retrieval and application of explicit knowledge and the sharing of tacit knowledge" (Desouza, 2011, p.170).[74] As previously mentioned, a part from the important fact that a firm needs to manage its knowledge in a adequate way, its also important to link knowledge to the firms abilities to innovate, since a firm can refine its knowledge base through different innovation processes (Desouza, 2011).[75] Knowledge assets can be described as a set of intangibles resources, where for e.g. skills and assets interacts. "*Knowledge management processes enable the generation of new knowledge, and the development of organizational routines that form the building blocks of firm's competencies or the way it performs its operational processes and activities. These organizational competencies, hence, condition the efficiency and the effectiveness of business processes, and consequently the value of firm's products and services*" (Moustaghfir, 2008 p.20).[76]

3.4.3 Deployment and use of knowledge assets

Teece (1998) describes that when a company has a functional management, proper structures and good incentive systems in place this facilitates the process of creating and building knowledge assets and the generation of innovation. Knowledge assets that derives from individuals, are shaped into competences through for e.g. physical and social resources provided by a company, and the way that these knowledge assets and competences are configured and deployed effects the outcomes and the commercial success for companies. Furthermore Teece also argues that what contributes to competitive advantage in today's economy it is knowledge asset that are hard to replicate, and the way that the assets are deployed.[77]

3.4.4 Reuse of intellectual assets - creating new offerings

Since a lot of companies increasingly are relying and competing on knowledge, Davenport, Thomas & Desouza (2003) argues that it is relevant to develop and improve the way that a company is reusing its intellectual assets. Reusing intellectual assets allows for a company to focus time and resources on other activities instead of starting from scratch to rebuild and reinvent processes and ideas. For intellectual assets to become valuable and useful they need to be codified, once put in a codified form intellectual assets can be described, used and exploited. Furthermore Davenport, Thomas & Desouza makes a distinction between process assets and product assets, where process assets are described as *"the codified*

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[74] Desouza Kevin, C. (2011) Securing intellectual assets: integrating the knowledge and innovation dimensions. International journal of technology management, v 54, Nos. 2/3 p.170
[75] Ibid p.170
[76] Moustaghfir, Karim. (2008) The dynamics of knowledge assets and their link with firm performance. Measuring business Excellence Vol. 12 No.2 p.20
[77] Teece, David J. (1998) Capturing Value from Knowledge Assets: The new economy, markets for know-how, and intangible assets. *California Management Review,* Vol. 40, 3. p.62

knowledge of how to perform a task" and product assets as *"the specific outputs or work products of knowledge work"* (Davenport, Thomas & Desouza, 2003 pp.14)[78] Theses two different categories of intellectual assets can then be combined and recombined in different ways to create value.[79]

3.4.5 Value conversion

Converting intangible assets such as internal structures, reputation and human knowledge into negotiable forms of value, is one of the most challenging issues when dealing with intangibles is according to Allee (2008). Furthermore Allee argues that the future level of success of a company is depending on how well a company can convert one form of value into another. Allee states that "*Understanding the dynamics of value conversion requires expanding beyond the asset view of intangibles to understand the function of intangibles as negotiable goods and as deliverables*"[80] Allee also argues that there are different dimensions that are important to recognize and grasp, to understand how intangibles can contribute to value creation. Allee reasons that intangibles could be described as negotiable economic offerings, where the assets are seen as negotiable forms of value. For e.g. knowledge can be exchanged for financial means through offering services or products, in that way intangible is converted to tangibles or one could trade intangibles by exchanged knowledge for other knowledge.[81]

3.4.6 Evaluating strategic value vs. control of genuine assets

In the context of integrating important assets into a firm's strategy, Frigo & Hurley (2014) describes in a process of five steps on how to identify and manage genuine intellectual assets. "*Genuine Assets can be defined as the tangible and intangible resources and capabilities that enable an organization to achieve its strategic objectives. Based on extensive research about high- performance companies, we can say they are the "building blocks" of strategy that form the basis for creating sustainable competitive advantage and lead to superior returns, growth, and, ultimately, drive market value"* (Frigo & Hurley, 2014 p. 20).[82] The first step consists of identifying both obvious and non obvious assets that a firm has by making an inventory of the company to find the assets with the most potential, the key genuine assets. Example on obvious assets could be strong financial position, dominant market structure or for example superior physical assets. Whereas non-

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[78] Davenport, Thomas H. Thomas, Robert J. Desouza Kevin C. (2003) Reusing intellectual assets. *Industrial Management*; May/June V. 45, 3 p.14
[79] Ibid p.14
[80] Allee Verna, (2008) Value Network Analysis and value conversion of tangible and intangible assets. Journal of Intellectual Capital Vol. 9, No. 1, p 2
[81] Ibid p.3
[82] Frigo, Mark, L. & Hurley, James. (2014) Understanding Your Organizations' Genuine Assets. *Strategic Finance* February pp. 20-22

obvious assets could consist of, customer relationships with suppliers/customers/regulators, brand equity, deep domain expertise, workforce's competences etc. The second step is to identify what assets that a firm might be missing, assets that could be developed or acquired through strategic partnering. In this step its important to define the level of control that is required over new assets, and how new assets could affect other parts of the organizations processes. The third step is to see the strategic value of the assets, in what way the assets are valuable for an organization, to see if and how assets can contribute and increase the capability to innovate and deliver a company's offerings to meet customer needs.[83]

The fourth step in the process is to analyze the degree of control in relation to the assets, and to define what level of control that should exist in relation to different types of assets, by assessing other elements such as risk, flexibility and costs. The authors argue "*the more control, the more the costs, the less flexibility, the less risk the organization is willing to absorb*"(Frigo & Hurley, 2014 p.21).[84] The fifth and last step in the process is to create a structure of strategic objectives so that a firm can continue managing the assets in a efficient way by establishing ownership of assets and defining measures to control them, furthermore to developing new assets to protecting and leveraging current assets (Frigo & Hurley, 2014).[85]

3.4.7 Evaluate intellectual assets

In relation to the five steps mentioned above, Frigo & Hurley (2014) has also created a matrix*[86] that can be used to evaluate a company's genuine assets in relation to strategic value and strategic control. The essence of the matrix suggests that for the assets that a company turns out to have high control over and which are of high value for the company, these should be protected, nurtured and defended. In this category one can often find, for e.g. intellectual property, physical assets, key personnel and brand equity. Furthermore the Matrix suggests that, for the assets that a company turns out to have low control over and which are of high value, one could partner up with another company, instead of putting resources to try to control them. For the assets that a company turns out to have high control over, but that is of low value for the company, the authors argues that it is a question of managing the

[83] Frigo, Mark, L. & Hurley, James. (2014) Understanding Your Organizations' Genuine Assets. *Strategic Finance* February pp. 20-22
[84] Ibid p.21
[85] Ibid pp. 20-22
[86] * The Matrix can be found at page 21 in the article "Understanding Your Organizations' Genuine Assets"

risk when making a decision on how to proceed with these assets. For the assets that a company turns out to have low control over and that are evaluated as being of low value, these assets could according to the authors be outsourced or sold.[87]

[87] Frigo, Mark, L. & Hurley, James. (2014) Understanding Your Organizations' Genuine Assets. *Strategic Finance* February pp. 20-22

4 EMPIRICAL FINDINGS - CASE STUDIES SKF

This chapter describes the empirically collected data, which addresses how SKF work's with technical IA at present. Thereafter 2 cases from SKF will be introduced to illustrate how SKF have used/uses technical IA in various ways to create different kind of value propositions and service-based offerings. The two cases are focused on two areas, the first case about SKF's simulation tools and the second case about lubrication.

4.1 INTELLECTUAL ASSET MANAGEMENT IN THE SKF CONTEXT

Interview with Martin Jansson, IA & IP Strategy Manager.

Place: Gothenburg, SKF, IP Department

Time: 18th of May 2015

About Martin Jansson

Jansson is currently the IA & IP strategy Manager at SKF, and is globally responsible for the intellectual asset function for SKF. Jansson started working for SKF in 2004 as a Patent Analyst, and have also had previous positions within SKF as Intellectual Asset Counsel and Patent Account Manager. As an educational background Jansson holds an MSc in Mechanical Engineering from Chalmers University of Technology.

4.1.1 SKF IA/IP group and the role of the IA department

Three main areas, the first area is Intellectual Asset Management (IAM), focusing on developing, adapting and implementing IAM tools, processes etc. and developing and support implementation of IA exploitation strategies. The second area is, IP Strategy covering the filed of portfolio build up and exploitation strategies, IP assessment etc., developing and implementing IP strategies in SKF units. The third area is IA & IP business, focusing on exploiting IA and IP.[88]

The IA/IP group is a part of the Group Technology Development, where research and technology development are the main focus. Thereafter the business units, Industrial and Automotive Market follows up the developed technique and continue the process of product development into creating

[88] SKF material slide show, IP in manufacturing industries. Group Intellectual Asset & Intellectual Property. Prepared by Martin Jansson.

product/service offerings. Together with the IA/IP group Jansson develops and implements IP strategy for SKF, and are involved in various projects where he has a strategic role in managing IA and IP. Once implemented, the patent department, and the specific business unit for each segment thereafter manage the IP strategies. In relation to intellectual assets the IA/IP group performs various work depending on the project, such as:

- Assessments and evaluations of assets, together with for example sponsors or someone involved or in charge of a certain project.
- Structure assets and acknowledge current opportunities and possibilities in relation to intended use.
- Performs detailed assessment on which assets that are the most valuable in relation to the project and its context, and which assets that are the least controlled.
- Suggests recommendations for the use of assets based on the assessments.
- Identifies suitable choices of how to keep control of relevant assets that are of high value.

4.1.2 A cross-functional unit

Jansson describes the IA/IP group as a cross-functional unit between the technology side and the business unit side of SKF, where they can add the control aspect of the intellectual assets, and assess whether the control level is high or low in relation to the context. When doing assessments and evaluations the IA/IP group often work together with people that knows the technology well, and can therefore discuss the dimensions of what's important in relation to a specific technology. Mapping the assets and structuring a project can clear out at what level in a development phase a technology is. Furthermore to provide material that can be shared with all the people involved, making sure that everyone sees the status of the project or/and a technology in the same way. Thereafter it's the different business units representing the different segments that make decisions in relation to the business potential of a certain project. Jansson mentions further that what the IA/IP group can contribute with is suggesting in a systematical way from an IP perspective, the type of control that can be obtain by packaging assets in a certain way, and thereafter the business side evaluates and takes decisions whether its interesting from a commercial business perspective or not to pursue with.

4.1.3 IA/IP groups function in relation to intellectual assets

In certain projects the IA/IP group are involved from the start and throughout the whole process, where there function could be to facilitate communication, be a support system in a collaboration process, develop and implement IP strategy, addressing issues around FTO and other control aspects

in relation to IA that are important. However it is the patent function of SKF that performs the freedom to operate analysis.

The cases that the IA/IP group get's involved in are all at different stages with different aspects to take into consideration. Some projects can be at an early stage far away from the market, and there might be difficulties to assess and evaluate a business model in relation to intended use, in this case the contribution of the assessment could be in form of identifying the level of control of the IA that SKF has internally and externally at present over the asset(s). After having mapped the assets in a project and identified certain ways the IA could be used, this could lead to a continuation of the project into a next phase, where IA/IP group follows up the process. When coming into a project that are soon to be launched, typical issues that the IA/IP group could be asked to look into could be to investigate and analyze the control situation in relation to the assets. If certain assets are very important but are easy to copy, they might suggest patenting certain assets if there is an intended external use, or if the assets are to be included in a physical product. However if the assets are difficult to imitate, but are to be used in a potential collaboration setting, other strategies for controlling the assets in different way could be recommended.

4.1.4 Control aspect of IA - an IA project example

According to Jansson the control aspect of IA influences implicit the way that assets can be exploited. SKF can control assets in one way for example when IA are incorporated in different features/functions in the products and services that SKF provides, since the knowledge itself are not revealed. Jansson describes a project where they where involved in analyzing the assets incorporated in a new bearing design that could potentially affect all the different SKF bearings, and by mapping the assets in a structured way with a product commercialization in mind, they identified three main concepts that could each constitute as a new platform. Basically, concept 1 constituted the ground base, and concept 2 where building on concept 1, and concept 3 where building on concept 1 and 2. When doing the evaluation they looked into the control aspect of the assets and the intended use and depending on this assessment they recommended that certain patents should be drawn back. Since patent activities where already performed in relation to concept 2, these patents where drawn back, to not give away to much information about concept 1 to competitors operating in the same field. Thereafter they re-filed for new patents with the new concept focus in mind where SKF could maintain a better level of control over the assets in the new design.

4.1.5 Technology and innovation process

The technology and innovation process that SKF have, constitutes of a structure with different phases, where research and development, business strategies and technology roadmaps are driving the technology and innovation forward, closely linked to SKF's commercialization processes. Jansson mentions further that even if the term intellectual assets aren't used in this context, these processes can be seen from an IA/IP perspective as a way to identify, generate and develop new assets that can be used in context to create value for SKF, both tangible and intangible offerings.

In the research and development phase, decisions and assessments are made regarding which area and technique to improve, in what way and how. Evaluations are made to see if an existing product can be used without making any changes, where SKF can continue building on previous models/designs and/or create programs around. When creating something new, SKF looks into the product requirements that exist. Once these decisions are made SKF launches new projects through a commercialization process to create new market offerings for example from a previous technique or developing a new technology.

4.1.6 Commercialization process for ideas and technology

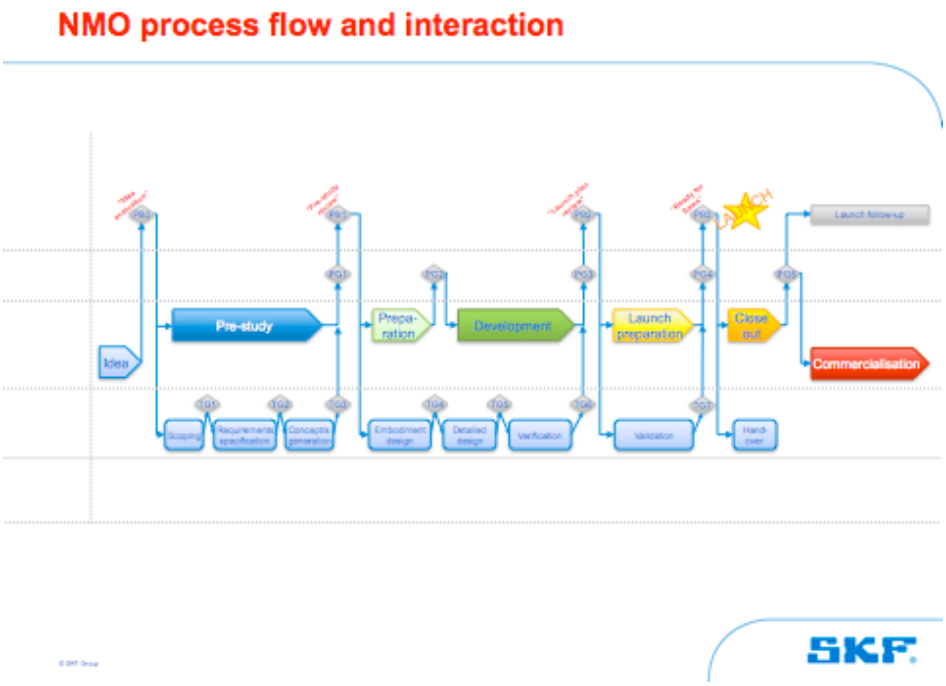
The Industrial and automotive market have two commercialization/innovation processes in place, both can be seen from a product development phase to develop ideas and technology. The two processes are called NMO (*New Market Offering, see figure 4 below*) and NCO (New Customized Offering). The NMO are targeting many customers and/or many segments. In the NMO packages and launches new offerings, sometimes a technique can be adapted to a new segment, then the whole product development process are relevant. However in some cases only new marketing offerings needs to be adjusted in relation to the technique. Looking at the NCO commercialization process, it is focused on only a certain segment and creating a specific customized offering where certain criteria are important. Both industrial and automotive market uses the same NMO process, however the industrial model differs in the governance part in relation to who decides what in the process.

In the step before the commercialization process (NMO and the NCO) there are two main areas, the research and technology development process. Coming into the commercialization process there could be a technique that has evolved from a research or technology development process or an idea that derives from another area or idea provider. Then the idea goes through the different steps in the process and depending from case to case the process looks different. In certain cases where a technology doesn't need to be developed further the product development process isn't necessary and

the technique then moves forward into the process to creating a new market offering. Specific industry boards decide what kind of projects that should be pursued with and when a new NMO or NCO needs to be started. In the industry boards there are representatives from each of the business areas, group technology development, industrial market and automotive market.

A control group that follows the process of the project manages each project.

Figure 4 - NMO process flow and interaction



4.1.7 The commercialization process and the IA group function

The IA group can come in to the process in many different ways. Sometimes they are contacted directly from a specific segment and asked to review a project, or they can get involved through the different gates in the commercialization process. There are certain check points in the process that are there as a reminder for the project responsible to look at all important aspects, such as if all the planned steps have been taken, if all options have been evaluated or issues regarding the control situation in form of patenting activities FTO etc. Jansson also describes that depending on the project sometimes they decide to get involved in a later stage of the process once it has passed a certain gate or part of the process to make use of the resources in a more efficient way.

4.1.8 Commercialization process in relation to IA

Even if there is no explicit commercialization/innovation process for technical IA, Jansson describes that the technical IA that SKF have can be seen as indirectly commercialized since different assets are incorporated within products and services that SKF commercializes, therefore by acknowledging knowledge from an IA perspective can be useful to see new utilization possibilities and business models for the assets that SKF possesses. Jansson highlights that both control and value of assets are contextual and therefore the outcome might differ depending on how the assets are used and in what way. In certain cases where SKF have low control over an asset or there is a high risk when utilizing the asset in the way it was thought out to be used, it might still generate high value and could have great potential if recognized and packaged for it to be used in another way. The same goes the other way around where SKF might have high control over an asset but the output seems to be low in relation to the asset, but packaged in a certain way the outcome could be different.

In the future Jansson see's the benefits of having the IA/IP group involved early on in the commercialization processes (NMO and NCO) in the pre study phase, for the IA/IP group to be able to contribute to assessing and acknowledging how IA can be used in different ways to exploit and leverage the value, by packaging the assets into different offerings and business models, that are relevant for the context. Furthermore the information from the assessments from an early stage could be used as complementary information into the development phase in the commercialization process. However there needs to be a good balance between prioritizing the most important projects in relation to available resources and time.

4.2 CASE 1 - SIMULATION TOOLS

Interview with Martin Jansson, IA & IP Strategy Manager.

Place: Gothenburg, SKF, IP Department

Time: 18th of May 2015

4.2.1 Background to SKF knowledge and calculation tools

"SKF possesses one of the most comprehensive and powerful sets of modeling and simulation packages in the bearing industry. They range from easy-to-use tools based on SKF General Catalogue formulae to the most sophisticated calculation and simulation systems, running on parallel computers."[89]

Jansson describes that the tremendous knowledge base that SKF possesses are what constitutes the core of SKF's offerings, whether it's in form of physical products or one of many solutions and services that SKF provides. From the beginning SKF developed its knowledge by studying and analyzing existing bearings to improve different aspects of the bearings and other SKF products. Once the computer technology arrived, SKF started building and developing software programs such as the internal simulation tool BEAST (BEAring Simulation Tool) to be able to perform simulations, that are built upon almost hundred years of knowledge assets, around bearings, bearing solutions, seals and other application areas that are important for the industry. As of today SKF are continuously adding new functions into the program to improve the quality and the performance.

4.2.2 Internal calculation tool (BEAST)

"BEAST is a simulation program that enables SKF engineers to simulate the detailed dynamics inside a bearing. It can be seen as a virtual test rig performing detailed studies of forces, moments etc. inside a bearing under virtually any load condition. This enables the "testing" of new concepts and designs in a shorter time and with more information gained compared with traditional physical testing."[90]

Included in the SKF Engineering Simulation Software BEAST are for example data from internal research that SKF have been performing for many years, but also test-data from labs where products have been tested in different settings, and operation data from testing products in real applications/operating conditions in test rigs, Jansson describes. Furthermore Jansson acknowledges

[89] http://www.skf.com/group/products/bearings-units-housings/roller-bearings/principles/selection-of-bearing-size/skf-calculation-tools/index.html

[90] Ibid

that the knowledge also derives from theoretical research around bearings, classic tribology and around other relevant mechanical components. With the advanced internal dynamic simulation program BEAST, SKF uses the simulation tool to improve it's own products, but also to provide services in form of performing customized calculations and providing the result as a consultancy service, and also calculating optimal solutions for customers in collaboration projects.

4.2.3 External calculation tools SimPro Quick and Expert

In addition to the external programs available via the SKF.com site, SKF recently launched two external calculation tools for optimizing field performance, called SKF SimPro Quick and SKF SimPro Expert.[91] Jansson explains that these tools can be seen as less advanced versions of the internal BEAST program. With the external software tools (adding to the already existing ones) that SKF have launched, customer will be able to perform calculations themselves and quickly change certain variables in the external program and get reliable results by using a tool that are based on validated bearing knowledge from SKF, since the external tools are based on SKF knowledge assets that derives from many years of knowledge and technology development. The tool can also be used to facilitate the process of finding the right type of bearing solutions for the customers.

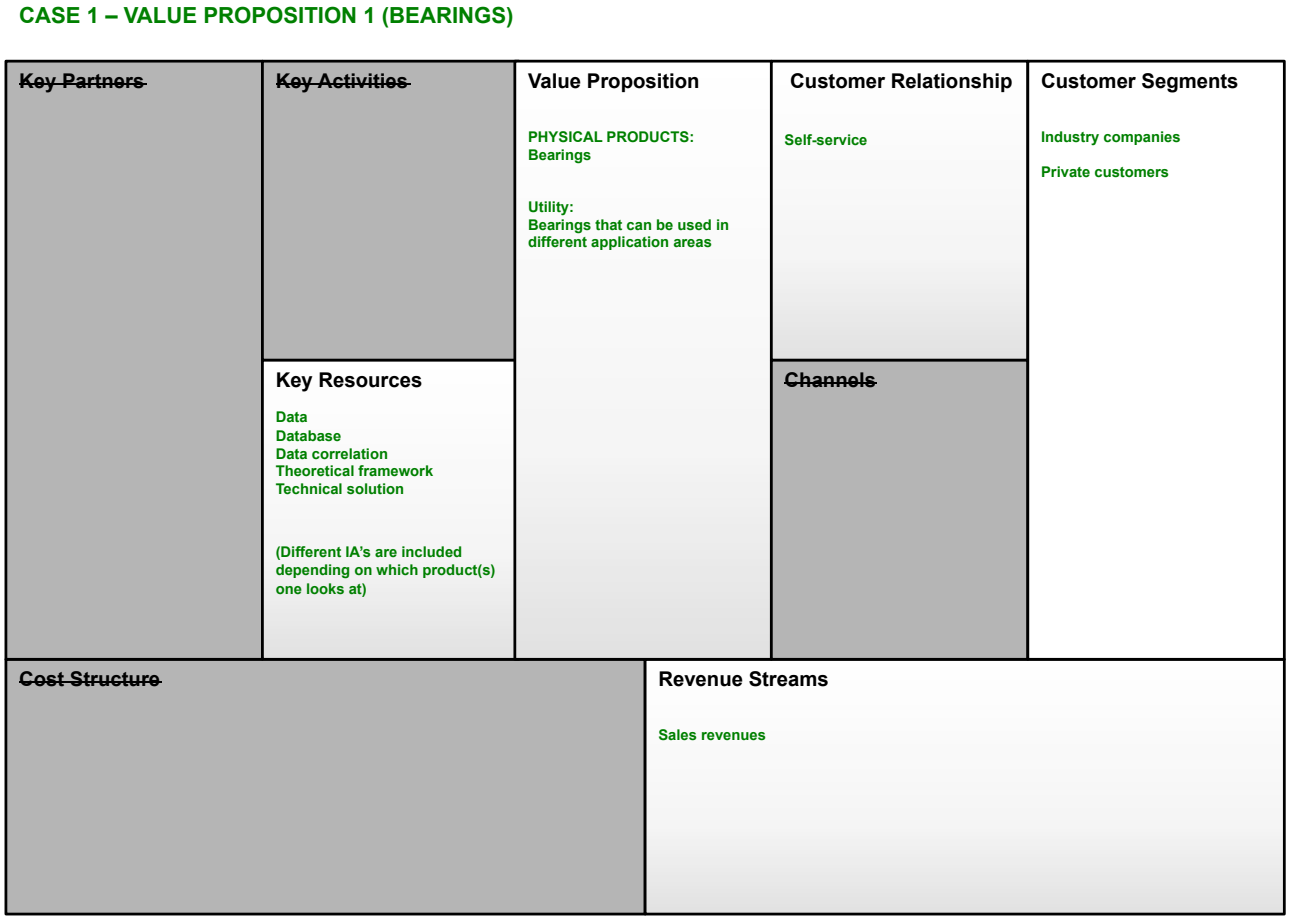
Even if the focus are on the two examples of SKF's internal and external simulation tools and what type of knowledge, defined as technical IA they are built upon, Jansson also describes that the same assets are also embodied and incorporated in many other ways, for example within: (*see figure 5 below*)

- Physical products, for example in form of a bearing.
- The internal engineering simulation software is used in various ways within SKF, for example to improve SKF products, and provide services for customers.
- External calculation tools, based on SKF knowledge, as a service that customers can use.
- Utilized in R&D and product development.
- Utilized in collaborations, which could be in form of exchange of test-data and by performing calculations and alignment with SKF products for customers.

[91] http://www.skf.com/encompass/tools/index.html

In the Business Model Canvases below data from four value propositions from the empirical material has been presented. To facilitate four different colors have been used to describe the different value propositions in the examples below. In the examples one can see the technical IA (key resources) that are embedded in the value propositions, and how these assets have been packaged into a value proposition and the utility it provides, what type of customer relationship SKF has in relation to how the value proposition is offered, which customer segments that are relevant and what kind of revenue streams that the offering generates.

Figure 5 - Overview of 4 different value propositions in the area of case 1



CASE 1 – VALUE PROPOSITION 2 (CALCUALTIONS AND RECOMMENDATIONS)

<table>
<tr>
<td rowspan="2"><s>Key Partners</s></td>
<td><s>Key Activities</s></td>
<td rowspan="2">Value Proposition

VIRTUAL PRODUCTS
Calculations and recommendations
(conducted by the Simulation software tool BEAST)

UTILITY:
Advanced simulation and calculations performed in a virtual text rig</td>
<td>Customer Relationship

Collaboration settings

Provided as calculation services</td>
<td rowspan="2">Customer Segments

Industry companies</td>
</tr>
<tr>
<td>Key Resources

Data
Database
Data correlation
Theoretical framework
Technical solution
Visualization and simulation
Instruction
Software

Furthermore product data and test data. (All of the IA categories above are included since the software tool can access many different areas)</td>
<td><s>Channels</s></td>
</tr>
<tr>
<td colspan="3"><s>Cost Structure</s></td>
<td colspan="2">Revenue Streams

New knowledge/technology from collaboration settings

Sales revenues (when calculations and simulations are sold as service)</td>
</tr>
</table>

CASE 1 – VALUE PROPOSITION 3 (CALCUALTION TOOLS)

<table>
<tr>
<td rowspan="2"><s>Key Partners</s></td>
<td><s>Key Activities</s></td>
<td rowspan="2">Value Proposition

LICENSING OFFERINGS:
Calculation tools SimPro Quick & Expert

UTILITY:
On sight calculation tool</td>
<td>Customer Relationship

Self-service

Personal assistance (calculation services)</td>
<td rowspan="2">Customer Segments

Industry companies</td>
</tr>
<tr>
<td>Key Resources

Data
Database
Data correlation
Theoretical framework
Technical solution
Visualization and simulation
Instruction
Software

(All of the IA categories are included since the software tool can access many different areas)</td>
<td><s>Channels</s></td>
</tr>
<tr>
<td colspan="2"><s>Cost Structure</s></td>
<td colspan="3">Revenue Streams

Licensing fees

Sales revenues (when calculations is sold as a service)</td>
</tr>
</table>

CASE 1 – VALUE PROPOSITION 4 (EXCHANGE OF DATA)

<table>
<tr>
<td rowspan="2"><s>Key Partners</s></td>
<td><s>Key Activities</s></td>
<td rowspan="2">Value Proposition

SERVICE:
Data exchange/ utilization of test rig(s)

UTILITY:
Possibility to gain new data/ knowledge/technology</td>
<td>Customer Relationship

Collaboration settings</td>
<td rowspan="2">Customer Segments

Industry companies</td>
</tr>
<tr>
<td>Key Resources

Data
Database
Data correlation
Theoretical framework
Technical solution
Visualization and simulation
Instruction
Software</td>
<td><s>Channels</s></td>
</tr>
<tr>
<td colspan="2"><s>Cost Structure</s></td>
<td colspan="3">Revenue Streams

New data/knowledge/technology</td>
</tr>
</table>

Interview with: Mario Romero C, Senior Design Engineer.

Place: Gothenburg, SKF, IP Department

Time: 1st of June 2015

About Mario Romero C.

Romero is currently working as Senior Design Engineer at SKF, and started working at SKF 1983 as a Design Engineer, and has also had previous positions within SKF as Product & Development Engineer Manager, and Senior Knowledge Services Engineer. As an educational background Romero holds a bachelor of mechanical engineering.

4.2.4 Difference between the calculation tools BEAST and SimPro

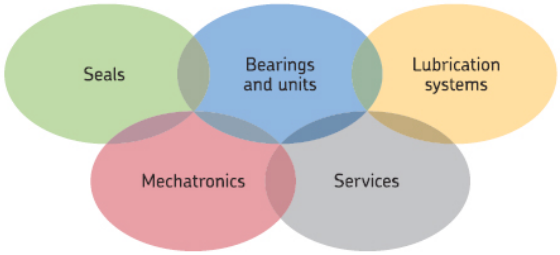
Romero describes that BEAST and SimPro are two out of many calculation tools that SKF uses. Both simulation programs are built on the same platform, however they are built in different ways to serve different purposes. The internal simulation program BEAST is a virtual test rig that shows the dynamic of what one is studying. The simulation program allows for a product to be analyzed in an application area, for example a bearing included in a machine, therefor BEAST can deliver results and information about the whole application area. Whereas the simulation tool SimPro that are used both internally and that have also been launched externally, analyzes bearing related results and shows a specific value, such as the lifespan of a bearing, deformation and temperature in relation to the product, however mostly focusing on the bearings. The available information and product data is limited to a certain extent in SimPro, and the program does not work as a test rig, however it is useful as a calculation program, where input data gives a certain value and certain parameters in relation to the bearings.

Furthermore Romero mentions that the platform that the simulation programs are built upon has access to all the knowledge that are generated from SKF's technology and innovation processes (previously mentioned above, see figure 8 below) that are stored in different databases. The tools have access to the knowledge from following areas: development, engineering and application engineering. The tools do not use the knowledge from the research directly, however research theories can be used as input and coded into the programs. The tools contain knowledge from all of SKF's five technology platforms, bearing and units, seals, mechatronic, lubrication and services (see figure 6).

4.2.5 Knowledge from the five technology platforms

Romero mentions that the knowledge that derives within the technology platform *Seals* is basically knowledge in form of seals for different application areas such as automotive seals or industrial seals or knowledge about what type of material that is needed. In the technology platform *Bearing and units* SKF's knowledge consists mostly about bearings, housings and special products. SKF knowledge from the *Lubrication systems* technology platform are knowledge about different kinds of lubrications depending on and in relation to the application areas and other variables, and also knowledge about lubrication systems. The *Mechatronics* technology platform consists of knowledge about the different mechanical components and tribology. And the last technology platform *Services* consists of knowledge in relation to condition monitoring, and maintenance of the products.

Figure 6 - SKF's five technology platforms[92]

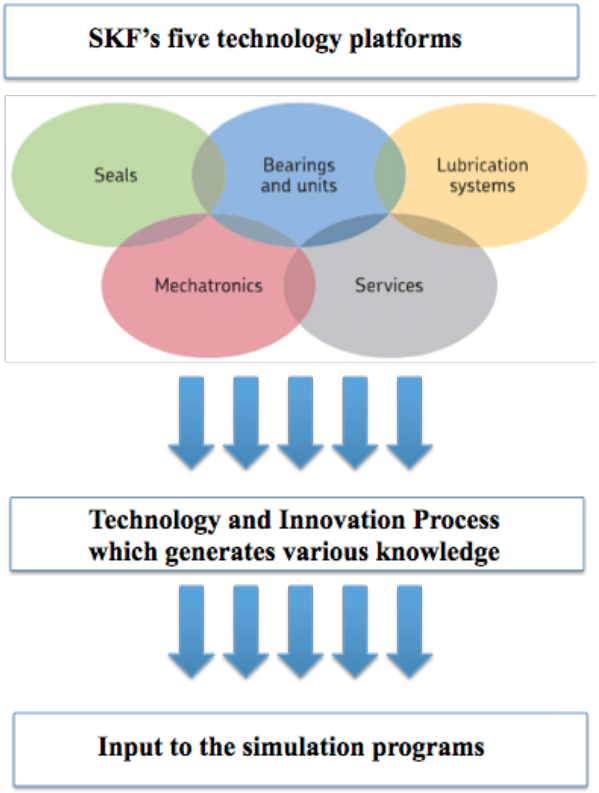


4.2.6 Technology and Innovation process

Romero describes that SKF's Technology and Innovation process has different phases that consists of research, development, engineering, application engineering, marketing and Sales, and ends up with the customer where a value proposition is delivered. The technology and Innovation process is applicable for all the five technology platforms, and each area generates new knowledge, which builds the SKF knowledge and gives inputs to e.g. the simulation programs. (*See figure 7 below*).

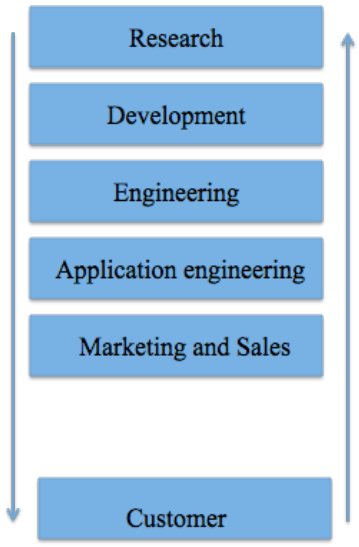
[92] http://www.irpublications.com/skf/annualreport/2013/en/03-forvaltningsberattelse/06-affarsmodell.php

Figure 7 - Knowledge generation



Romero also describes that the flow of knowledge goes through the whole process from research to market and sales, and the other way around also when receiving feedback from customers. (*See figure 8 below*).

Figure 8 - Technology and Innovation process - the flow of knowledge



The first phase in the technology and innovation process is the research phase, where the generated knowledge is documented and stored; this knowledge can be accessed in the next phase, which is the development area. Both research and development have also cooperation with different universities. The overall research phase is divided into two different areas, research on technologies and manufacturing process research. In relation to research on technologies SKF performs research and evaluates theories and technologies regarding for example what kind of material is needed for a specific product, whereas research processes are more focused on how something can be produced and in what way to achieve that optimally, or figure out new processes that can be useful to develop something.

The next phase is the development phase, where the engineers who works with this part generate and delivers product solutions. For example if the research has developed a theory, then in this phase they aim to create a process to achieve that, and apply this theory into SKF world wide products.

Followed by the development phase comes the engineering phase, where different designs are developed and product information are generated and stored in a database that contains for example 3D models etc. The engineering phase are closely followed by application engineering that uses e.g. the internal simulation BEAST, among other programs to put products into an application area, which often generates technical solutions. The last part of the innovation process is marketing and sales, which are in charge of the business strategies and business related aspects in relation to the different segments, to commercialize the value propositions that have evolved from the technology and innovation process.

4.3 CASE 2 - LUBRICATION

Interview with: Håkan Lindgren, Senior Technical Specialist

Place: Gothenburg, SKF, IP Department

Time: 5th of June 2015

About Håkan Lindgren

Håkan Lindgren is currently working as Senior Technical Specialist at SKF. Lindgren started working for SKF 1997. Previous positions that Lindgren has had at SKF are for example, Head of technical development in Gothenburg, and Responsible for lubrication and software development.

4.3.1 The purpose of using lubrication

"...with the right lubrication solution you can create new opportunities to increase uptime and productivity. Along with helping to reduce premature bearing failures and machine downtime, proper lubrication can increase energy efficiency. At SKF, we can help you realize the true potential of lubrication."[93]

4.3.2 SKF - lubrication knowledge

Lindgren describes that the largest part of SKF lubrication use, constitutes of selling lubrication as a part of a product e.g. with a sealed bearing, or as a package where lubrication is integrated as a component in a device. SKF are also selling lubrication grease as a stand alone, tangible product however this is only a small part of the SKF lubrication business. Most of the bearing the SKF sells is not sold with lubrication. Furthermore SKF offers recommendations for how to lubricate SKF products, and how to choose lubrication for the products. Since SKF offers lubrication systems, and delivers solutions, Lindgren highlights that SKF need to have a lot of knowledge about how to mange lubrication in a proper way. There are also a lot of expectations from customers, that want to know how to lubricate the products correctly, and therefor SKF provides recommendations to customers. Furthermore SKF provides calculation tools to customers to facilitate the process in choosing and managing the lubrication process for different application areas.

[93] http://www.skf.com/us/products/lubrication-solutions/index.html

4.3.3 The engineering tools SKF DialSet and SKF LubSelect

SKF DialSet

SKF DialSet is a program that is accessible free of charge in form of an app that SKF provides.
The program is designed to help customers set up SKF automatic lubricators, once a customer has selected the appropriate lubrication grease for the application area according to certain criteria; the program provides the necessary settings for the SKF automatic lubricators. The tool can be used for instructions on relubrication and quantity calculations.[94] Looking at the knowledge embodied in the SKF DialSet, the most relevant would be data correlations and theoretical model, and test data from the LubSource database, which will be described below.

SKF LubSelect

- External tool

LubSelect are developed by SKF and available and offered as an external tool that customers can pay for to use when selecting an appropriate SKF lubricant grease for the bearings in a specific application area, based on application conditions or/and application profiles.

- Collaborations

LubSelect is also used as a service where SKF together with customers can choose the proper lubrication solution for a specific application area. SKF helps customer to optimize the use and security around lubrication in the customer's application area. By analyzing how customers are managing the lubrication at present at their work sight, SKF can offer the customer advice for how to adjust or improve the lubrication, how their fixed cost might be lowered, enhancing the level of accuracy in use etc. Lindgren highlights that one of SKFs main goal in the lubrication area is to ensure that the customer's bearings are functioning properly. Looking knowledge embodied in SKF LubSelect, the most relevant would be data correlations and theoretical model, and generic data and test data from the LubSource database.

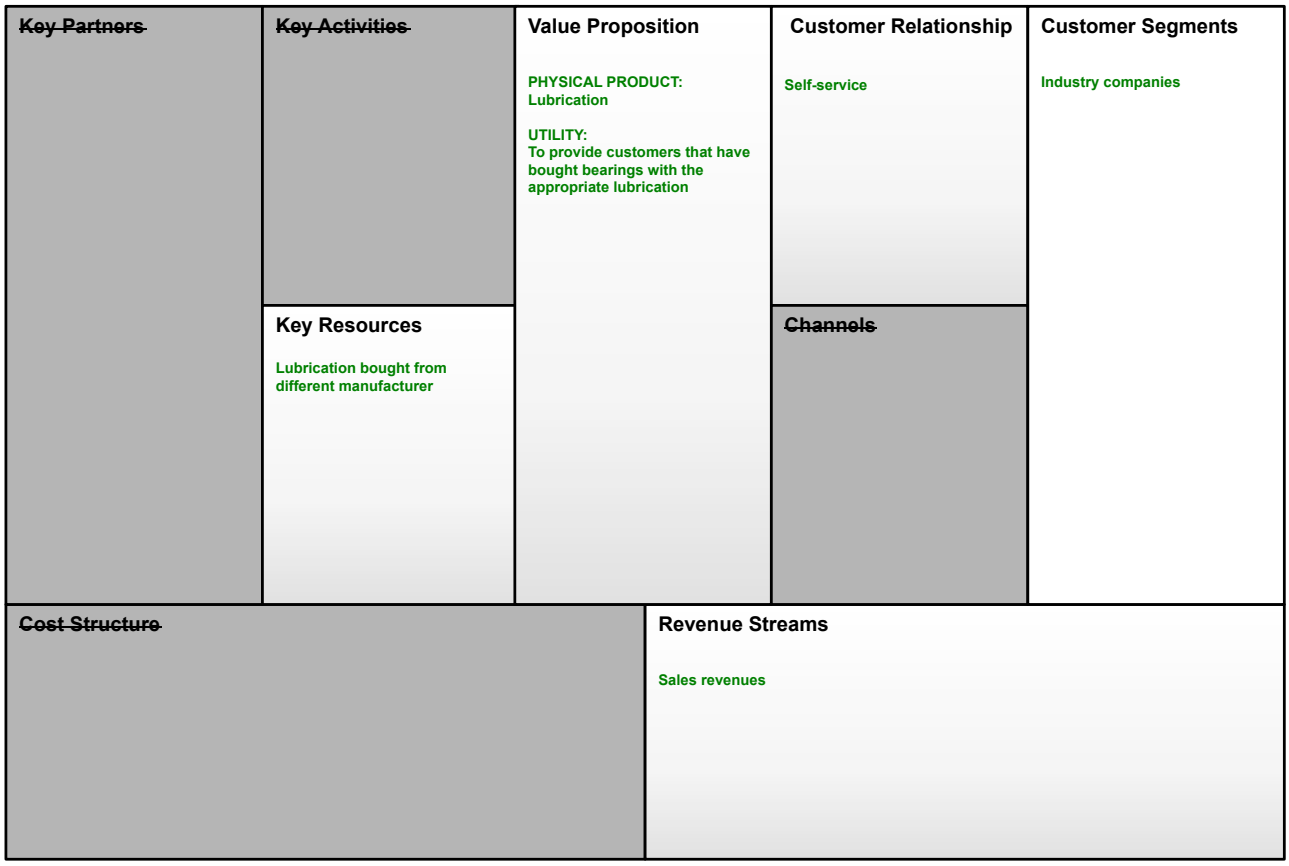
Lindgren emphasizes that depending on what type of information that are put into the LubeSelect, and how one describes the operating conditions for the bearings in a specific application area, LubSelect will assess which parameters that are relevant and should be taken into consideration as low or high priority. Some of the data are frequently used whereas some are less utilized. The most important part

[94] http://www.skf.com/group/knowledge-centre/engineering-tools/skfdialset.html

of this knowledge would be how all the data are mixed together to figure out the appropriate lubrication grease. The most important knowledge and intellectual assets that LubSelect has is the possibility to put together the generic data and the test data based on experiences that gives a result on which lubrication one should choose.

In the Business Model Canvases below data from four value propositions from the empirical material has been presented. To facilitate four different colors have been used to describe the different value propositions in the examples below. In the examples one can see the technical IA (key resources) that are embedded in the value propositions, and how these assets have been packaged into a value proposition and the utility it provides, what type of customer relationship SKF has in relation to how the value proposition is offered, which customer segments that are relevant and what kind of revenue streams that the offering generates.

Figure 9 - Overview of 4 different value propositions in the area of case 2



CASE 2 – VALUE PROPOSITION 2 (SOFTWARE APPLICATION)

<table>
<tr>
<td rowspan="2"><s>Key Partners</s></td>
<td><s>Key Activities</s></td>
<td rowspan="2">Value Proposition

VIRTUAL PRODUCT:
Software application
SKF DialSet

UTILITY:
Provides the necessary settings for the SKF's automatic lubrication systems.</td>
<td>Customer Relationship

Self-service</td>
<td rowspan="2">Customer Segments

Industry companies</td>
</tr>
<tr>
<td>Key Resources

Data
Data correlation
Theoretical framework

↑

Database (LubSource)
Test data
Generic data</td>
<td><s>Channels</s></td>
</tr>
<tr>
<td colspan="2"><s>Cost Structure</s></td>
<td colspan="3">Revenue Streams

Indirect increased sales of bearings</td>
</tr>
</table>

CASE 2 – VALUE PROPOSITION 3 (SOFTWARE APPLICATION)

<table>
<tr>
<td rowspan="2"><s>Key Partners</s></td>
<td><s>Key Activities</s></td>
<td rowspan="2">Value Proposition

VIRTUAL PRODUCT:
Software application
SKF LubSelect

UTILITY:
Enables customer in the process of selecting an appropriate SKF lubricant grease for bearings in a specific application area, based on application conditions or/and application profiles.</td>
<td>Customer Relationship

Self-service</td>
<td rowspan="2">Customer Segments

Industry companies</td>
</tr>
<tr>
<td>Key Resources

Data
Data correlation
Theoretical framework

↑

Database (LubSource)
Test data
Generic data</td>
<td><s>Channels</s></td>
</tr>
<tr>
<td colspan="2"><s>Cost Structure</s></td>
<td colspan="3">Revenue Streams

Indirect increased sales of bearings</td>
</tr>
</table>

CASE 2 – VALUE PROPOSITION 4 (SERVICE)

<table>
<tr>
<td rowspan="2"><s>Key Partners</s></td>
<td><s>Key Activities</s></td>
<td rowspan="2">Value Proposition

SERVICE:
Advice about the type of lubrication, appropriate amount and configurations on SKF automatic lubrication systems

UTILITY:
On sight assistance</td>
<td>Customer Relationship

Personal assistance</td>
<td rowspan="2">Customer Segments

Industry companies</td>
</tr>
<tr>
<td>Key Resources

Data
Data correlation
Theoretical framework

↑

Database (LubSource)</td>
<td><s>Channels</s></td>
</tr>
<tr>
<td colspan="2"><s>Cost Structure</s></td>
<td colspan="3">Revenue Streams

Sales revenues</td>
</tr>
</table>

4.3.4 LubeSource database

LubSource database is a database that contains data that are from unique SKF tests, where some are based on standard tests. The database also contains generic data that includes parameters that SKF consider important to describe lubrication grease. Input data comes from lab tests, and product development tests. The LubSource database is used in many different ways. The database is used for Internal purposes for product development and research, and the engineering tools mentioned previously are used together with customers. The database is also used externally to give advice to customers, and as a description of product performance for sealed units. Furthermore it functions as a compliment to the SKF catalogue when choosing the right lubrication for the bearings. The two engineering tools SKF LubSelect and SKF DialSet, have access to the database to analyze certain parameters, the data can be seen in the examples in figure 10 below.

Figure 10 - Overview of example data the two apps can access from the LubeSource database

LUBESOURCE DATABASE (Contains the types of data below)		SKF - LubSelect (App)	SKF - DialSet (App)
TECHNICAL IA CATEGORIES	**DESCRIPTION OF THE TECHNICAL IA**		
Generic Data			
Data Data correlations Theoretical framework	Type of soap: specific knowledge on the exact composition of ingredients in different soaps that are one main component in creating the lubrication grease	x	
	Oil-base: data in form of the oil source, synthetic oils, vegetable based oils	x	
	Data about additives e.g. corrosion:	x	
Test Data			
Data Data correlations Theoretical framework	Emcor: A measurement test on how well the lubrication can protect against rust.	x	
	Four Ball: A standardized test method that can show how well a lubrication solution can protect the bearing during demanding conditions such as heavy loads, without breaking through the lubrication causing harm to the bearings.	x	
	Data about consistence/texture	x	x
	Pumpability: knowledge about how easy each lubrication grease can coagulate and form lumps in a system.		x
	Data about oil leakage		
	VAM (test machine)		

5 ANALYSIS

The following chapter consists of three main parts. The first section 5.1 describes the new adjusted model that will be used to analyze the empirical material from the two cases. In section 5.2 examples from case 1 and 2 will be applied and analyzed in the model. Section 5.3 discusses how SKF works with IA and addresses SKF's technology and innovation process. Furthermore section 5.3 discusses different factors that was addressed in the empirical case material, that are relevant in relation to value creation from technical IA that influences the configuration of the service-based offerings, illuminated and analyzed with theories from the theoretical framework.

5.1 PROPOSED MODEL

5.1.1 The research questions

In section 5.3 the main research question, how a company more efficiently can utilize its intellectual resources to create new service-based offerings will be discussed and also certain factors will be considered since these can influence the value creation process of how the IA are and can be used and exploited. Furthermore sub question 4, how the new model could help to increase the efficiency of intellectual resources, will also be addressed in this section.

The sub question 1 that questions how a company's knowledge and intellectual resources can be objectified, where described in the theoretical framework, and established that if defining knowledge as technical IA these can be used as building blocks to create service-based offerings.

In section 5.2 the sub question 2, how intellectual resources have been utilized in service-based offerings, will be explored through a discussion of the two cases. The cases illustrate what type of IA resources that have been used, and how these have been packaged, transacted, respectively what type of customer relationships and revenue models that can be identified. Furthermore sub question 3, how the impact of intellectual assets can be made explicit in service-based offerings, will also be discussed in section 5.2 in relation to the model that will be described in this section (5.1) below as one way to make it explicit on how to identify ways to exploit technical IA.

5.1.2 Overview and the purpose of the proposed model

An adjusted model based on Alexander Osterwalder's BMC is presented below, as a way to explicitly see how technical IA have been used in different value propositions, to see how a company can exploit technical IA efficiently by identifying how the assets contribute in the process of value creation. The blocks that where marked in grey in the original BMC are not part of the new model, and are therefore not included in the discussions either. The proposed model consists of four different building blocks, derived from 5 out of the 9 original blocks from Osterwalder's BMC (*see figure 11 below*). The model will be used from a resource-based perspective where the intangible resources, more specifically technical IA constitutes as the core resource that can be exploited and leveraged in different ways by configuring the assets into new service-based offering.

The model could be used as an analysis tool in different ways, in this thesis it will be used in following way: As a tool to visualize how IA have been used, embedded and configured into different value propositions in form of products and services to create value, and to see how these have been transacted to customers, by deconstructing value proposition to se what types of IA that have been used, by mapping out in the model how the assets have been deployed, packaged, transacted and what type of relationship and customer segment that are relevant. Thereafter one can identify which assets that are the most important, and has potential that could be efficiently leveraged by repacking these into new service-based offerings and assess different ways that these could be used and exploited efficiently in alignment with a company's business strategies.

Figure 11 - Overview of the blocks in the adjusted model

1. KEY RESOURCES	2. PACKAGING	3. TRANSACTIONS	4. VALUE GENERATION
CATEGORIES			EXTERNAL
DESCRIPTION			INTERNAL

Block 1 - Key Resources

The first block in the adjusted model that originally is called *Key Resources* in the BMC will continue being called the same, but the focus will now only be on intangible resources, more specifically technical IA. This block is divided into two parts, *Categories* and *Description*, where the technical IA categories will be identified and a description of the assets will be given. This block allows for an assessment of the intangible resources in form of technical IA that a company has to its disposal. Example of technical IA categories that derives from Petrusson's (2015) work can be seen in figure 1 in

the theoretical framework. This block will be used by identifying what types of technical IA that have been included in the value proposition, to see how these contributed to the offering, and how these can be repackaged into new service offerings.

Block 2 - Packaging

The second block in the adjusted model that originally is called *Value Propositions* in the BMC will be called *Packaging*. The definition of packaging will correspond to the way that the IA have been deployed or/and bundled together, that can be repackaged into new service-based offerings, or after having identified in block 1 what kind of technical IA that a company has to it's disposal, then one can package these into different service-based value propositions and create new offerings. Examples of packaging possibilities that derive from the SKF material that will be used to analyze are for e.g. device/component, service, training, software/system, reports, instructions and right to use.

Block 3 - Transactions

The third block in the adjusted model that originally is called *Customer Relationship* and *Customer Segments* in the BMC will be merged into one block called *Transactions*, with the purpose to see how the value proposition have been offered and could be transacted. Examples of transaction types that derives from SKF material that will be used to analyze are for example; one time sales, license, devise subscription/lease, sharing in collaboration, installation, training. In the model a general definition of transactions will be used, where a transaction could constitute of any type of business transaction where parties exchange goods, services, payment or other assets of economic value.[95] Another definition that will be used in this context is three categories that is an interpretation from and article that describes business transactions. The three categories are called simple transactions, ongoing transactions, and complex transactions. Where simple transaction shall refer to single events of exchange, ongoing transactions of the same kind or different kinds of repeatedly transactions. Complex transactions shall correspond to multiple types of transaction configurations.[96]

Block 4 – Value Generation

The fourth block in the adjusted model that originally is called *Revenue Streams* in the BMC will be called *Value Generation*. This block is divided into to categories *External* and *Internal* value generation. The

[95] https://sv.wikipedia.org/wiki/Transaktion
[96] http://smallbusiness.chron.com/business-transaction-definition-examples-25244.html

External value generation represents the value and utility that the value proposition generates for the customer, and the *Internal* value generation represents the different value that the value propositions contributes to for the company, which could be both direct and indirect value streams in form of financial means such as sales revenues, licensing fees, royalties etc. Other types of value could be, new knowledge, new technology, strengthened relationships, brand recognition etc., and any other type of value that a company considers valuable.

5.1.3 Examples and the definition of efficiency and service-based offerings

In the proposed model examples that derives from the SKF material will be used to illustrated and analyze the cases to see how technical IA can be exploited and leveraged by creating service-based offerings. The definition that will be used in this thesis to define service-based offerings shall refer to any value proposition based on technical IA that isn't configured in a tangible form. The definition of efficiency shall refer to the ability for a company to recognize and apply how to use its technical assets in many different ways both already deployed assets, and unexploited assets in multiple ways.

5.2 ANALYSIS OF CASE 1 AND 2

In this section 5.2 the sub question 2, how intellectual resources have been utilized in service-based offerings, and sub question 3, how the impact of intellectual assets can be made explicit in service-based offerings, will be explored in this section, through a discussion of the two cases, applied in the new adjusted model. All of the eight presented value propositions from case 1 and 2 will be discussed below briefly; and four out of these examples have been applied in the new model, to show four value propositions that generate different kinds of value for SKF.

5.2.1 APPLIED EXAMPLES FROM CASE 1 - SIMULATION TOOLS

Alee (2008) argued that the future level of success of a company is depending on how well a company can convert one form of value into another, and by understanding how intangibles can contribute to value creation, which is something that the new proposed model can facilitate with, since it shows the process of how IA contributes to value creation in different ways.

The examples described in this chapter show different value propositions from the empirical material from case 1 and 2, that have been applied in the new adjusted model. The value propositions have been deconstructed and applied in the model to se how IA have been deployed to create the value propositions and in what way these have been offered, to be able to analyze how the assets have been used and exploited in different ways. After having deconstructed the value propositions one can derive the technical IA and reveal the knowledge embodied in the value proposition, to illustrate the process on how the IA contributes to value creation. Once having identified what type of technical IA that have been used and how in value propositions this enables for companies to create new service-based offerings by packaging (after adding or developing assets) or/and repackaging assets into new configurations, depending what can be done with the technology and what the strategic objectives within the area are etc.

The block called resource have been the main focus, since the aim was to see how IA as a resource contributes to value creation and identify how the assets can be exploited in different ways. By focusing on the role of the IA as a resource, and understanding this block this will enable for companies to create different service-based offerings from the same assets. The examples above illustrate multiple ways that the knowledge assets have been packaged into different value propositions. However when the value propositions was deconstructed and mapped in the original BMC, the value generation in the described in the revenue streams block where the one that changed the most.

5.2.2 The utility of the value propositions and various kind of value generation

CASE 1 – VALUE PROPOSITION 1 (BEARINGS)

In the value proposition and example 1 presented in the empirical material in the original BMC we could see the value creation process where technical IA have been packaged into physical products for e.g. bearings. However the specific technical IA cannot be addressed since these are depending on which product one are looking at. These products are sold to manufacturing companies and private customers, which generates direct revenue streams for SKF.

CASE 1 - VALUE PROPOSITION 2 (CALCULATIONS AND RECOMMENDATIONS)

1. KEY RESOURCES	2. PACKAGING	3. TRANSACTIONS	4. VALUE GENERATION
CATEGORIES Data Database Data correlation Theoretical framework Technical solution Visualization & simulation Instruction Software	Virtual product: Simulations & calculations (conducted by the Simulation software tool BEAST)	Collaboration settings Provided as services	**EXTERNAL** Access to advanced simulations and calculations results performed in a virtual text rig.
DESCRIPTION Different assets become relevant depending on what the simulation program is used for.			**INTERNAL** Generates sales revenues when used as a service Generates new knowledge and enhances SKF products when the test rig is used in R&D

In the value proposition example 2 above, the value creation process where the technical IA is packaged into an internal simulation program (BEAST) is described and applied in the new model. The key resources in this value proposition constitute of all of the technical IA categories, and depending on what the simulation program is used for different assets become relevant. The value proposition is offered as a service where customers pay a fee when provided with calculations, recommendations or simulations, which also can be provided in collaboration settings. The value proposition generates internal value for SKF is form of sales revenues when the simulation tool is used to perform calculations and simulations as a service for customers.

The simulation program also contributes with other value generation for SKF by enhancing SKF product when used in house as a test rig, which saves time and money for SKF since products can be tested in a virtual environment. The tool is also used in R&D to enhance knowledge and technology, which could lead to new products that could be commercialized in the future. Another benefit with the program is that many engineers can use it at the same time and tests can easily be compared, and for R&D purposes and product development, the assets can be used together with for example BEAST to evaluate and develop technologies further. The external value of this value proposition for the customers can be seen as being able to access the calculations and simulations in form of a service that SKF offers based on the simulation program, since the simulation program is a powerful tool as it contains both theoretical data and data input from testing in real life settings which renders the quality and the reliability of the tool.

Another advantage with the simulation tool, is that one can leverage the value of the assets since they are combined in a software program that can be used in several ways as in the example to improve SKF's tangible products as these can be tested in a virtual test rig, which is less time consuming then performed and cost saving then performing the test in reality, since one can quickly add and change parameters while using the programs. More over the simulation programs are comprising of multiple variables that are taken into consideration when doing the testing which would have been difficult otherwise, such as loads, speed, rotation, materials, temperatures, friction etc. The technology and innovation process generates new knowledge, which builds the SKF knowledge and gives inputs to the simulation programs, which means that the tools have access to a tremendously amount of data and knowledge.

CASE 1 - VALUE PROPOSITION 3 (CALCULATION TOOLS)

1. KEY RESOURCES	2. PACKAGING	3. TRANSACTIONS	4. VALUE GENERATION
CATEGORIES Data Database Data correlation Theoretical framework Technical solution Visualization & simulation Instruction Software	Licensing offerings: Calculation tools (SimPro Quick & Expert)	Collaboration settings Provided as services	**EXTERNAL** On sight calculation tool
DESCRIPTION Different assets become relevant depending on what the simulation program is used for.			**INTERNAL** Licensing fees

In the value proposition example 3 above the technical IA have been packaged into the external simulation tools SimPro Quick and SimPro Expert. The key resources in this value proposition constitute of all of the technical IA categories, and depending on what the simulation program is used for different assets become relevant. The main external value generation for customers is that the value proposition provides the possibility to be used as tools on sight, which saves both time and money since the customers can use the tool independently at any moment. The software program also enables customers to apply the tools on sight and in conjunction with their tangible product. The value proposition generates internal value for SKF in form of financial means from licensing fees. Other benefits that this value proposition fulfills for SKF, is that the tools are also used internally for calculations. Both of the two simulation tools SimPro and the previously mentioned program BEAST are built on the same platform, but built differently since they have different purpose, this platform might therefore have the capacity for new service-based offerings to be built upon by packaging and repackaging the technical IA into new configurations.

CASE 1 - VALUE PROPOSITION 4 (EXCHANGE OF DATA)

1. KEY RESOURCES	2. PACKAGING	3. TRANSACTIONS	4. VALUE GENERATION
CATEGORIES Data Database Data correlation Theoretical framework Technical solution Visualization & simulation Instruction Software	Service: Data exchange Utilization of test rig(s)	Collaboration setting	**EXTERNAL** Possibility to gain new data/knowledge/technology
DESCRIPTION Database (LubSource) Test data Generic data			**INTERNAL** Possibility to gain new data/knowledge/technology Enhancing relationship with collaboration partner Brand recognition

In the value proposition 4 above the technical IA is offered as an exchange of data from the LubSource database, which could be different types of assets, derived from the test data or/and the generic data. The example below describes the value creation process where the assets are used in a collaboration setting, where there is an exchange of data. The external and the internal value generation for the collaboration partner is the possibility to receive new data/knowledge/technology, which could enhance the technique, and/or the knowledge about a new area or a new application area, but also to get the possibilities of gaining insights into how the other party performs certain tests and procedures etc.

Exchange of data could therefore be beneficial for both parties, and could strengthen relationships with external partners for SKF. Another benefit is that the data and knowledge exchange could be seen as a way to create new opportunities for SKF, where the technique could be developed further into another application area that the company is planning to expand into. Using the assets in a collaboration setting could be a good way to leverage the value of the assets from a resource-based view since in accordance with Shum & Lin (2010) resources that are generated from a collaboration that has access to an external network, exceeds the potential to explore them, compared to what a individual organization could do on its own.

Moreover, Davenport, Thomas & Desouza (2003) reasoned that the life cycle of IA is comparable to any other resource that a firm uses in the production of services and goods, since IA can be improved, transformed and redefined by for example additional investment and use. However IA differs from tangible resources in one important aspect compared to intangibles, tangible resources can be exhausted. Using Foray's (2003) perspective on knowledge, that has the specific characteristic of being non-rival in use, which means that knowledge could be used repeatedly and concurrently by many people without being depleted, and since IA is mostly based on knowledge and information these assets can therefore be used and exploited in many different ways at the same time, packaged as different value propositions that targets different customers and that generates multiple revenue streams. In comparison to a physical instruction book that only can have one user at the time, instead of a digital version that could be used by many users at the same time. The ability to come up with many ways to see how the assets could be used therefore becomes important, since when one knows what type of knowledge that one has at disposal one can package and exploit the assets in multiple ways simultaneously to create value for a company.

Looking at the concept of a value proposition, Pekkarinen & Salminen (2013) argued that an offering could be seen as constituting of different elements through which companies can utilize to provide value. By deconstructing value propositions these elements could become clearer for a company. Skålén, Gummerus, Von Koskull & Magnusson (2014) argued that having the right resources are one critical part when creating value propositions, however one also need established methods and ways to generate attractive value propositions from these resources, and the new model could be used as a tool to address this issue. Gummesson (1995) described that customers don't buy services or goods; instead it can be argued that customers buy value propositions, which render services, which create value for them. With this thinking in mind, one could reason that the way that a company uses its assets are important and not always how the value propositions is formed, since it is the utility and function that the value proposition offers to customers that is valuable.

Vargo & Lusch (2004) addressed the issue from a similar view, that what enterprises essentially are offering, are different kinds of value propositions. However a value proposition whether its in form of a service or a tangible product embedded with knowledge, is not embodied with value (utility) value is determined in the coproduction with the consumer where there is a potentiality to fulfill a customer need and therefor becomes valuable. With a utility perspective in mind this would imply that a customer doesn't necessarily want a specific tangible product, instead what's valuable is the effect that a

product can produce according to Chesbrough (2011). Therefore IA could be packaged either as a tangible or intangible offering as long as the utility of the offering efficiently fulfills a customer need.

According to Moustaghfir (2008) knowledge management processes affects the efficiency and the effectiveness of business processes, and therefore consequently the value of a firm's products and services. By utilizing the new model as a method to manage a company's IA this could facilitate the exploitation of intangible resources.

A lot of the different existing perspectives on innovations have emerged from the view of business models that are focused on manufacturing and product based thinking according to Chesbrough (2011). In these models one look at business as a chain of economic activities, where different elements adds value to a process, which results in a tangible product. However with this perspective this limits the potential exploitation and leveraging of companies intangible resources since the focus isn't on what one could do with the assets, instead the assets are used as input in the creation of tangible goods. If one where to start with what could be done with the IA, this might result in both intangible and tangible offerings, or as a packaged deal including both.

5.2.3 APPLIED EXAMPLES FROM CASE 2 - LUBRICATION

CASE 2 – VALUE PROPOSITION 1 (LUBRICATION)

In the value proposition example 1 that was described in the BMC in the empirical material, shows the value creation process where lubrication chosen and bought by SKF, are sold directly to customer stand-alone, but mostly together with a product, which generates sales revenues for the company. Since SKF is primarily manufacturing company lubrication is often sold as a bundled value proposition together with SKF products to increase the sell of bearings.

CASE 2 - VALUE PROPOSITION 2 (SKF DialSet)

1. KEY RESOURCES	2. PACKAGING	3. TRANSACTIONS	4. VALUE GENERATION
CATEGORIES Data Data correlation Theoretical framework	Virtual product in form of a software application called SKF DialSet	Offered as a free downloadable software application	**EXTERNAL** On sight calculations
DESCRIPTION Database (LubSource) Test data Generic data			**INTERNAL** Indirect increased sales of bearings Brand recognition

5.2.4 The utility of the value propositions and various kind of value generation

The value proposition example 2 above describes the value creation process where the assets have been packaged into the program SKF DialSet, offered as a free downloadable software application. The key resource in this value proposition constitutes of data from the LubSource database, which could be different types of assets, derived from the test data or/and the generic data. The external value generation from the value proposition is that SKF's customers, could use it on sight which facilitates for customers since the program provides the necessary settings for the SKF automatic lubricators instantly, which saves them both time and money, since buying a service through collaboration might take time, which could be spent on production instead. One of SKF's main goals within the lubrication area is to ensure that the customer's bearings are functioning properly. SKF therefore provides free advice about lubrication to maintain good relationships with customers and to make sure to keep a good quality on the sold bearings. The internal value creation for SKF could be increased indirect sell of bearings due to brand recognition for bearings that maintains good quality when properly lubricated.

CASE 2 – VALUE PROPOSITION 3 (SOFTWARE APPLICATION)

The value proposition 3 example illustrated in the BMC in the empirical material shows the value creation process where the assets have been packaged into the program SKF LubSelect. With the benefit that this app is dynamic to use since the recommendations that are given from LubSelect for an appropriate lubrication are based on what criteria that the customer's selects and what type of application and operating conditions that are chosen. Which makes the tool flexible since the program can access the test data and the generic data, based on what selections that are made. Even if the assets in this area are packaged into a service-based free value proposition in form of downloadable app, they fulfill however other benefits and utility's then generating direct revenue streams. Customers can easily find out what type of lubrication and what amount they need, and by lubricating bearings accurately with the right amount and type of lubrication this affects the life span of the bearings, reducing premature bearing failures and machine downtime. Proper lubrication can also increase energy efficiency and increase the life span of the bearings. This gives SKF good brand recognition as a manufacturer of high quality products, which indirectly could lead to increased sales of the bearings for SKF from both current and new customers.

Once having identified the type of technical IA that have been used in this value proposition, and in the previous value proposition number 2 above, one can see that both service-offerings are based on the same source, the LubSource database, where specific assets are frequently used, which could be continued to be leverage if similar service-based offerings where to be built on the same assets. However the calculation tools accesses different data from the LubSource database since they are used for different purposes.

Frigo & Hurley (2014) argued that it is these genuine assets that a company wants to leverage, and by applying value propositions into the new model one could identify which assets that are frequently used and packaged into different offerings to acknowledge which ones that could be the most valuable to continuing leveraging on by developing these further and configuring new service-based value propositions. Sullivan (1998) described that once the know-how and the knowledge of a firm's human capital become codified it can be seen as the firm's intellectual assets. Edvinsson & Sullivan (1996) argued that knowledge that is codified can be transferred and shared, and one of the purposes to identify the type of IA that a company has to its disposal is to be able to use the asset in different ways, which according to Sullivan (2005) is of importance since IA is a source that a company can commercializes upon.

According to Osterwalder & Pigneur (2010) the BMC can be used to show how a firm aims to generate financial value. In the new adjusted model different kinds of value creation is demonstrated, not only financial value. However one could argue that all of the different revenue models presented in the examples are valuable since they could generate financial value in from a long-term perspective. Fritscher and Pigneur (2014) reasoned that the BMC as a tool can enable people to vision multiple business models and as a way to see how the elements interacts with one other, since adding or changing certain elements could impact other relevant elements. Something that has been shown in the case examples, that depending on how the IA is packaged this affects the outcome and the whole value creation process.

CASE 2 – VALUE PROPOSITION 4 (SERVICE)

The value proposition example 1 shows the value creation process where the assets in the database are used as a service to customers, where advice are given from the knowledge about the lubrication in relation to the bearings which could improve the quality of the bearings under operating conditions. By selling high quality products this is beneficial since the company will have strong brand recognition in relation to the quality of their products, and customers are more likely to continuing buying bearings from SKF in the future which would be the internal value generated from this value proposition

In the different value propositions from both of case 1 and 2, we have seen different processes on how the IA contributes to value creation in various ways. The notable changes in the presented examples can be seen in block 4 the value generation and the outcome differs. Through the different value propositions one can see that the value generated for the customers but mostly for SKF changes. Some value propositions generated financial means for example in form of licensing fees, and other generated new knowledge/technology, brand recognition that in a long-term perspective could generate financial means from both new products and services, and good reputation and other value propositions showed that collaboration settings could strengthen relationships.

The change of the value generation from the value propositions are essential to address since depending on what the company wants to get out of the use of the assets, these could be packaged into different value propositions. Efficient use and exploitation of knowledge and IA can therefore be achieved by identifying many different ways that the assets can be used at the same time to leverage the assets in an optimal way.

Knowing how IA contributes to value creation are important to be able to find ways to exploit the assets in relation to the company's intended use of the assets, packaged into different value propositions that could be offered in a way that generated the desired value, for the company and fulfilling the utility for the customers. Where both physical products and services could be offered, nevertheless a physical product can also be seen as a service, since it might serve a utility.

Most of the presented service-based value proposition in this thesis can be seen as closely related to/or complementary offering to the sell of bearings. If the focus of a company is to produce a physical product then the focus will be on how the company most efficiently can produce the physical good, which might lead to the fact that the company could loose out of opportunities in relation to other potential ways to use the assets. However by using the thinking of Petrusson's (2004) theory regarding the intellectual value chain, a company could take into consideration the service-based perspective of the use of the assets, which could enable companies to create different ways to generate value, apart from physical products from the assets, and leveraging the knowledge base for e.g. by creating value propositions in form of service, virtual offerings, or licensing offers or packaged deals with both products and services offered simultaneously.

5.3 ANALYSIS OF INTELLECTUAL ASSET MANAGMENT IN THE SKF CONTEXT & EFFICENT UTILIZATION OF IA

In this section 5.3 sub questions 4, how the new model could help to increase the efficiency of intellectual resources, will be discussed. Furthermore the main research question, how a company more efficiently can utilize its intellectual resources to create new service-based offerings will also be discussed in this section. Thereafter different factors will be addressed that can influence the value creation process of how the IA can be used, exploited and leveraged.

5.3.1 EFFICENT UTILIZATION OF IA – UTILIZING INTELLECTUAL RESOURCES TO CREATE NEW SERVICE-BASED OFFERINGS

We have now seen that by defining and objectifying knowledge as technical IA, on can identify how knowledge assets have been used and embedded into different value propositions. Through the two cases we have explicitly seen how intellectual resources been utilized in service-based offerings, and how the IA contributes to the value creation process has been illustrated through the different value propositions examples. Applied in the new model, we have also seen the impact and the role that the technical IA have in relation to value creation. A company can more efficiently utilize its intellectual resources to create service-based offerings when knowing how the IA contributes to value creation, and by addressing what kind of value generation that the company wants to achieve, one can come up with many different ways to exploit and generate value from the assets.

The new model can increase the efficient use of IA since it enables a company to explicitly see how technical IA have been embedded in value propositions (as have been shown in the applied examples above), which thereafter enables a company to find various ways and options on how to exploit the assets in different ways. Julienti, Bakar & Ahmad (2010) reasoned that resources could be defined as tangible and intangible factors that are controlled or owned by a company and that can be used and converted, through different activities to products and services in an efficient way. Tangible assets can easily be identified and quantified; however since intangibles are based on knowledge and information they are more difficult to manage according to López-barajas de la puerta (2011).

The new adjusted model could therefore be used as a way for a company to more efficiently utilize its intellectual resources to create new service-based offerings, since the value creation process of how intellectual assets contributes to the offerings is made explicit. By identifying the assets that are in the

resource block this enables the company to efficiently find multiple ways and combinations of the assets packaged in different ways. Once having identified the assets that a company has at is disposal it becomes easier to see the current control over the assets and what assets that need to be protected. When controlling the deployment of the assets this will help the company in the process of exploiting the assets in an efficient way, and the assets could be exploited and leveraged by creating different value propositions that could generates multiple revenue streams from the same IA at the same time. Furthermore knowing what type of value that different offerings contributes to and what assets that are embedded in this offerings, creates a transparency for the company as it can see new ways that the assets could be packaged in.

5.3.2 FACTORS INFLUENCING THE CREATION OF SERVICE-BASED OFFERINGS

By referring to Davenport, Thomas & Desouza (2003) reasoning that the life cycle of IA is comparable to any other resource that a firm uses in the production of services and goods, since IA can be improved, transformed and redefined by for example additional investment and use, one could therefore argue that the knowledge that the technical IA are built on could be seen as an untapped resource that can be re-used in different ways an configured into new value propositions. Once having deconstructed value propositions in the adjusted model and identified the type of technical IA that a company has to it's disposal, these can be configured by either being packaged or and repackaged into new service-based offerings that can be exploited and commercialized. Before deciding how to use the technical IA and configure these into service-based offerings one needs to consider different factors that influences the way that the assets can be configured. Furthermore one needs to assess potential ways that the company will charge for the offering(s) and in what way it will be conveyed to the customers, since this influences the value of the outcome.

5.3.3 Technology and innovation process and the generation of IA

The technology and innovation process was described to illustrate how SKF's knowledge is created, and how intellectual assets are generated. According to Desouza (2011) knowledge are generated in innovation processes, and can be transformed into offerings with commercial value in form of services and tangible products. Using Petrusson's (2015) way of objectifying and categorizing the knowledge into technical intellectual assets, this enables for companies to explicitly see how knowledge can be objectified, which facilitates the process of identifying what kind of valuable assets their is that can be configured into service-based offerings. As Davenport, Thomas & Desouza (2003) argues that for intellectual assets to become valuable and useful they need to be codified, once put in a codified form intellectual assets can be described, used and exploited. Another reason why it is important to

transform innovations produced by the employees into intellectual assets and defining the IA according to Sullivan (1998) is that IA are interchangeable and can be owned by different shareholders.

To exploit the IA's efficiently it is of relevance to see the capacity of the assets and how these can be deployed since they then can be used to build new service-based offerings by packaging and repackaging the technical IA into new configurations and value propositions that are of good commercial use. By reusing the IA in an a efficient way into new offerings this allows for companies to focus time and resources on other activities according to Desouza (2003) since the company doesn't need to rebuild an reinvent processes and ideas from scratch again. One fundamental shift in relation to innovation processes that Lusch and Nambisan (2015) reasoned that the view of innovation is becoming network-centric and information-centric since innovation processes are not only related to tangible goods, it also has grown to be concerned with intangible offerings associated with tangible goods or stand-alone intangible offerings that are characterized by high content of information. Furthermore the focus is on value and experience. From this perspective a company could offer any type of tangible or intangible value proposition as long as it fulfills these two aspects.

5.3.4 Technology potential

Before deciding how to package the assets into new value propositions it's of relevance to evaluate the technology potential and the current state of the technology. Whether the technology needs to be developing further before configuring the assets into a new value proposition, or if one can use certain assets in different combination and create new offerings. The assets could be developed further through collaboration or internal research for a specific purpose to enhance the current technique and thereafter be integrating in new products or services.

When it comes to the technology potential its important to evaluate what kind of value that the technical IA can create and evaluate if it will be used to enhance products and services or for creating something new. Furthermore, depending if the focus is to exploit what the technique could do, or what the strategic objectives is in relation to the technique with expectation of what the technique should be used for and what type of value needs to be evaluated. Jansson mentioned that when doing assessments and evaluations the IA/IP group often work together with people that knows the technology well, and can therefore discuss the dimensions of what's important in relation to a specific technology. Mapping the assets and structuring a project can clear out at what level in a development phase a technology is.

Furthermore to provide material that can be shared with all the people involved, making sure that everyone sees the status of the project or/and a technology in the same way.

Another way of exploiting the assets it by using the IA for R&D purposes, which could strengthen the attributes around the IA, and the technique's potential, reach and capabilities could be tested to leverage the technique. SKF could perform the research within the company or together with other actor(s) as collaboration partner(s), or developing the assets to build on already existing offerings, both tangible and intangible.

5.3.5 How the assets are used and intended use

In accordance with Teece (1998) who described that the way that knowledge assets are deployed influences the value creation process and could also contribute to a competitive advantage depending on how the assets are used. Something that Jansson highlighted was that both control and value of assets are contextual and therefore the outcome might differ depending on how the assets are used and in what way. Furthermore Jansson mentioned that it could be beneficial for the company to have the IA/IP group involved early on in the commercialization processes to be able to contribute to the assessment of how IA can be used and packaged in different ways to see how the technical IA can be exploited and leveraged. Assessments and evaluations the IA/IP are performed with people that know the technology well, since it's important to assess whether the control level is high or low in relation to the context. The assets could be used separately, or in new combinations with other assets, or repackaged after certain assets have been developed, to create possibilities to differentiate offerings.

As could be seen in the empirical material in case 1 where the value proposition in form of the two simulation programs where built differently to serve different purposes, one could therefore argue that similar offerings could be built from the same knowledge base if making new configurations and repackaging the assets in new ways, or developing certain assets further and creating new versions. One could also argue in accordance with Chesbrough (2011) that what's valuable is the effect and the utility that the value proposition creates, whether it comes from a tangible product or and intangible service. Allee (2008) reasoned in a similar way that the future level of success of a company is depending on how well a company can convert one form of value into another. Therefore the strongest offering could be seen as the once that capture's the desired effect and utility, and where the assets can be re-used in different combinations to create value propositions.

Depending if the IA's are supposed to be used internal or/and externally exploited this effects the configuration of the offering since the control aspect will be set up, managed and regulated in different ways. If the service-based value proposition is based on or functioning as an add on to an already existing tangible packaged offerings the transaction model might differ compared to if it was only a new service-based offerings. Decision in relation to long- respectively short term use of the assets will have to be made, and if the assets are going to be re-used in form of new assets combinations, or based on newly developed assets since this also effects the control position. If the intended use with the assets is to form a complementary service-based value proposition to tangible products or a new version of an already existing service-based value proposition different transaction models could be more or less suitable in certain situations. Or if the goal is to creating future potential growth aspects, and strengthening or/and building networks to leverage the value of the assets.

If the intended use is to enhance the IA to generate new knowledge and developing the technique further certain ways to exploit the assets might be more suitable such as a collaborating settings or for internal research use until the technique is ready to be packaged into a value-proposition. If there are some assets that haven't been used yet when looking at the technical IA in a certain area, these could be combined and packaged with already deployed assets. In certain areas some assets can be seen as core assets if these constitutes as the basis in every value proposition within one area.

5.3.6 The level of control and risk assessment

Kramer et al., (2011) argued that IA generates economic benefits for the one that controls the deployment. Jansson mentioned that control over the assets can be obtained in different ways, through law, contractual means and that a certain control can be obtained by only incorporating the assets in different features/functions in products and services that SKF provides, since the knowledge itself are not revealed it remains controlled to a certain level. The IA group can assess the type of control that can be obtain by packaging assets in a certain way, and thereafter the business side evaluates and takes decisions whether its interesting from a commercial business perspective or not to pursue with according to Jansson the control aspect of IA influences implicit the way that assets can be exploited. The control level of the IA can also be used to create a strong position that generates the desired value from the IA. When going into a collaboration setting it's important to consider it is a short term and long term goals use of the assets. One also need to assess the balance of how much information and what part of the IA can or shall be shared in order to create collaboration opportunities, and what's important to not reveal etc. since keeping certain parts secret might be necessary to be able to utilize

and leverage the present IA in future settings. Furthermore to specify what SKF expects in return and what is the desired outcome of the collaboration.

Depending on what type of control a company has over its technical IA this influences the way that a value proposition could be configured. Jansson mentioned further that the control of SKF's assets are also contextual and therefore the outcome might differ depending on how the assets are used and in what way, and that the control aspect of IA influences implicit the way that assets can be exploited. SKF can control assets in one way for example when IA are incorporated in different features/functions in the products and services that SKF provides, since the knowledge itself are not revealed. Jansson mentions further that what the IA/IP group can contribute with is suggesting in a systematical way from an IP perspective, the type of control that can be obtain by packaging assets in a certain way, and thereafter the business side evaluates and takes decisions whether its interesting from a commercial business perspective or not to pursue with.

Frigo & Hurley (2014) argued in their matrix that for the assets that a company turns out to have high control over and which are of high value for the company, these should be protected, nurtured and defended. Desouza (2011) described that an organizations ability to secure its intellectual assets depends upon the way that the organization can recognize and manage the process where the intellectual assets are created and used. Depending on what type of control a company have over its technical-IA or want to have, different kinds of transaction could be suitable. Simple transaction could be suitable where SKF sells a product, however the technical IA behind might be patented and certain methods could be controlled as trade secretes. Ongoing transaction could be another way of controlling the assets such as when a customer is paying licensing fees while having access to a software program. Complex transactions where SKF might have different contracts with a customer, could offer a product, which will be charge for one time, and then offering a licensing fee for a program to use in relation to the product, and at a later stage performs installations and calibration for the customer on sight.

5.3.7 The importance of context

Tao, Daniele, Hummel, Goldheim & Slowinski (2005) reasons that the value of intellectual assets can be seen as contextual, since IA are intangibles they are often defined by, and dependent of the context of their use. Something that Jansson also highlighted as he described that the value of assets are contextual and therefore the outcome might differ depending on how the assets are used and in what

way. Harrisson & Sullivan (2000) shares a similar view in the way that they argues that the value can be put in relation to both the firm's context where it operates and also in relation to the desired outcome of the intangibles that are being used. Furthermore Harrisson & Sullivan (2000) argued that the context could be divided into to perspective where the external perspective consists of driving forces that influence the long-term viability of a firm in a certain industry in relation to opportunities and threats. Therefore it's important to address what types of markets the value propositions will be directed to, identifying competition and how the value proposition will be offered.

5.3.8 Strategic objectives

Besides business strategies and overall strategies for the SKF Company, Jansson mentioned that it's important to evaluate the potential use for the assets in each project, and thereafter the business side looks at the commercial potential with the value proposition. Defining what kind of value that are desired to create from the technical IA, will enable a company to package the IA and choosing transaction model(s) for the intended purpose. Certain value propositions could be more or less suitable to generate the most financial value. If the goal is to reach new markets and customers through collaboration certain ways might be more relevant. If a companies focus for some assets are to enhance some IA in a certain area to obtain new knowledge or technique, a collaboration setting could be a good way where knowledge can be exchanged and regulated through contracts. However in collaboration setting it becomes important to address the control situation of the assets to not reveal assets that could be leveraged internally into new products and services.

Other factors that influences the ways that the assets should be configured are for example if the objective is to exploit assets at already existing markets to generate the most financial value or new markets or to create opportunities. Or in relation to environmental aspects and the way that a company are perceive in form of brand recognition etc. can have an impact on the way that the offerings should be configured since this effects the way that a company performs it's business and the way that a company is perceived.

6 CONCLUSIONS

This chapter concludes, and sumps up the main findings of the research, and highlight the insights that illuminate the research questions.

By using an intellectual asset management and intangible resource approach to identify and objectify knowledge as technical IA, the new proposed model shows a way of how technical IA can be exploited by objectifying the assets, addressing packaging and transaction opportunities as a way to configure the assets by either being packaged or/and repackaged into new service-based offerings that can be commercialized. The proposed model could facilitate for companies to efficiently utilize their intellectual resources to create new service-based offerings, since it can be used as a tool that enables companies to deconstruct both tangible and intangibles value propositions to see explicitly how the technical IA have been used and contributed in the value creation process. Once having deconstructed value propositions in the model and identified the type of technical IA that a company has to it's disposal, these can be configured and exploited in different ways.

The analysis of the cases showed that depending on how the assets are packaged and transacted these generates different kinds of value for SKF. For e.g. financial means, new knowledge brand recognition, strengthening relationships etc. Furthermore the analysis showed the importance to be able to identify different ways that the assets could be used and packaged into various value propositions, since this effects the way that the assets could be exploited and leveraged by creating different offerings that could generates multiple value streams from the same IA at the same time. Companies also needs to consider different factors that influences the way that the assets can be deployed and configured, such as the level of control over the assets, the context where the company operates, the technology potential and development stage, strategic objectives, long- respectively short terms perspective and the intended use of the assets.

Since SKF is a manufacturing company where tangible products traditionally are carrying most of the core value, service-based offerings can be used as complement to enhance the sales of the tangible goods, or/and improving existing products, to offer more complete offerings to the market, consisting of both tangible and service-based offerings where the SKF knowledge has been packaged and leveraged into new offerings. From an IA management perspective companies could leverage their knowledge base and the intangible assets where there is a capacity to build new service-based offerings,

or by creating multiple new ways to utilized the assets packaged into different value propositions that could be offered.

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- Example of packaging and transaction types, SKF material. Group Intellectual Asset & Intellectual Property. Prepared by Martin Jansson.

8 APPENDICES

8.1 OVERVIEW OVER CONDUCTED INTERVIEWS AT SKF

Figure 12 - Conducted interviews

Interviewee	Time of interview
Martin Jansson	18th of May
Martin Jansson	18th of May
Mario Romero	1st of June
Håkan Lindgren	5th of June

8.2 INTERVIEW TEMPLATES

IAM at SKF

1. How does the commercialization process look for technical IA?
- Internal use of IA?
- External use of IA?

2. Which variables influence the choice of how technical IA shall be used?

3. Which aspects are most important when deciding how technical IA shall be used?

4. From a development perspective, what decides whether a technical IA shall be developed further?

5. How does the control aspect influence the way technical IA is used?

CASE 1 - First interview

1. Can you please describe the area?

2. Which services and products are SKF providing within the area?

3. How are the services and products provided to customers?

4. Which technical IA are the services based on?

5. Which technical IA are the products based on?

6. How does the future use of the same technical IA look?

‣ **CASE 1 - Second interview**

1. From where does BEAST retrieve the information?

2. What does the different parts consist of?

3. What can each part contribute with?

4. What type of data has BEAST access to?

5. Is SimPro based only based on information from BEAST?

6. What is the difference between BEAST and SimPro?

‣ **CASE 2**

1. Can you describe how SKF works with lubrication today?

2. How does SKF sell lubrication today?

3. Does SKF sell lubrication together with other products?

4. Can you give example of services that SKF offers in relation to lubrication?

5. What kind of knowledge are these service offerings built upon?