Patent portfolio analysis as a negotiation tool

a case study in the automotive industry

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*a case study in the automotive industry*

av

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Abstract
The automotive industry with its highly competitive environment together with high research and development costs is struggling to increase shareholder return. Cross-functional teams are employed to source suppliers which are helping to reduce production and development costs in close cooperation with the other departments. When working in a competitive environment and with external actors, intellectual property becomes increasingly important and organizational effort is directed to increase the generation and usage of such. Patent portfolio analysis is a well-known tool used to extract information from surrounding actors’ patents, which traditionally mainly was used for product development, but has potential to increase gross profit through cross-functional sourcing teams as well.

The purpose of this study is to investigate how to implement and use patent portfolio analysis as a cross-functional tool in the automotive industry. In order to fulfill the purpose, a qualitative case study has been conducted including both qualitative interviews, as well as action research in the form of workshops at the case company. The results were analyzed using a tailored framework denominated the system integration model which is a combination of the technology acceptance model and the managing strategy framework. The systems integration model was developed and validated by the researchers during the research process.

The research result shows that patent portfolio analysis has a high perceived usefulness but a low actual system use within the studied company, especially in the sourcing department. The main barrier to use patent portfolio analysis cross-functionally was that the intellectual property strategy was not yet fully communicated and linked to the different departments’ objectives. There were also barriers found in the communication between- and the understanding of- each other’s departments, which could be reduced by increased education and promoting clear contact points and guidelines. The final conclusion of this research was that patent portfolio analysis likely could be used cross functionally to map the competitive landscape and increase gross profit by protection innovations through product development and sourcing.

Key-words
Sammanfattning
Fordonssektorn kännetecknas av höga utvecklingskostnader och en konkurrenskraftig marknad där aktörerna strävar mot vinst till aktieägare. För att ge en hög avkastning till aktieägarna så arbetar man i tvärfunktionella team för att minska produktion och utvecklingskostnader samt för att anlita de bästa leverantörerna. Att arbeta i en konkurrenskraftig miljö med externa aktörer gör att immateriella rättigheter blir allt viktigare och företag satsar därför stora resurser för att detta ska hanteras på rätt sätt. Patentportföljanalys är ett välkänt verktyg för att extrahera information från omgivande aktörers patent, vilket traditionellt främst har använts i produktutveckling, men även har potential att öka bruttoresultat genom ett effektivare samarbete över avdelningar i tvärfunktionella inköpssteam.

Syftet med denna studie är att undersöka hur man implementerar och använder patentportföljanalys som ett tvärfunktionellt verktyg inom fordonssektorn. För att uppfylla syftet har en kvalitativ fallstudie genomförts genom kvalitativa intervjuer och workshops vid det undersökta företaget. Resultatet analyserades med hjälp av ett skräddarsytt ramverk som forskarna för denna undersökning benämnte som "the system integration model". Det här ramverket sammansvetsar den välkända modellen "technology acceptance model" som syftar till att undersöka acceptans av ny teknik och den välkända modellen "Managing four processes" som handlar om hur man skapar ett strategiskt management verktyg. "The system integration model" utvecklades och validerades av forskarna i flera steg under studien.

Resultatet visar att patentportföljanalys har en hög uppfattad nytta trots att det är låg systemanvändning i det undersökta företaget i dagsläget, särskilt i inköpsavdelningen. Den största barriären för användandet av patentportföljanalysen verkar vara att företagsstrategin för immateriella rättigheter ännu inte har kommunicerats och kopplingsmed de olika avdelningarna fullt ut. Det noterades även barriärer i kommunikationen mellan- och förståelsen för- de olika avdelningarna, vilken kan minskas genom utbildning och tydliga kontaktpunkter och riktlinjer. Den här undersökningen indikerar ytterligare på att patentportföljanalys är användbart i tvärfunktionella team då det ger möjligheten att kartlägga konkurrenslandskapet, säkra produkt- och eftermarknadsexklusivitet och förbättra leverantörsavtal, vilket i sin tur kan öka bruttovinsten.

Nyckelord
"Patent portfölj analys", "Tvärfunktionella team", "System integration model", "Immateriella rättigheter i inköp"
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Prologue and Acknowledgements
This thesis has been authored by Jennifer Asp and Axel Grapengiesser in parallel to our research during spring 2017. During this time, we have worked together in all aspects of the research and report writing. In relation to this MSc thesis, Jennifer Asp is being examined at Luleå University of Technology and Axel Grapengiesser is examined at Royal Institute of Technology. Both students are examined on the same identical report which is published by both universities separately.

The scale of the studied organization has during this research become evident to researchers, and while making recommendations and suggestions relevant to the development one should realize that the complexity of the studied organization may sometimes promote different actions or actions to be taken later. It should also be kept in mind that the studied parts of the organization and much of the strategy and knowledge studied throughout the research is still under construction and implementation. We have found the organization, the employees and the internal strategy impressive and ahead of its time, and we would like to encourage the reader of this report to embrace the opportunistic approach in which the report was written.

Finally we would like to take the opportunity to thank the case company and the universities for their input and encouragement. Tutors and stakeholders at both academic institutions and the case company have been there for us throughout the whole research process, allowing us to truly benefit from the access and resources given and to conduct our research in the best possible way. The collaboration between us researchers with different backgrounds and universities and the results from this thesis were possible thanks to you, which we are truly grateful for.

Due to confidentiality constraints we are not able to name the contacts dearest to us within the case company, and we have therefore chosen to not name others either. However it’s our intension and hope, that you realize your value to our research when reading this and that we have the possibility of working with you again in the future.

Yours sincerely,

Jennifer Asp
Axel Grapengiesser
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>IP</td>
<td>Intellectual property</td>
</tr>
<tr>
<td>KPI</td>
<td>Key performance indicator</td>
</tr>
<tr>
<td>PPA</td>
<td>Patent portfolio analysis</td>
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<td>TAM</td>
<td>Technology acceptance model</td>
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1 Introduction

In the search for higher shareholder return many organizations are looking to raise the sale of high margin products and services while decreasing development and/or acquisition costs. The automotive industry in particular is characterized by a tough competitive environment, with a few vehicle manufacturers competing on cost basis while developing and selling highly technological products (Sturgeon, Memedovic, & Biesebroeck, 2009), globally (MacNeill & Chanaron, 2005).

Sourcing became increasingly important when competent local actors moved production into developing countries in the early 1980’s, which enabled local suppliers to offer lower prices (Leung, Mok, Ho, & Lau, 2015). While suppliers are spread in terms of geography, the technical complexity of products and the scale effects that comes with a larger production has resulted in fewer dominating actors in the market (MacNeill & Chanaron, 2005) which separates the sector from many others. A high specificity of parts and a high degree of product complexity is also characteristic for the automotive industry and entails high development costs which require significant investments in development, sourcing and manufacturing (Sturgeon et al., 2009).

The automotive industry with its high technical complexity, and long product lifespan, is particularly interesting when it comes to aftermarket as it is a way to profit on the already installed base, which is previously sold vehicles in use (Johnstone, Dainty, & Wilkinson, 2008). Being an attractive area of business, different actors interact and compete for customers and market share. The recent focus on aftermarket business has promoted an increased interest in finding tools to secure companies’ products. Intellectual property (IP), and patents in particular, has proven to be one of the key tools for making sure the benefits of innovations are secured, and to receive income from aftermarket sales during the lifespan of the product (Bördin, 2016). This has led to an increased interest for IP in the automotive industry, and the usage has proven to extend far beyond securing the aftermarket; incorporating both direct income from IP and strategic decisions around product development and handling competing forces.

The above is likely one of the reasons why the number of patent applications globally has grown exponentially during the past 30 years (WIPO, 2017). With this trend, the use of the information provided in each patent filing has also improved, and theory states that patent information can be imagined as a jigsaw puzzle of key strategic data for an organization (Fabry, Ernst, Langholz, & Köster, 2006). By analyzing the publically available patent portfolios (an entities collection of filed patents), information concerning development-, sales- and cooperation-environments can be extracted through data analysis. The study by Lin, Chen, & Wu (2006) indicates that it is possible to characterize a company’s technology strategy by looking at its’ patent portfolio. Accordingly, the composition of the patent portfolio and the interrelatedness between a portfolio’s patents can reveal an organization’s technology strategy and focus. A series of quantifiable measures can moreover be developed from patent portfolio analysis (PPA), in order to represent a company’s technology strategy (Lin et al., 2006).

1.1 Pre-study

The increased generation and usage of PPA has led to organizations establishing visions, strategies and entire departments around the usage and analysis of IP. To concretize this movement, the case company for this study, a truck manufacturer, was studied in a qualitative
pre-study. Interviews with different departments were held focusing on the departments’ main tasks, collaborations between them and the perceived problems around the newly established IP-initiatives involving both strategy and an entirely new department focused on IP.

The conducted pre-study of the case-company revealed a general basic understanding for IP generation and usage within the organization. Segmentation between departments with different key performance indicators (KPIs’) was observed from the pre-study as shown in Table 1. Furthermore no department mentioned IP in relation to their core KPIs. However, a general demand for more IP usage and PPA in particular was observed as all departments could see a potential benefit of such analysis when briefly explained by researchers. Several interviewees mentioned difficulties to search for valuable knowledge: as for example how aggressive suppliers and competitors are on the market, and suppliers core competences are.

<table>
<thead>
<tr>
<th>Department</th>
<th>KPI</th>
<th>Focus</th>
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<tbody>
<tr>
<td>Sourcing</td>
<td>Cost</td>
<td>To select the supplier that brings the desired innovation at the right cost level</td>
</tr>
<tr>
<td>Product development</td>
<td>Technical Excellence</td>
<td>To satisfy technical specifications and develop new products which are better than competitors’ yielding competitive advantage.</td>
</tr>
<tr>
<td>Aftermarket</td>
<td>Gross Profit</td>
<td>To maximize gross profit and provide aftermarket parts through the entire lifecycle of the product.</td>
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Generally researchers found all departments to experience difficulties in finding useful information from their surroundings, which they can use to improve daily work. Many interviewees stated that there probably exist a lot of useful documents and tools, though which they are not aware of, or do not know how to use. Interviews with the newly established IP organization confirmed that substantial investments of time and money had been made to access software tools for PPA containing key features for different departments. However, the usage of the tools in the different departments was still deemed limited.

1.2 Problem discussion
Larger organizations which are working in cross-functional teams often struggle with the alignment between the different departments because of different goals, initiatives and tools (G.Ancona & Caldwell, 1992; Schmidt & Kochan, 1972). Cross-functional tools and initiatives are therefore important for the entire organization in order to work towards a common goal and ultimately, to increase gross profit and shareholder return. Establishing these common initiatives and tools along with anchoring them within the organization is difficult as their importance needs to be made clear to all stakeholders. The recent trends of increased IP use have created a quest for cross-functional tools in this area.

There is a high quantity of existing literature about IP and PPA found during the literature study conducted in relation to this research, however no information about how to extract the true benefits in the complex and cross-departmental environment present in the vehicle industry. While resources can be allocated, and strategy to use patent portfolio information are implemented as seen in the case-company for this study, barriers and an uncertainty concerning the usefulness of information between departments can limit efficient use of PPA.
In order to reap the true benefits of publically available patent information in the different departments, the different departments’ upsides must therefore be established along with the barriers that prevail when trying to implement PPA cross-functionally.

The problematic of how PPA should influence management practices and how it should be used in the organization was clearly seen in the case-company pre-study, and was also stated to be an interesting area for future research by Lin et al., (2006). Because of the possible impact that PPA could have on company gross profit it is likely worth implementing by overcoming the barriers to do so.

1.3 Purpose and research questions
The purpose of this study is investigating how to implement and use patent portfolio analysis as a cross-functional tool in the automotive industry.

- RQ1: How can the barriers of using patent portfolio analysis as a cross functional tool within the automotive industry be reduced?
- RQ2: How can the information from patent portfolio analysis be used in different departments?

1.4 Disposition
After this introductory section and in order to increase the understanding of IP and PPA, existing literature will be presented in section 2. Two well established frameworks will also be presented in section two before being combined in section 3. The combination of the frameworks is also argued for in this section. The methodology will be presented in section 4, and then the empirical results and analysis will be outlined in section 5. Discussion and conclusions follow in section 6 where the research questions are answered. The last section also contains the researchers’ reflections and final remarks.

An overview of the disposition of this study is found in Figure 1.
2 Existing literature
The literature study was done in order to understand the PPA and to see what previous research had been done in this area. The existing literature also formed the base for the choice of frameworks. To understand PPA, one must also understand what IP is and why it exists.

2.1 Intellectual Property
According to WIPO (2011; p.2) “IP refers to creations of the mind: inventions; literary and artistic works; and symbols, names and images used in commerce“. Sengupta (2016) agrees on the definition: creations of mind, but adds that IP primarily are of novelty, have market value and are unobvious. Furthermore, IP can be divided into the two categories: Industrial Property (patents for inventions, industrial designs, trademarks and geographical indications) and Copyright (literary works and architecture design) (WIPO, 2011). IP rights enable the owner to benefit from intangible assets such as an idea even though other companies might produce the product since it gives the owner the same ownership rights as for tangible assets (WIPO, 2011). For example patents prevent inventions or ideas from being made, used, or sold by other parties without the owner’s consent (WIPO, 2011).

In a global industry, IP rights are a key competitive tool which prevents innovations from being sold or used by other parties without benefiting the inventor (Shen & Su, 2016). As described by Shen and Su (2016) there are over 50 million IP rights in force, of which 10,6 million are patents (WIPO, 2016). In addition to publishing the number of outstanding IP rights WIPO clarifies that there is a strong growth in demand of such. The global growth of patents for 2016 was for example +7,6% compared to 2014 (WIPO, 2016).

Shen & Su (2016) have found a relationship between IP and innovativeness by improving the innovation process. The use of patents in particular can trigger the industrial development by disclosure of inventions, which enable other actors to continue developing the invention further (Shen & Su, 2016).

2.2 Patent Portfolio Analysis
A patent portfolio is formed by all outstanding, published and active patents of an entity. Patent portfolio data can be retrieved internally for own patents and externally through publicly available databases. When studying patent portfolios, it is important to notice the difference in time delay between internal and external information gathering. The delay arises from the 18-month time period between the filing of the application and its’ publication (Fabry et al., 2006; The US Patent and Trademark Office, 2015), however as patents are often filed before development is finished and the time between finished product and patent publication can be shorter (Fabry et al., 2006).

The patent data provides a good information base which can be useful to analyze the breadth and depth of knowledge within a company (Suominen, Toivanen, & Seppänen, 2017). The extent of product development for a specific entity can for example be observed (Suominen et al., 2017). When analysis is done correctly, the active participants on the market within a certain field can be identified, as well as actors with extraordinary patent positions (Fabry et al., 2006). Fabry et al., (2006) furthermore states that the easiness to access patent information in combination with increased computing power has generated a trend of computer aided PPA. PPA can be useful to evaluate the research and development landscape and business opportunities of an organization, or in a larger perspective for an entire business landscape (Shen & Su, 2016). PPA is also argued to be easily implementable in an
organization, geared mainly towards the senior management for strategic planning reasons and for external stakeholders who wish to collaborate or invest in the firm (Ernst, 2003). PPA has become increasingly important as the competitive landscape requires a broad competence base, meanwhile keeping depth in core business area (Suominen et al., 2017). When assessing the usefulness of patents for business development, it is important to realize that the individual patents are not the focus but rather the value of the patent information as a whole (Fabry et al., 2006).

For a PPA to be useful it needs to be based on appropriate patent data, to select and evaluate only the applicable patents to fit into the model of analysis (Fabry et al., 2006). Analyzing a high quantity of patents for an entire industry or product category could be overwhelming and make the analysis less useful. In order to analyze the right parameters, and thereby achieve a highly useful analysis, Fabry et. al (2006) claims the parameters to be set in such a way that they receive between 50 and 2000 patents to analyze. Using the international patent classification system, patents can be naturally divided into their respective technology area (WIPO, 2016). Such categorization can be useful for searching and analysis of patents, however care should be taken to the contents of each classification. Preferably analysis should be conducted on technology areas separately, as patents can be included within multiple areas (Fabry et al., 2006).

When analyzing patent portfolios activity, Fabry et al., (2006) claims that the number of patents and the patent quality is both important. He furthermore described the quality to be measured by; the ratio between granted and filed patents, the international scope that is seen though which areas patents are filed in, the technological scope which can be evaluated by looking at intellectual property classifications and the citation frequency where patent age should be considered. Last but not least he claims that a company or a sector can be evaluated using PPA by analyzing its overall patent strength given a combination of its patent activity and patent quality.

According to Fabry et al., (2006) the results of a PPA are preferably illustrated in graphical formats, using bar-charts for different characteristics, and normalized spider-net graphs when an overall picture of the analysis is to be presented. Care should though be taken when abnormalities or unexpected values are obtained as these cases might need special treatment or might have properties affecting the analysis in an unjust way (Fabry et al., 2006). Recent machine learning could however minimize the need for this kind of reliability analysis (Suominen et al., 2017).

2.3 TAM – Technology acceptance model

The technology acceptance model (TAM) was developed by Davis (1985) to improve understanding of the users’ acceptance process and analyze how users might react from, and accept a new technology before it is introduced to the market. It is a popular technology acceptance model (Marangunić & Granić, 2015) which has been modified and further developed several times to suit different purposes and businesses. It is considered a leading model for predicting behaviors towards rejections and acceptance of new technologies (Marangunić & Granić, 2015) such as PPA. The first draft of Davis’ (1985) model is presented below in Figure 2.
According to Davis’ (1985) model, the **Attitudes Towards Using** determine if the technology will be used, or rejected through establishing the users’ motivation to use the same. The Attitudes towards using is affected by the **Perceived Usefulness** and **Perceived Ease of Use** (Davis, 1985). As shown in Figure 2, the perceived ease of use also has an impact on the perceived usefulness. The usefulness and ease of use is both dependent on actual system capabilities and features involving what they do and how they to it in which by Davis (1985) is denominated the systems **Design features**. The arrows in the model indicate causal relationships where the attitude toward using is going to determine the actual usage of the technology represented by **actual system use**.

### 2.4 Managing Strategy: Four Processes

Organizations often build their management systems around financial measures and targets (Kaplan & Norton, 1996) such as for example cost KPIs. These targets are not directly related to the companies long term success. When companies started to transform and compete based on information, the intangible assets became more important. During this time the managing strategy four processess were introduced in order to use balanced scorecard as a strategic management tool aiming on connecting companies’ long term strategies with their short term actions (Kaplan & Norton, 1996). The processes are illustrated in Figure 3.
Figure 3 – Managing strategy: Four processes framework (Kaplan & Norton, 1996)

The combination and linking of several strategy processes into one management tool strengthens the implemented tool such as the original balanced scorecard through strategic alignment around measurable output (Howard, 2007). For the purpose of this study it will be used as a tool to improve strategy with regards to PPA. The strategies are linked in the four processes as shown in Figure 3. By following these processes managers can connect short term actions with long time goals (Kaplan & Norton, 1996) and by increasing understanding of how to work with different tasks to reach the common and long term goal of the organization.

The first process managers need to address is Translating the Vision, meaning translating the company vision into operational terms and guidelines of actions (Kaplan & Norton, 1996). During this process identification of the long term drivers and measurements for the long term success is taking place (Howard, 2007). The second process is Communication and Linking, which refers for managers to communicate the strategy both upwards and downwards in the organization hierarchy and link it to the different departments’ and individuals’ objectives (Kaplan & Norton, 1996). During this process the strategy needs to be discussed thoroughly so that everyone understands the strategy which connect the individual and departments objectives with the company’s vision (Howard, 2007). When the entire organization understands the business strategy the Business Planning process starts in which Kaplan & Norton (1996) explains that managers should prioritize allocation of resources to the initiatives that are a part of reaching long term goals. For the purpose of continuous strategic learning, the process Feedback and Learning exist, in which the financial goals and how they are archived are being analyzed, both individually and in the different departments (Kaplan & Norton, 1996). This way the business strategy and the company’s vision are continuously being analyzed and possible improvements are brought up to surface (Howard, 2007). Since the processes are linked endlessly, the company is continuously improving the short term actions and strategy in order to reach the long term goals.
3 Conceptual frameworks
For the purpose of this analysis the two frameworks presented under existing literature were combined. By incorporating the technology acceptance model, the necessary software/service specifications are derived while a change model (managing four processes) is necessary to assess the organization’s readiness for the software/service implementation.

Already in the development of the technology acceptance model Davis (1985) established that the TAM related to other business aspects. He clearly stated that its use would correlate and have a causal performance impact on its surrounding as seen in Figure 4.

Dubois & Gadde (2002) suggests that a suitable analysis model for a single company case study is one that evolves throughout the research process, from a tight theoretical starting point to an analysis model suitable to the particular problem of study. The correlating nature of TAM to its surrounding creates an opening for connecting TAM with an additional framework surrounding it in the particular case, and TAM was thus seen as a suitable theoretical starting point for this research.

Since PPA is a technical tool which could also be used as a strategic management tool, the researchers chose to connect TAM with Kaplan & Norton’s (1996) managing strategy model. These two frameworks will together form a strategic tool for implementing and improving PPA cross-functionally within an organization and linking PPA to business performance. The tailored framework shown in Figure 5 furthermore makes it possible to have an information flow between the technical and strategic parts of PPA, which in turn enables the departments to improve their cross-functional work and reach the overall company goals.
The features will, according to Davis (1985), have a direct impact on the perceived ease of use which is defined as “the degree to which an individual believes that using a particular system would be free of physical and mental effort” (Davis, 1985). In this study the perceived ease of use will refer to that of PPA in the different departments. The perceived usefulness will similarly refer to what different departments believes the information from PPA could be used for. The perceived usefulness will be directly affected by the design features and the perceived ease of use which together will form the departments attitudes towards using PPA as well as affecting the business planning of the organization. In the attitude towards using process the departments current willingness to use patent portfolio in their daily work will be analyzed which according to Davis (1985) will result in the degree to which PPA is used in the organization (actual system use). The resources allocated to PPA under business planning will also affect the actual use of the technology. Results from actual system use will be brought to feedback and learning.

Since there are no financial KPIs related to PPA in the organization, the feedback and learning process will analyze actual PPA use based on more qualitative and available measures to use as input for improving the PPA design feature selection and the organization’s translating the vision process. In the translating the vision process the company vision is translated into individual and departments guidelines of action aligned to department objectives (Kaplan & Norton, 1996). Communication and linking refers to the communication of strategy in the whole organization with individual and department objectives (Kaplan & Norton, 1996). In the tailored model the awareness of IP strategy as well as the level of department education about PPA is associated with a positive communication and linking process. In the business planning the idea is to allocate resources between projects and initiatives to succeed in the best possible way given the established strategy (Kaplan & Norton, 1996). For this study this means to analyze the departments KPIs and the business plan for efficient use of PPA. Given its iterative nature, this System Integration Model will be used as a continuous improvement model of PPA and the strategy for efficient usage of it.
4 Method
In this section the methodology of research is discussed to allow replicability of research as well as elaborate on the quality of research.

4.1 Research design
A qualitative case study approach was chosen for this study in order to quickly gain insights regarding practice, to provide relevant results and recommendations for the case company as well as a theoretical contribution. The case study was divided into four phases as shown in Figure 6.

![Figure 6 - Methodology outline for this research](image)

*Phase 1* contains a qualitative pre-study with an interpretative analysis to deductively position the identified gap in the literature to the organizational context. The results from *phase 1* were used to form *phase 2* containing semi-structured interviews in order to understand the different departments perceptions of the researched problem. In *phase 3* an action research was performed with two workshops to understand how to implement PPA and one additional management workshop to ensure validity of findings before finishing the research in conclusions and report writing in the final phase 4.

For each phase, an analysis was made and results from the first three phases were discussed with management to assess their understanding of the situation. During all interviews and workshops both researchers where present and well structured notes were taken in pre-defined excel schemes. Interviews and workshops were recorded after approval from interviewees and participants in order to minimize researcher bias and information loss.

4.1.1 Systematic combining
The methodology described above follows a systematic combining approach to research, which is an abductive way to conduct a case study. The method is aimed at developing theory and empirics simultaneously (Dubois & Gadde, 2002) throughout the research process.
Dubois & Gadde (2002) upholds that: “theory can not be understood without empirical observations and vice verca”. Opportunities therefore prevail within an intertwined process as opposed to the linear research process often found in classic research methodology. The method is coherent with a focused and smaller theoretical and empirical starting point, which will develop over time by going back and forth in unknown directions between the areas

Given the low amount of previously conducted research in the problematized area of this research, and the complex and unspecified nature of the initial problem, this method is deemed both suitable and necessary. The system combining approach explains the reason for the long process of literature study and gathering of secondary data for this research as well as the development of a tailored framework seen in section 3.3.

4.1.2 Research context
Throughout this research, researchers worked in close relationship to the case company for the full duration of the research (February 01 to June 12 - 2017). For the period of this study the researchers were appointed desks at the case company’s purchasing headquarters as well as personal computers and access to software and intranet used by the case company. In addition to the directly relevant interviews and workshops held at the case company for the purpose of this study, the researchers took place in several other company hosted events.

4.2 Literature review
In order to acquire a basic understanding for the area of research and gather the smaller theoretical base needed to start empirical studies, previous literature within the area was studied, summarized and reflected on by researchers. The previous literature gave researchers basic knowledge used to set the interviews and workshops topics.

Initially researchers searched literature on all areas and aspects of the automotive industry’s internal collaboration around aftermarket sales and protection of such. The broad starting point was used to gain an understanding of the environment and develop a theoretically anchored problem discussion. From that point on search criterias were narrowed down in parallel with the pre-study to isolate PPA and cross-functionality as key topics for this research. Literature on these topics was studied intensively throughout phase 2 and 3 of this research.

Some of the keywords used to source literature were:

4.3 Case study
The research was conducted as a single company case-study, focusing solely on one organization through the gathering of secondary as well as primary data.

4.3.1 Secondary data collection
Qualitative secondary data for the case study was gathered through the first three phases of the study. Data was most commonly found through interviewees and workshop attendees. However the case company’s intranet was also accessed allowing the researchers to find relevant data for the research.
4.3.2 Primary data collection

Primary data collection took place in interviews and workshops. The phases of primary data collection will be presented in this section.

4.3.2.1 Phase 1 - Pre-study

In order to explore and understand the problems that the studied organization was facing, unstructured, informal interviews were performed. These interviews were used to gain an empirical starting point for the continuing study. The sample frame due to access was the departments: product development, IP, aftermarket and purchasing. As the pre-study was not to be analyzed statistically the sample was not random but instead judgmental by researchers and the case company tutor to select the interviewees with the right knowledge and insights. Snowball sampling also occurred as interviewees referred to other employees that were later interviewed. Interviewees from different hierarchical levels were selected in order to grasp the general perception in the organization. The interviewees for the pre-study interviews can be seen in Table 2 along with their titles and number of interviews.

Table 2 – Interviewees for phase 1

<table>
<thead>
<tr>
<th>Department</th>
<th>Denomination</th>
<th>Title</th>
<th>Nr. Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aftermarket</td>
<td>Interviewee 1</td>
<td>Global manager</td>
<td>1</td>
</tr>
<tr>
<td>Product development</td>
<td>Interviewee 2</td>
<td>Global manager</td>
<td>2</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Interviewee 3</td>
<td>Manager</td>
<td>2</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Interviewee 4</td>
<td>Manager</td>
<td>1</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Interviewee 5</td>
<td>Buyer</td>
<td>1</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Interviewee 6</td>
<td>Buyer</td>
<td>1</td>
</tr>
<tr>
<td>Product development</td>
<td>Interviewee 7</td>
<td>Component engineer</td>
<td>1</td>
</tr>
<tr>
<td>IP</td>
<td>Interviewee 8</td>
<td>Global head</td>
<td>1</td>
</tr>
</tbody>
</table>

Because of the unstructured nature of the interviews, the questions were not defined in advance but rather developed during the interviews (Saunders, Lewis, & Thornhill, 2009). The main idea of the interviews during the pre-study was to improve understanding of how the different departments: aftermarket, sourcing, product development and IP department were working, and what hinders and potential improvements they have noticed in their work. Since there were no set interview questions, and the interviewees were speaking freely about their thoughts and opinions, they were the ones guiding the interviews. Most of the interviews were face to face but a few was conducted via Skype (telephone) because of geographical constraints. After the interviews a group presentation was held with stakeholders from different departments informing them on how the problem was understood from the pre-study to ensure that the results from the pre-study captured an actual problem within the organization.

4.3.2.2 Phase 2 - Interviews

Using the results from the pre-study semi-structured interviews were used to gather qualitative data regarding how and why different departments could benefit from using PPA and enforce the newly established IP strategy. The research problem discussion and purpose of research changed as more empirical material was gathered during interviews.

Interviewees from different departments within the case company were selected and approached. In order to gain an insight in how and why the different departments could benefit from mapping patents, maximum variation sampling was used as interviewees were selected to represent all roles and departments studied. The selection involved many of the
interviewees that had been involved for the pre-study as well. A majority of sampled and approached interviewees accepted to be part of the research and in total 20 interviews was conducted in phase 2 with case company employees in various hierarchical positions within the organization as seen in Table 3. All interviews were 60 minutes long and most were face to face, others were conducted using Skype. While time-consuming the personal approach to interviews allows a comprehensive information gathering, and relevant but sensitive information regarding personal opinions and inefficiencies is more likely to be obtained (Collis & Hussey, 2013).

### Table 3 – Interviewees for phase 2

<table>
<thead>
<tr>
<th>Department</th>
<th>Denomination</th>
<th>Title</th>
<th>Nr. Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aftermarket</td>
<td>Interviewee 9</td>
<td>Director</td>
<td>1</td>
</tr>
<tr>
<td>Aftermarket</td>
<td>Interviewee 10</td>
<td>Global manager</td>
<td>1</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Interviewee 3</td>
<td>Manager</td>
<td>2</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Interviewee 11</td>
<td>Buyer</td>
<td>1</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Interviewee 12</td>
<td>Buyer</td>
<td>1</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Interviewee 13</td>
<td>Buyer</td>
<td>1</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Interviewee 6</td>
<td>Buyer</td>
<td>1</td>
</tr>
<tr>
<td>Product development</td>
<td>Interviewee 14</td>
<td>Global manager</td>
<td>1</td>
</tr>
<tr>
<td>Product development</td>
<td>Interviewee 15</td>
<td>Component engineer</td>
<td>1</td>
</tr>
<tr>
<td>Product development</td>
<td>Interviewee 7</td>
<td>Component engineer</td>
<td>1</td>
</tr>
<tr>
<td>Product development</td>
<td>Interviewee 16</td>
<td>Analyst</td>
<td>1</td>
</tr>
<tr>
<td>IP</td>
<td>Interviewee 8</td>
<td>Global head</td>
<td>2</td>
</tr>
<tr>
<td>IP</td>
<td>Interviewee 17</td>
<td>Analyst</td>
<td>2</td>
</tr>
<tr>
<td>IP</td>
<td>Interviewee 18</td>
<td>Global head</td>
<td>1</td>
</tr>
<tr>
<td>IP</td>
<td>Interviewee 19</td>
<td>Consultant</td>
<td>1</td>
</tr>
<tr>
<td>IP</td>
<td>Interviewee 20</td>
<td>Attorney</td>
<td>1</td>
</tr>
<tr>
<td>IP</td>
<td>Interviewee 21</td>
<td>Analyst</td>
<td>1</td>
</tr>
</tbody>
</table>

Questions for each identified problem area that was found in the pre-study were designed for the phase 2 interviews. Questions were developed to extract information and designed accordingly with theory in research methodology aimed at probing the interviewee by requiring them to elaborate (Collis & Hussey, 2013). For each topic, open ended questions were therefore posed to explore the area of question and gather broader understanding and personal experiences especially from talkative interviewees. Closed questions were also asked to extract more definite or factual answers (Collis & Hussey, 2013; Blomkvist & Hallin, 2015). The predefined interview questions are found in Appendix A.

During the interviews follow-up questions were given to require interviewees to elaborate on their initial statements and extract in-depth information. These questions were both probing questions following up on a previous answer or closed questions extracting factual information (Collis & Hussey, 2013). Multiple questions in one sentence were avoided both in predefined and followup questions to avoid stressing or confusing the interviewee.

### 4.3.2.3 Phase 3 – Workshops

Workshops were conducted as a mean to gain qualitative discussions among employees in the different departments and combine their ideas and knowledge in order to archive the best solution for their department. Through phase 1 and 2 the research was narrowed down to focus on improvements in the sourcing department through IP intelligence collaboration with the case company's IP department. One workshop for each department was held as the different departments have different needs and KPIs. When the results from the workshops
had been analyzed and matched with secondary data and theory, they were presented to managers in a final managerial workshop. Given the managers’ cross-functional involvement, they were able to add their experiences to the final results and assess the initial results validity and applicability.

The 120 min workshops were started of with an educating presentation about the opposite department as well as a brief presentation from researchers of information gathered in previous phases to set the frame of discussion. The smaller workshop groups were chosen so everyones ideas could be heard and as the time was limited five/six people were invited for the two hour workshops and four people for the shorter management workshop. All groups were assessed to be diversified enough through different areas of business and/or different hierarchial levels.

The first workshop was held with the case company's IP department where global heads were present, being the ones working with the usage of patent portfolio information in sourcing. A buyer from sourcing was present to educate the employees about the sourcing process and contextualize the questions of discussion found in Appendix C. Participants in the IP workshop are presented in table 4 (Previous interviewees have been denominated with their prior denomination while new to this research have received “Workshop participant” denominations).

<table>
<thead>
<tr>
<th>Department</th>
<th>Denomination</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP</td>
<td>Interviewee 8</td>
<td>Global head</td>
</tr>
<tr>
<td>IP</td>
<td>Interviewee 16</td>
<td>Global head</td>
</tr>
<tr>
<td>IP</td>
<td>Workshop participant 1</td>
<td>Global head</td>
</tr>
<tr>
<td>IP</td>
<td>Workshop participant 2</td>
<td>Global head</td>
</tr>
<tr>
<td>IP</td>
<td>Workshop participant 3</td>
<td>Global head</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Interviewee 10</td>
<td>Buyer</td>
</tr>
</tbody>
</table>

The second workshop involved the sourcing department in discussions where participants from different hierarchial levels were selected to get the complete view of the applicability of PPA within sourcing. Similar to the workshop with intellectual propery one partipant from intellectual propery was invited to educate and contextualize the participants about the other department. The full list of participants for the second workshop is found in Table 5 and the questions of discussion are found in Appendix D.

<table>
<thead>
<tr>
<th>Department</th>
<th>Denomination</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP</td>
<td>Interviewee 16</td>
<td>Global head</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Interviewee 3</td>
<td>Manager</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Interviewee 4</td>
<td>Manager</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Interviewee 13</td>
<td>Buyer</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Workshop participant 4</td>
<td>Director</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Workshop participant 5</td>
<td>Intern</td>
</tr>
</tbody>
</table>

The final managerial workshop involved the participants in Table 6 and since all participants had been part of previous workshops, no particular education or introduction was needed. For the same reason, this workshop had a shorter duration of 60 minutes. In the managerial
workshop the raw results of the two initial workshops was presented by the researchers and discussed together with the participants.

Table 6 – Participants in managerial workshop

<table>
<thead>
<tr>
<th>Department</th>
<th>Denomination</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP</td>
<td>Interviewee 8</td>
<td>Global head</td>
</tr>
<tr>
<td>IP</td>
<td>Interviewee 16</td>
<td>Global head</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Interviewee 3</td>
<td>Manager</td>
</tr>
<tr>
<td>Sourcing</td>
<td>Workshop participant 4</td>
<td>Director</td>
</tr>
</tbody>
</table>

During the workshops, the researchers acted as group leaders, encouraging participants to discuss the topics of discussion and their reactions and feelings around them. The workshops were recorded and the participants’ discussion-notes were kept for summarizing the empirics gathered.

4.4 Data analysis

Researchers focused on non-quantifying methods of analysis when analyzing primary as well as secondary sources of data. The different purposes of the three first phases therefore resulted in three different analysis methods as outlined below.

4.4.1 Phase 1 – Pre-study

During the first phase researchers took a comprehending approach to analyzing data, acquiring an understanding for the setting, culture and study topic prior to commencing the research. For this phase the displayed data was continuously reduced to an absolute minimum and conclusions were drawn based on the data assessing the context and discussing the problem of research.

4.4.2 Phase 2 - Interviews

For the analysis of the qualitative data gathered through interviews in phase 2, a thematic content analysis was performed aiming at synthesizing by gathering empirical information in themes and matching them to the concepts of research. Themes were developed by using the tailored framework: systems integration model, applying the criterion for the different aspects when categorizing interview answers thematically taking notes of departmental and hierarchical differences. Results were thematically categorized as the empirical material was reduced following researchers’ predefined sorting guidelines (Appendix E). The different themes were linked in advance to the research questions that they were supposed to answer as seen in Table 7 to raise the validity of analysis.

Table 7 – Themes used for analyzing the different research questions

<table>
<thead>
<tr>
<th>Theme</th>
<th>Research question 1</th>
<th>Research question 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design features</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Perceived ease of use</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Perceived usefulness</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Attitudes towards using</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Actual system use</td>
<td>Used to see status and assess reliability</td>
<td></td>
</tr>
<tr>
<td>Translating the vision</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Communicating and linking</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Business planning</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Feedback and learning

4.4.3 Phase 3 – Workshops

The data gathered throughout the workshops were analyzed in a similar manner to interview data in phase 2. The data was structured under four different topics directly related to the themes and thereby indirectly related to the research questions. The structure was then used to complement the earlier thematic analysis.

Table 8 – Workshop discussion categories used when analyzing different research questions

<table>
<thead>
<tr>
<th>Category</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>What do you want from the other department?</td>
<td>Communicating and linking</td>
</tr>
<tr>
<td>What information from patent portfolio is useful?</td>
<td>Perceived usefulness</td>
</tr>
<tr>
<td>How can the information be used in sourcing?</td>
<td>Ease of use</td>
</tr>
<tr>
<td>What do you want to give to the other department?</td>
<td>Communicating and linking</td>
</tr>
</tbody>
</table>

For the purpose of this research discussions in the managerial workshop were analyzed in relation to the validity and reliability of the earlier findings. The findings of the managerial workshop itself was not reduced, presented or analyzed in detail for the purpose of this report but rather to create company specific recommendations.

4.5 Research Quality

Apart from efforts described in the methodology chapter, monthly meetings with the tutors at the case company, Luleå University of Technology and Royal Institute of Technology has helped researchers in their strive for higher quality.

4.5.1 Validity

To raise validity in research care for equal interpretation was taken when designing interview questions and a predefined template was used for questions and guidelines to ensure equal questioning. Since this study is using systematic combining the validity is believed to increase as the empiric material was analyzed using the most suitable theory. The workshops were used to assess validity in results and managers at the case company had the possibility to discuss the results from the interviews and workshops in all phases of this research.

4.5.2 Reliability

Given the single case study methodology with few interviews, certain measures were taken to raise the reliability and achieve authenticity in results. Semi-structured interviews followed a predefined template (Appendix A) containing predefined questions which were followed by open ended questions to achieve the complete picture and raise reliability as proposed by Yin (2003). Before each interview the interviewees were also given information about confidentiality and ethics of research as seen in Appendix A as well as information about the researchers’ involvement with the case company. The information was given to prevent sampling errors caused by interviewees holding back on information or lying which according to Collis & Hussey (2013) is a common threat to reliability.

4.5.3 Generalizability

For this particular case, much effort was put on gathering a comprehensive view through a comprehending phase and a syntezing phase. The problematization and methodology of research should therefore be generalizable to other actors in the automotive industry.
However the concrete results and recommendations should be seen as case-specific benchmarking/comparison material when applying the methodology on other cases due to the single case study methodology.

5 Results
The result section covers the structured empirics and analysis that was gathered during the research and used for to answer the research questions in the conclusions section fulfilling the purpose of research. For confidentiality reasons, denominations of strategic initiatives and company specific terms in the quotes have been altered.

5.1 Current IP environment in the case company
After the pre-study researchers could conclude that there are a lot of strategic measures in place to create the desired efficient case company organization. Inter- and intra-organizational collaborations around initiatives and models have become increasingly important and more focus is aimed at such. Furthermore, a strategic initiative to develop and use more IP within the studied organization had also been launched.

The initiative involved new strategy affecting existing departments in different ways, as well as a completely new global department focusing solely on IP matters. The new IP strategy involved removing much of the previous department focused IP tasks, replacing them with the global IP organization’s tasks allowing them to work proactively throughout the case company (Bördin, 2016). While an extensive strategic work had been done by the IP department, the department and strategy was still under buildup especially in relation to less traditional and innovative usage of IP.

One of the more important strategic changes was establishing what values the case company should extract from the usage of IP. These values were combined in a model illustrating what should be used for throughout the organization. The case company concluded similar values as many other organizations, including the protection of inventions in terms of manufacturing and selling them throughout their entire lifespan. The potential to drive better negotiations in sourcing was also seen and the case company acknowledges the bargaining power value of IP through their new initiatives and models.

To administer the usage of IP within the organization, the case company's IP department was asked to proactively take part in development and sourcing projects and aligning interest while maintaining a business focus. One of the main tools available to the IP department to fulfill this duty was found to be PPA software and human resources to use such.

5.2 Patent portfolio analysis in the case company
Below the thematic analysis of interviews in phase 2 is presented. The interviews in the second phase was built on the pre-study as explained in the methodology and the empirics in the following section builds on that of the prior section.

5.2.1 Design Features
The PPA software available to the case company is well in line with current trends of PPA that are presented in literature by Suominen et al. (2017). The software selection was carefully made as explained by interviewee 19: “We did a comparison of available software for PPA, and while the selected may not be the best one in all aspects it was preferred looking at all aspects together”. Because of the rigorous software selection it contains many of what Fabry
et al. (2006) explained to be essential features for searching and analysing the patent environment. Such features involved the sizing of- and trends of- patent portfolios of organizations or in entire markets. Features also involved determining the quality of patent portfolios through different indices as described by Fabry et al. (2006). There are six different purposes to the work that we do” (Interviewee 17). The features were evaluated against the values that IP should bring to the organization, establishing specific purposes for PPA within the case company and ensuring the software features compliance with these purposes. The amount of available features developed externally by Patentsight and Patbase Express places the software aspect of using PPA within the organization into the framework definition of design features (Davis, 1985).

The interviews confirmed that the selection of software and the selected software’s features are highly relatable to the usefulness within the organization and the purposes that the organization can rely on the IP intelligence function to fulfill. In the case company the sizing and trend features of PPA was for example seen as an enabler to establish the relative strength of the case company’s IP portfolio when suppliers are evaluated.

In the case company, many of the features such as the trend feature are still being piloted through application in different projects to establish what can be achieved by IP intelligence. This process is seen as verifying the iterative nature of the systems integration model as the organization seeks to extract usefulness across departments. The model allows a set of selected features to be used for the organizations purposes through the TAM stages. Furthermore the selection of features can then be modified for the next project to fully extract the true benefits of PPA in the different departments, similar to what is seen in the case company.

In several interviews the limited access and difficult distribution of PPA was discussed as seen in statements such as “The software is too expensive for everyone to have” (Interviewee 21) and “We have looked into read-only accounts to distribute reports to other departments” (Interviewee 18). The knowledge within the IP department about the available features is estimated to be good throughout the hierarchy of the department, however unknown of in other parts of the case company. This is expectedly due to the restricted software access which is estimated to be a key point to the usefulness of features in the organization. The numbers of available features that are transferred to the different departments are seen as a function of access, and based on interviewees answers, cross-functionality is partially hindered by the restricted access which often comes with high software costs.

5.2.2 Perceived Ease of Use
Davis (1985) discusses how the perceived ease of use will measure the direct ease of using the features to extract useful results. It might be easy in terms of having an overview, but much harder due to needed expertise and risks, as more quality in analysis is looked for as explained by the following quotes: “I need help from engineers to truly understand the context of analysis and get good results” (Interviewee 17) and “Getting an overview is fairly easy, however zooming in on a specific context and yield useable results is harder” (Interviewee 18). Interviewees from the IP department also raises an important aspect of risks in using PPA because of the material being difficult to interpret: “If information is misinterpreted it may very well illuminate all the usefulness of patent portfolio analysis” (Interviewee 21). The risks covered in theory concerning PPA are more related to the potential overwhelming nature of data, and difficulties in conducting the actual analysis (Fabry
et al., 2006), however very little previous research has been done on the business aspect of PPA where such risks would be identified.

Many of the interviewees from the IP department presented features and discussed their useability, however no complete list or mapping of features in relation to usefulness in different departments exists but rather a notion that all projects require different features as stated by Interviewee 21: “Every case is different and there is no way of knowing what will be useful beforehand”. This notion is expected to be reducing the perceived ease of use as a detailed search and selection process of features needs to be done for every project which is a time and resource consuming process, contradictory to theory stating that PPA is becoming easier and more qualitative as a process (Suominen et al., 2017). It is deemed likely that a mapping of features and previous usage would allow the features to be more easily accessible and their perceived ease of use higher.

While employees within the case company’s IP department reflect the direct ease of use of features as they are the ones using Patentsight, the indirect ease of use coming from the difficulties around the direct use (Davis, 1985), or in this case the cross-functional collaborations with other departments is of particularly interest for the research questions. Interviewees from other departments are found to have little previous experience with PPA: “Do you have any example of such analysis?” (Interviewee 3). The absence of PPA in sourcing processes is likely due to the recent implementation of the IP department, however the absence has seemingly created a false notion of difficulties in using PPA. That perceived difficulty is however not seen in product development where more analysis and collaboration effort has taken place.

Davis (1985) also mentiones the indirect influence of the organizational system on the perceived ease of use, which is seen during the interviews with other departments as difficulties in communication between department often arising from the lack of knowledge about the other departments processes. These difficulties in communicating about, demanding and presenting PPA may sometimes following the theory by Davis (1985) result in features never being used despite usefulness being larger than difficulties or costs of using the same. This is seen as a significant barrier that needs to be focused on to facilitate cross-functional ease of use. This barrier will likely be reduced over time as the new IP department settles into the organization.

5.2.3 Perceived Usefulness
The perceived usefulness of PPA has been debated in literature to be high, however not quantified or specified in relation to different organizational entities. Given the increased filing trend and patent focus of organizations (WIPO, 2016; WIPO, 2017), and the improvement of technology the usefulness is also expected to increase over time. Through analysis of the empirics gathered for this research it was evident that all interviewees saw usefulness in PPA that was easily anchored to the values that the case company seeks to extract from the technology. IP intelligence can therefore be said to be useful to the overall strategy and goal of the organization: “The IP value models summarizes the organization’s overall ambition with IP, and IP intelligence is a part of achieving those goals” (Interviewee 17).

The product development department found the traditional protecting of innovation aspect of using PPA to be the most important, and both the IP department and the product development department have seen similar usefulness, where the main usefulness is perceived to be patent
portfolio mapping’s power to visualize technology trends of market competitors and suppliers. Based on established trends, product development can help the case company to stay competitive as explained by interviewee 2: “We monitor competitors’ patent activity to see what others are developing and stay competitive”. The trend analysis is believed to be particularly useful in the automotive industry product development, as development cost are high (Sturgeon et al., 2009) making alignment and efficiency in development more important: “Patent portfolio mapping could be used as inspiration for our development of patents” (Interviewee 7). The long product lifespan (Johnstone et al., 2008) is believed to mitigate the problem seen in literature with the 18 month delay between patent filing and publication that commonly reduces analysis usefulness around fast moving technology (Fabry et al., 2006).

The protection of innovation aspect is raised in relation to aftermarket along with the need for more bargaining material when discussing the mapping of suppliers’ patents in particular with the IP, sourcing and aftermarket departments. The low amount of previous usage of PPA in these areas and the indirect use through cross-functional relationships with the case company’s IP department makes perceived usefulness different in the IP department compare to other departments. The main usefulness found in the sourcing and aftermarket departments relates to insight about suppliers which could potentially “give a new dimension” (Interviewee 10) by knowing their main technology focuses and trends. The case company’s IP department explains that this can be done using similar features as for product development, but focusing selection criteria on suppliers. Information from PPA could likely also be used in negotiations to get better prices and reach sourcing KPI’s: “It is important to understand who own the idea in the beginning. If we have time we can create ideas which compete with suppliers and thereby can negotiate about price” (Interviewee 12). Analysis of trends and size of supplier patent portfolio can also help determining supplier hostility, similarly to what was seen by Fabry, et al., (2006), which would be useful when evaluating suppliers for selection in a long term business perspective.

The aftermarket department upholds a particular usefulness of continuous patent portfolio mapping of suppliers, as it could help find potential threats to the aftermarket, and reasons for increased cross-functional collaborations between the IP-, aftermarket- and product development- departments. The usefulness of such continuous analysis would likely increase when applying the system integration model as it would allow the selection of features and the perceived usefulness of to change over time and with a new strategy.

Previously unknown suppliers can also be found using PPA and this use is found to be particularly interesting according to the IP department. The motivation for the perceived usefulness is said to be the difficulty in acquiring the same information from other sources, and the ease of use of this particular kind of analysis. The perceived usefulness around this feature further enforces the system integration model as a suitable model as the causal relationship between perceived ease of use and perceived usefulness described in theory by Davis (1985) is seen in the empirics.

5.2.4 Attitudes towards Using
When analyzing the attitudes towards using PPA, it is clearly a function of perceived usefulness/ease of use as stated by Davis (1985) since skepticism/positivism around these themes is transferred into attitude toward using for the individual employees that were observed. Employees in the IP department and those in higher hierarchical positions of other departments have more insight into PPA and are thus more nuanced in their attitudes towards using as can be seen by the difference between the following quotes: “I think PPA should be
an option to every project” (Interviewee 6) and “PPA should be used in sourcing, but each case is different and a careful assessment of the situation is necessary” (Interviewee 8). However all interviewees welcomed more education around the counterparty in departmental collaborations, which should if followed create a stronger and more nuanced attitude towards using.

While the general attitude towards using the technology is good and in some cases extremely good: “I contacted the IP department last week concerning a sourcing case as I need IP help concerning the case” (Interviewee 13) reluctance is partially found around indirect use with motivation in difficult communication and in direct use referring to the risks of miss-/over-interpretation. With the system integrations model this is believed to change from project to project, and as the IP organization is still new to the organization the equilibrium is likely not established yet. No particular difference in the attitude toward using could be seen between the departments despite some individuals in each being more/less positive. The generally positive attitude implies a readiness for cross-functional PPA use (Davis, 1985).

5.2.5 Actual System Use
Through the empirical material it is evident that little PPA has been done in relation to sourcing, and that focus has been on product development which has received more analysis by the time of research. Interviewees from product development mention analysis done both internally in the previous organization and through the established IP department in the new global organization. The interviewed sourcing and aftermarket departments have not seen such analysis as of now. Researchers estimate the total system use to be low; however the IP department clearly explains that PPA is still under piloting for the different departments. This explanation is coherent with the iterative nature of the system integration model. Actual system use should increase over time with more IP related strategy and new projects.

5.2.6 Translating the Vision:
In close cooperation with the case company, the overall business vision; to raise gross profit and shareholder return was transferred into IP use tailored for cross-functional use with help from the consultancy firm Konsert Strategy & IP (Bördin, 2016). “We were involved from the start helping with the design and implementation of the new business oriented IP organization” (Interviewee 19). The cooperation created the foundation for translating the vision, by developinig a framework that is seen in Figure 7.
The framework prompted a development of the IP value models as well as a business structure that was implemented in the case company where each technology area received a portfolio head responsible for a part of the IP plan. The portfolio heads gathered critical business input that together with IP intelligence was supposed to form the operational IP plan: “We are still a new organization and we are still building the IP plan” (Interviewee 8). The importance of a clear IP plan was argued to be particularly important for the new global organization, as collaboration with suppliers that are also supplying to other actors and directly to the aftermarket.

The majority of the work concerning the translation of the vision as described by Kaplan & Norton (1996) is conducted by the IP department in cooperation with higher hierarchical employees from other departments: “The IP plan is developed together with the global technology managers” (Interviewee 8). The cooperation with other departments is supposed to make the IP plan more operational and more in line with the other departments’ objectives if following Kaplan & Norton’s (1996) advise. The IP plan is structured into different technology areas, focused on developing and using IP cross-functionally according to the case company’s core values, involving prioritizing among focuses to fulfill the IP value models in the best possible way.

While the IP plan fits into Kaplan and Norton’s (1996) definition of translated vision, it is far from done with respect to some areas: “We haven’t got that much for sourcing yet, I know that another portfolio head has gone further” (Interviewee 8) and the IP plan in itself is long and partly abstract which makes it hard to use an operational plan (Kaplan & Norton, 1996): “The IP plan is hundreds of pages, you won’t get any wiser by reading it” (Interviewee 8).

The IP plan is however an important management tool which helps the IP department to understand the organization’s priorities regarding IP related matters and how to allocate their resources efficiently. However, the IP plan is not set up as an operationally guiding document since each project face different challenges and therefore the information need to be extracted and interpreted differently, which require expertise in the area. While the overall strategy is
there to extract the full usefulness, there lack of a clear operational guidelines could limit the usefulness of PPA in the different departments.

The case company’s IP plan is updated yearly which is in line with the theory motivating the use of the systems integrations model. An active empirical finding supporting the system integration model was that the IP plan needs to be continuously updated with the development of PPA capabilities to truly extract the benefits of such: “It’s important to connect the industry use of PPA to theoretic development and the contrary” (Interviewee 19).

5.2.7 Communicating and Linking

Since the initiation of the new IP organization, the IP department has been focusing on translating the vision through creating the strategy: “The portfolio heads have been working hard creating IP plans for their segments and the organization is still new” (Interviewee 20). The IP department’s ambition was to commence communicating and linking the strategy during development, as stakeholders from different departments such as the global technology managers took part in the IP plan development. The communication was supposed to create awareness as well as a direct link between the IP strategy and the objectives of different departments to facilitate cross-functional collaboration around IP. The link between strategy and departmental objectives is seen as very important in literature (Kaplan & Norton, 1996) and empirics: “All departments see different advantages in IP based on what they do and how they do it” (Interviewee 15).

Researchers have found that much focus has been put on developing the product development and aftermarket aspect of the IP plan, while less effort has been put on aligning the strategy to the objectives of the sourcing department. As a result, communication and linking has gone further for product development and aftermarket than for sourcing which is seen in interviews. The closer involvement of product development in the strategy building process, and the lack of education of the IP department about the other departments’ work are believed to be contributing to the difference in alignment and progress of strategy. The tendency may create barriers for efficient cross-functional collaboration if the IP plan is not sufficiently linked to the all the different departments objectives (Kaplan & Norton, 1996).

Communication and Linking efforts have been made by the IP department by establishing business partners within the organization: “Today we rely on information spreading from educated parties within the department, like circles in water” (Interviewee 19). The IP department has also tried to be an active part of projects, providing education to involved stakeholders in all departments to communicate the IP plan and IP values of the case company in the different departments. All education found by researchers has been in presentation form, and no written education material concerning IP or outlining the IP strategy has been found. The reason for that medium of communication has been said to be the complexity and confidentiality of the IP strategy: “the IP plan is confidential and I doubt that I will be able to let you read it” (Interviewee 8) along with the importance of tailoring the information to the different departments: “Every project requires different information, I usually start the project by educating them about IP and IP intelligence” (Interviewee 21). The motivation in complexity/confidentiality is seen as a barrier in need of mitigation by better translating the vision or limiting access to certain to the receiver applicable areas as suggested by theory (Kaplan & Norton, 1996). The second motivation of differences between departments is anchored in theory as objectives are different, but seen as a problem given the low amount of IP department resources to educate every project and the high staff turnover in the sourcing department making educational synergies between projects small. Researchers have seen a
tendency that education in the product development department has been better than for other departments, involving the creation of patents and directly relatable tasks, while sourcing has received a similar education and believes it to be too general and not applicable to their context: “I have seen his presentation three times, we need to know what we can use IP intelligence and IP for in sourcing” (Interviewee 3). The applicability and quantity of education is perceived to be a barrier towards communicating and linking the vision.

Looking at the current awareness within the organization differences between and within the departments are noted, which relate to the described barriers. Within the IP department there are different opinions concerning how well their work and the IP strategy and usage of IP is known throughout the organization which is seen in the following quotes: “The organization has relatively low awareness of IP, and the usage of such throughout the organization” (Interviewee 19) and “The other departments understand what we do” (interviewee 17). The general notion within the IP department was however that much work is left in the communication and linking process which is also seen throughout interviews with the other departments: “I want more education on IP. We need support from IP department to know where to go. And this should be focused on.” (Interviewee 6). Studying the different departments, researchers found that the awareness around IP values and the IP plan in relation to department objectives was much better in product development than in sourcing, and better in higher level of the hierarchy than in the lower levels. The IP plan is significantly less known in the organization than the IP values, which is seen as a reason for concern as it is the operational plan that is supposed to link IP to the different departments’ objectives.

5.2.8 Business Planning

Analyzing the empirical material gathered in relation to the business planning of the organization, the system integration model is enforced as the barriers and shortcomings in communication and linking has limited the business planning of the different departments in relation to IP. While all investigated departments believe that the IP department and PPA are involved too late in the process: “PPA should be used early in the supplier selection process” (Interviewee 13), the product development department is the only one where such involvement is commonly seen: “I mostly encounter patent related issues early in the development process” (Interviewee 15). The timing aspect of business planning is found to be a barrier to using PPA, as the late involvement reduces the IP department’s ability to perform good analysis as well as the usefulness of the analysis in the process. The systems integration model’s relation to perceived usefulness and business planning, is expected to aid reducing this barrier, as the correlation between usefulness and timing is made clearer.

Resource allocation is discussed by Kaplan and Norton (1996) as they debate business planning, and looking at the current resource allocation researchers found that PPA resources are allocated based on portfolio heads assessment of different projects: “We cannot keep in contact with 100 000 employees or 10 000 engineers but instead the portfolio heads select the project which we should focus on” (Interviewee 21). However there is difficulties for a couple of employees to keep track of every project, and as today’s communication between the project and the portfolio head goes through a project leader commonly located in the product development department, they have historically received more resources than other departments. Improved contact points between the departments are believed to be important for a cross-functional relationship to work in relation to allocation of resources, but only after the communication and linking aspects have been fulfilled.
A common opinion found was that the departments’ KPIs should be altered to positively reflect cross-functional collaboration around IP when it’s in line with the overall vision of the organization: “I think clear KPIs are good to focus on the right things and improve efficiency” (Interviewee 17) and “We need more overall business KPIs in sourcing where IP efforts are reflected” (Interviewee 13). While most employees in the sourcing and IP department agree that their current KPIs are non-optimal or insufficient, most uphold that the risk of applying additional KPIs would be focusing too much on quantitative work, thereby lowering quality or flexibility which is seen as essential for the usefulness of PPA in the organization.

Despite many interviewees having opinions about resource allocations and business planning, it is worth noticing that the limited amount of communication and linking seen in the previous section will make business planning difficult as described by Kaplan & Norton (1996). Such will likely also be inaccurate, which is seen in terms of very general empirics concerning IP related business planning given from interviewees.

5.2.9 Feedback and Learning:
Since the IP vision is not fully translated, communicated or planned according to in the different departments, the collaborations among department around IP has been limited. In the existing collaborations there has however been feedback meetings and email correspondence regarding cross-functional collaborations around PPA. The feedback has so far contained information of qualitative nature about the usefulness of information and recommendations for changes in the IP department’s delivery. The feedback information included what knowledge was gained, how the information would be considered in the supplier selection and if the department would like to have this kind of information on a more regular basis among other things. The feedback evaluated the process, the information as well as the alignment with the department objectives and goals.

Despite not being fully comparable with the financial measures that Kaplan and Norton (1996) promoted, the information is believed to be all the currently measurable given the different departments KPIs. This notion is enforced by all hierarchical levels of the project and all involved departments were taking part in the feedback meeting. The attendees of the studied feedback meetings were one Global Head, a patent portfolio analyst, a sourcing buyer, a commodity manager, a portfolio manager and systems and components team leaders which in total gives the information high credibility. The meeting and email correspondence were summarized and sent both to the higher hierarchical levels in all departments which are a part of translating the vision, but also to the analysts conducting the PPA, thereby validating the systems integration model.

5.3 Improvement of intellectual property usage in the case company
Interviewees from product development and aftermarket were found to be more aware of the organization’s IP strategy, and product development also stated that the collaboration with the IP department is already working well which is wonderful. Sourcing however had limited knowledge about the IP strategy and had never seen a PPA in use, even though they had high expectations on the perceived usefulness.

Looking at the system integration model in the sourcing department, qualitative design features of PPA exist as well as high perceived usefulness and attitudes towards using but no actual PPA in use. Looking at the barriers, the reason is likely that the IP strategy has not been communicated in such way that a business plan incorporating IP could be formed. According
to the system integration model, clear business planning is needed to use PPA efficiently in the organization and the lack of usage therefore verifies the model. During the workshops the main barrier found in interviews were the communication and linking where the discussion concluded that the sourcing department and IP department needs to understand each other’s processes better in order to have the correct picture of the actual usefulness. Both workshops concluded that there needs to be better and closer operational communication between the departments, through ideas such as for example “Ticks in a box in order for sourcing to remember contacting the IP department when necessary” (Workshop 1; Workshop 2). Some ideas as the one just explained were assessed to be easily implementable and would directly impact the business planning process positively by facilitating operation around PPA. Other ideas as for example: “Notification any time a supplier raises patent” (Workshop 1) or “Sourcing calendar to keep track of sourcing steps in overall project flow” (Workshop 1) might take more time to implement and needs more analysis to make sure that it impacts the communicating and linking process in the best way.

The workshops themselves also affected the communication and linking process positively by raising awareness in sourcing regarding the IP strategy and providing concrete examples of previous usage of PPA within sourcing: “This was really good information, we learned a lot” (Workshop 2). Additionally the communication and linking process was affected positively by raising awareness in the IP department about the sourcing process. The increased awareness hopefully help the IP department to lower many of the barriers seen under translating the vision and communicating and linking and aligning the IP plan to the sourcing departments objectives where applicable: “We learned a lot and would like to know more about the sourcing process” (Workshop 1).

In workshop 1, after the portfolio heads were introduced to the sourcing process there was a qualitative discussion regarding the perceived ease of use of PPA where they all agreed that the information could be used differently “Depending on circumstances, each case is different” (Workshop 1) and that the perceived ease of use and perceived usefulness is also dependent on the case. During workshop 2, after the presentation containing earlier usage of PPA in sourcing, a qualitative discussion followed concerning the perceived usefulness. The main usefulness was found to be “Compare our competitiveness against suppliers” (Workshop 2) which match the ideas that product development mentioned during the interviews: “We monitor competitors’ patent activity to see what others are developing and stay competitive” (Interviewee 2). Discussions in workshops regarding the usefulness and perceived use was not found to yield any particularly interesting results as hoped when conducting action research, however this is likely due to the communication and linking process not being finished, making detailed discussions around actual use of PPA difficult.

The goal with the management workshops was to ensure validity and reliability to the proposed actions, and relate them to the overall case company business case and financial measures. The management workshop was also used to allocate responsibility areas for future actions between the different managers to start using the system integration model within the organization. During this last workshop all managers agreed on the key findings, promoting reliability of the research. The proposed and empirically motivated actions to solve the problem of research involving the use of more PPA within the case company was also acknowledged, which by researchers was seen as a sign of validity.
6 Discussion and Conclusion
In this section the results are discussed to answer the two research questions that were formulated in the beginning of the research. The fulfillment of the purpose of this study by the answered research questions is also discussed.

6.1.1 RQ1: How can the barriers of using patent portfolio analysis as a cross functional tool within the automotive industry be reduced?

Several barriers for using PPA cross-functionally were identified throughout the analysis of empirical material. Among them was the direct/indirect perceived difficulty of use and lack of strategic readiness to use the technology throughout the organization which according to the developed systems integration model is found to hinder efficient use of the technology.

The information from PPA could be difficult to demand, understand and distribute. In order to produce high quality analysis and reduce the risk of misunderstanding, education and practice is needed along with stronger cross-functional collaborations. A trend toward lower barriers with more use is also observed and researchers believe that feedback from previous projects should be used to create synergies between projects and lower the barriers for using PPA in the organization.

As of today sourcing has little experience regarding how to use information from patent portfolio analysis, and since the information could be interpreted differently depending on circumstances, it might be necessary to ask for expertise in the beginning. Product development on the other hand is found to experience lower barriers in the indirect use and thus may not be in need of the same expertise when taking advantage of PPA. In order for the different departments to understand when and how to ask for expertise, it is believed important to have clear frames and guidelines for when to ask for expertise. To properly pursue PPA the department in question needs time to understand the specific case and use the information. The main barrier is found to be the late delivery of PPA to the projects. It is therefore important for the department to include the IP department as early as possible to establish the cross-functional collaboration.

The effort and resources for translating the vision into department guidelines of action resulted in detailed IP strategy for each department. These guidelines need however to become more accessible and communicated into personal and departments objectives according to the system integration model. The reason for this is in order for the vision to reach all the departments, lowering the established strategic knowledge barrier and motivate them to request and use PPA. The idea of spreading knowledge as circles on the water is good but is not seen efficient enough since it might not reach everyone, being offset by for example staff turnover. By including IP usage in KPIs, departments like sourcing which are normally strictly measured by KPIs might also be more willing to include PPA in their daily work and taking the IP aspect into consideration.

6.1.2 RQ2: How can the information from patent portfolio analysis be used in different departments?

PPA was found to be useful in all studied departments of the organization and when elaborating on the usefulness the following was found. PPA could by comparing suppliers’ and competitors’ patent portfolios provide a good picture of the competitive and collaborative
landscape. The analysis can thereby help in the process of securing exclusivity of important products by analyzing technological focuses and changes of the surroundings making prioritization and selection of development opportunities easier for the product development department.

PPA could likely also increase the company gross profit by protecting innovation and thereby securing the aftermarket sales through keeping track of suppliers’ technology movements and analyze their potential aftermarket hostility. Finally PPA is expected to improve supplier agreements thanks to an increased bargaining power derived from an information advantage in the sourcing process. The information advantage could for example come from analyzing the market size and trends, which in turn can indicate which actors are competitive and in which areas. It could also help finding new interesting actors in the market. The possibility of finding unknown actors in an easy way is perceived as particularly important since it can reduce costs through more sourcing alternatives.

Many aspects are found to be critical to the usefulness of PPA such as software selection providing a certain set of features as well as how well the vision is being translated into guidelines for the different departments. PPA is found to help in relation to choices containing IP, and clear focuses for the different departments in respect to IP is therefore crucial for the perceived usefulness and how the information will be used. The usefulness of PPA may change over time, and it is therefore important to allocate resources for feedback and learning in order to improve the outcome from PPA continuously to increase competitiveness through the use of PPA.

6.1.3 Patent Portfolio Analysis: A cross functional tool
PPA has shown to have positive impact on several departments in the studied company and it therefore seems logical that it also could be used cross-functionally to reach a company’s main goals; increase gross profit and be competitive in the market. Implementing PPA is not easy and there are several steps to consider, as explained by the system integration model, but by following these steps the technology and strategy is continuously improving and the outcome also improves with the processes. By using the model and staying ahead of technology it is believed that much cross-functional usefulness can be reaped from PPA.

6.2 Theoretical contributions
The system integration model proves that it is possible to use TAM and the managing strategy processes in other contexts, such as combined as a management tool which takes both the technical and strategic parts into account. The TAM has therefore once again proven to work outside of its initial usage of software development, and the managing strategy processes have proven to be useful not only to implement the balanced scorecard but also for anchoring other management tools in strategy.

The system integration model furthermore validates the theory by Davis (1985), that TAM is correlating and affecting the surroundings of the technology. The application of the system integration model on the case company furthermore shows that it could be used to analyze and improve collaborations in cross-functional teams. The integrated model could help organizations to archive better understanding of the benefits and barriers with IP and PPA in cross-functional cooperation, and how to work with this efficiently, which is closing the previous gap in literature seen in the background.
Looking at PPA in particular this study has also validated the usefulness and trends seen by Suominen et al, (2017) and Fabry et al, (2006) finding the same usefulness in the product development department and new ways of using the same information in regards to bargaining power in the purchasing department.

6.3 Practical contributions
After studying the use of IP during a period of four months at the case company, gathering extensive knowledge and ideas from employees in different departments and hierarchy levels, the researchers would now like to share some final reflections and recommendations with the case company for future actions.

When looking at PPA cross-functionally including the aftermarket, product development, IP department and sourcing department the main barriers for using PPA within the organization is seen between sourcing and the IP department. In order to reduce these barriers, the suggestion is to increase awareness regarding each other’s departments, and use this awareness to commonly focus efforts towards the organizational overall success. To do so, PPA can be used to extract multiple IP values and thereby also benefiting the collaborating departments. The recommendation is also to set clear contact points for each sourcing buyer, including guidelines for when to include the IP department, have a close relationship with the IP department and continue working with the feedback and learning process.

The above recommendations are based on the usage of the system integration model which has worked well for the researchers in analyzing the current state of the case company. Researchers therefore recommend the case company’s management team to continuously map the organizations situation in the system integration model and use its iterative nature to develop technology and strategy in parallel with regards to using PPA cross-functionally.

6.4 Future Research
This study shows that the model is applicable at one company in the automotive industry, and for future research it would be interesting to see if PPA could be used as a cross-functional tool in other industries and for companies with other prerequisites. It would also be interesting to investigate whether the system integration model could be modified to suit implementing and improving other technologies.

By studying an organization which has already implemented PPA in purchasing, extraction of actual usefulness is believed possible and would be seen as benefitting to both theory and practice. Last but not least it would be interesting to study how PPA could be used in other parts of the world where other conditions apply, and to draw conclusions on what conditions are determining the usability of PPA.
Bibliography


Case Company Employee. (den 01 02 2017). (J. Asp, & A. Grapengiesser, Intervjuare)


Appendix A – INTERVIEW GUIDELINES / QUESTIONS

Interview guidelines
Thank you for taking your time to participate in this interview.

The aim of this interview is to gain an understanding for how the case company is working with IP throughout different departments and to develop a more efficient use of IP. This interview forms a part of a master thesis project. The interview will take around 60 minutes.

The participation is voluntary. At any point in time you can choose to discontinue the interview. All the data will be treated as confidential. The participation is anonymous and you will not be mentioned by name in any documentation. Only the interviewers will have access to the interview material.

Further, you data will be shown with no connection to the case company before being approved by the case company. To help us handle the interview material this interview will be recorded with your permission. Is it ok for you if we record this interview?

What is your position/role in the organization?
Years at the organization?
Previous positions?
Department’s main KPI?
Department’s 2:nd KPI?
Opinions concerning these KIPs?
Any suggestions for better KPIs?

Have you had any case company organized education about Patents?
Have you held courses for other departments? Explain
Are you aware of the organization’s IP Strategy?
What would you say are the organization’s goals in terms of IP on the larger scale?
What does the case company use patents for?
What would you say are the organization’s goals in terms of IP for your department?
In what area of your work do you mainly come in contact with patents?

Do you use patents portfolio mapping today?
Who do you map using patent portfolio mapping? Where is focus?
What would you say is the main reason for using patent portfolio as of today?
Is the patent portfolio mapping process easy?
How often do you use patent portfolio mapping?
What potential improvements could be done to make this process easier?
Do you think that a patent mapping of suppliers could help reaching your goals? If yes, how?
What patent information/patent portfolio information would be useful for your department?
Do you know any analysis method for PPA?
Would it be suitable for your department?
In what format would you prefer to have the patent portfolio analysis results presented? By whom?
Does it exist?
Do you think you would use it if it existed?
What platform would you prefer to find the analysis on?

## Appendix B - LIST OF PARTICIPANTS

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<tr>
<th>Department</th>
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<th>Title</th>
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Appendix C – IP WORKSHOP

- What is your desired delivery for sourcing?
  - What, when, why and how?

- What information do you need from sourcing?
  - What, when, why and how?

- Relationship responsibilities?
  - Who is responsible for doing what?
  - Present three main responsibilities for each department?

- When, how and why should this information be used in sourcing in relation to the organization’s IP value models?

- What risks exists when using this material?
Appendix D – SOURCING WORKSHOP

- What information do you want from the IP department? What, when, why and how?

- What information can sourcing provide to the IP department? What, when, why and how

- How could patent portfolio analysis be used in the sourcing process? What basis of selection/negotiation does it provide?

- In what part of the sourcing process would patent portfolio analysis be most valuable?
Appendix E – THEMATIC SORTING GUIDELINES
Case specific sorting criteria for the different themes of the tailored framework “system integration model” is outlined below.

**Design Features:**
- Features of IP Intelligence (presence of analysis?)
- How the selection of features is made?

**Perceived Ease of Use:**
- How easy the information could be used in sourcing?
- How should the information be presented and used within the organization?
- Who does the information need to pass through to reach the final user?

**Perceived Usefulness:**
- What information from PPA was perceived to be useful information in the sourcing process?

**Attitudes towards Using**
- If sourcing buyers would use the information from PPA if existing?
- If the IP department would like to prioritize/help sourcing with PPA?

**Actual System Use**
- What IP intelligence has previously been done in the organization?

**Translating the Vision:**
- How the case company’s vision of IP is interpreted to different department's guidelines and activities?
- How the IP plan is structured and created? How IP value models are derived, are they suitable? Good? Need of change?

**Communicating and Linking**
- Level of Awareness (communicate IP vision and Values)?
- Presence of education?
- Communication between departments?

**Business Planning**
- How the resources are used and how they should be used most efficiently
- Are existing KPIs’ good?
- Do you see any potential improvements of KPIs’?
- IP the IP department an active part of sourcing process?
- Where does the process need to be changed? When, what how in daily work?

**Feedback and Learning:**
- Have you reached the KPIs?
- What potential improvements can and should be done in order to use PPA (IP intelligence) efficiently?
- How does the feedback system work?
- Email correspondence?