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Patent Management and Social Software

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Abstract

The worldwide increase of patent applications and the important role patents play in economic development make the management of intellectual property (IP) an important area for many companies. At the same time, the complexity in decision-making and IP process management necessitates a high degree of collaboration between various enterprise divisions such as strategy and policy making and market research. In this paper we present an ongoing case study at a large international automotive manufacturer that is exploring the potential of social software to support patent management. We conducted 31 semi-structured interviews to identify relevant patent processes at the company as well as typical operational problems within these processes. This leads us to derive four propositions on how social software can support patent processes. We conclude by providing an overview of the next steps in our research project. Our results present a first step in understanding the role of emerging social software services in enabling collaborative patent management.

Keywords

Social Software, Patent Management, IP, automotive, Innovation

INTRODUCTION

The topic of this work-in-progress paper is the support of patent management practice with social software. Patent management is a topic of great interest and relevance in today's knowledge and technology-intensive economy. Enterprises worldwide react to perceived increases in technological diversity, product complexity, competition as well as shorter product life cycles by paying more attention to and putting centre stage the development of their knowledge resources (e.g. Corrado et al. 2006; Hall 1993; Haskel and Marrano 2007). The growing importance of intangible assets is also shown by the worldwide increase in patents during the past 20 years (Fink 2011) and the important role patents play in economic transfer and development (e.g. Hall and Helmers 2010).

Within the wider scope of managing knowledge resources, the management of intellectual property (IP) is an important sub field. Enterprises have several means to benefit from new knowledge development and innovation efforts. In addition to claiming and protecting intellectual property (IP) rights through patents (e.g. Arora et al. 2001), there are other strategies like nondisclosure, the exclusive use of complementary goods (Teece 1986) or time/cost advantages (Manfield 1986). In technical enterprises in particular all decisions and processes dealing with IP converge in the management of patenting activities. Therefore, most established management approaches that deal with IP concentrate on patent management activities (Burr et al. 2007; Gassmann and Bader 2010; Harhoff and Reitzig 2001). A patent can be defined as a territorially, factually and temporally limited exclusive right for the use of an invention (e.g. Gassmann and Bader 2010).

The high complexity in patent management processes and decision-making causes several problems and difficulties. Firstly, the value of patent rights is difficult to measure and predict (e.g. Griliches 1990; Harhoff et al. 2003; Ziedonis 2004). Secondly, patent managers have to consider possible future exploitations, such as selling patents (e.g. Rivette and Kline 2000) or licensing (e.g. Heller and Eisenberg 1998; Zander and Kogut

1995). Thirdly, there are several other appropriation mechanisms, which means that the opportunity costs of patenting in contrast to other means such as nondisclosure have to be kept in mind (e.g. Anton and Yao 2004; Bhattacharya and Guriev 2006; Moser 2011). Fourthly, in addition to these more or less internal factors, external factors such as potential activities of competitors (e.g. Harhoff and Hall 2011; Hunt 2006; Wright 1983), the role of the patent office and the strength of the patent system (patents are only feasible and valuable if they can be enforced (e.g. Harhoff and Hall 2011; Shapiro 2010) have to be taken into consideration (e.g. Denicolo and Halmenschlager 2010; Hall and Ziedonis 2001; Lerner 2002). Together this complexity necessitates a high degree of collaboration and cooperation across many parts of the enterprise, like strategy, research and development departments or market research and intelligence.

In the past few years “online technologies of the Web 2.0 generation that allow users to easily and inexpensively generate and share content” (Kaganer and Vaast 2010, p.2), often called social media or social software, have found their way into corporate practices (McAfee 2009). A growing body of research has demonstrated potential benefits of social software in the corporate context in terms of facilitation user participation (Danis and Singer 2008; Ip and Wagner 2008; Stocker et al. 2012) and new ways of connecting, interacting and communicating with other people (Richter and Riemer 2009; Steinfield et al. 2009; Zhang et al. 2010). We define social software according to Coates (2005) as software that supports, extends, or derives added value from human social behaviour. In our specific case, social software is implemented in the company as a platform for communication and collaboration in ideation and product development processes. The target users of this innovation are predominantly engineers and innovators.

In this paper, we argue that these specific characteristics of social software might help enterprises with overcoming the challenges of patent management briefly described above. Notwithstanding the fact that there are several studies that help to better understand user motivations (e.g. DiMicco et al. 2008; Riemer et al. 2011) and perceived barriers or rules of use (e.g. Grace 2009; Holtzblatt et al. 2011; Riemer and Richter 2010) there is no comprehensive study that investigates in detail the special affordances that social software brings about in the field of patent management. We argue that the business transformation described above is likely to challenge existing theories and frameworks of software use in the field of patent management.

Consequently, in this work in progress paper we aim to contribute to a better understanding of how social software might be used to support patent management. To this end, in the following (section 2) we present a case study conducted at an international automotive manufacturer. In a series of 31 semi-structured interviews we identified a set of patent processes and operational problems within these processes. Through an analysis of the situation in the case company (section 3), we derive a set of deduce propositions on how the use of social software can support the identified patent processes (section 4). Drawing on action research methodology (Baskerville and Myers 2004) we outline next steps in our research project that aim to introduce changes into the organisation with a view to studying the resulting effects (section 5).

CASE STUDY AND RESEARCH DESIGN

Case Study

We investigate patent management practices at an international automotive manufacturing enterprise with about 100.000 employees. Patent management in the automotive industry is quite similar to neighbouring industries that are equally reliant on engineering practices, where most new ideas are technical in nature and therefore potentially relevant for patent attorneys. In doing so, international patent law requires particular attention because of the international nature of product marketing and production. Moreover, single patents have only moderate impact, because most products draw on more than one patent and in some cases, these patents have more than one owner, which makes the decisions concerning patenting very complex. In the patent department of this enterprise the patent attorneys are in charge of all IP issues worldwide, as is the case in most industrial patent departments. Hence, our case is typical for a range of similar businesses in other engineering-reliant industries, which ensures transferability of our research results.

Social software has been in use in our case company since 2007, mainly with a view to support technology and innovation management and to integrate people, knowledge and innovation in one system with the aim to facilitate the leap from creative freedom to target-oriented value creation. With the human actor at the centre of its efforts social software aims to support networking and communication beyond spatial, organisational and hierarchical boundaries. It serves as a bridge between strategic decision makers, such as the patent department and creative workers and supports the formation of special interest groups. The collaboration solution is an information and communication platform for the development of expertise and ideas as well as their enhancement and implementation in the new product development process. In the beginning, only a selected

group of employees were able to join. From 2012, the solution is open to the entire enterprise and the use of the social software will be (partly) mandatory.

Research Design

To address the research gap identified above, we apply an action research approach. Action research is a research method that solves immediate practical problems while expanding scientific knowledge (Avison et al. 1999). Unlike other research methods where the researcher seeks to study organisational phenomena without interfering, the action researcher is concerned with creating organisational change and simultaneously studying the process and its outcomes (Baburoglu and Ravn 1992). Although there are many different forms of action research (Baskerville and Wood-Harper 1998), action research can be described as an iterative research process that capitalises on learning by both researchers and subjects within the context of the subjects' social system (Baskerville and Myers 2004). Most importantly there are several stages in the research process. In a first phase the analysis of the social situation by the researcher and the subjects of the research are necessary. Theories are formulated concerning the nature of the research domain. In the subsequent phase changes are introduced and the effects are studied (Baskerville and Myers 2004).

Our paper summarises the first phase in our ongoing research project. In the following we describe how we conducted interviews to analyse the social situation at our case company, to illustrate existing work practices and to identify perceived problems in this context. From this data we derive four propositions on how the implementation of corporate social software might improve the situation in enterprise patent management.

Data Collection

We carried out 31 semi-structured interviews (Lindloff and Taylor 2002) with members of the patent department between January and February 2012. The interviews lasted between 40 and 90 minutes and were structured around questions about the relevant processes and operational problems and questions derived from these problems tending to the potential of social software for improving the situation. In detail, these questions are dealing with the relevant processes and problems, and finding out how social software can be created to support patent attorneys. The first round of interviews was accompanied by fulltime observation over a period of three weeks. The semi-structured interviews with patent attorneys in different technological fields allowed for a conversation that was rather fluid and flexible to allow for active engagement with the participants. At the beginning of each interview, the interviewee was informed of the purpose of the interview as well as confidentiality and privacy issues. Afterwards, each interview was fully transcribed into text. From the data critical incidents were identified, selected and coded. In order to validate the empirical data, the transcript of each interview was then sent to individual participants to verify their answers and the participants were asked for their consent for publishing their quotes. The results of these interview series and the additional observation will be illustrated in the remainder of the paper as analysis of the social situation.

Limitations of our Approach

A very important question when conducting action research is concerning the involvement of the researchers in the case: As Walsh (2006) notes, there are advantages and disadvantages of close involvement in action research. For example, close involvement guarantees in-depth access to people, issues, and data. "It enables observation or participation in action, rather than merely accessing opinions as is the case in an interview-only study" (Walsh 2006). On the other hand, close involvement may also lead the researcher to become socialised to the views of the people in the field and the researcher may lose the benefit of a fresh outlook on the situation. In our case, the lead author was part of the field work, whereas the other researchers critically discussed and theorised the results together with the lead author. This enabled us to combine the advantages of deep access with open minded discussion of the results. Another difficulty is to attribute identified effects clearly to one specific change measure. We will explain at the end of the paper how we aim to avoid this problem in the subsequent project stage.

ANALYSIS OF THE SITUATION

To support the work of patent attorneys via social software, it is important to concentrate on processes with a high need for cooperation and integration with other parts of the enterprise. During the first round of interviews, we identified several core processes and associated problems. We will give an overview of several important processes in the following.

Processes

The key process we identified is “processing inventions” (see figure 1). This is captured in the following quote: “*Our main job is of course to deal with reported inventions.*” (Interview 2, in the following I2) This process deals with all aspects concerning the processing of inventions (by employees act), such as checking whether the inventions reports are complete. This normally includes several feedback loops and leads to the final decision about filing a patent or using other mechanisms, like secrecy. Also included in this process are all decisions after filing a patent, like retention decisions or decisions about additionally filing patents in other countries. Each stage of the process includes several challenges or problems. During the first stage “Completeness”, patent attorneys are faced with problems concerning the content of the reported invention, like incomplete or inscrutable descriptions and missing prior art or benefit: “*Sometimes inventors only sent us incomplete descriptions, for example [...], I received only a drawing of a wheel. (...) Often the core of the invention is just inscrutable.*” (I1) The next process step includes several queries. The queries are necessary to understand the invention or grasp the benefit by asking the inventor or other experts. An often-mentioned problem is the selection of these experts and no or late responding: “*I often loose time because employees are not answering. (...) Sometimes I have to decide on my own.*” (I1) After or even parallel to the queries, patent attorneys have to inquire about prior art. This is difficult, because they have to consider many sources and only patent databases are easily available: “*To inquiry prior art it is necessary to understand the potential of an invention to be accepted by the patent office.*” (I3) The last step of the process is the filing of the patent. For doing so the patent attorney has to decide about the real benefit of a patent and about the technological and geographical scope.

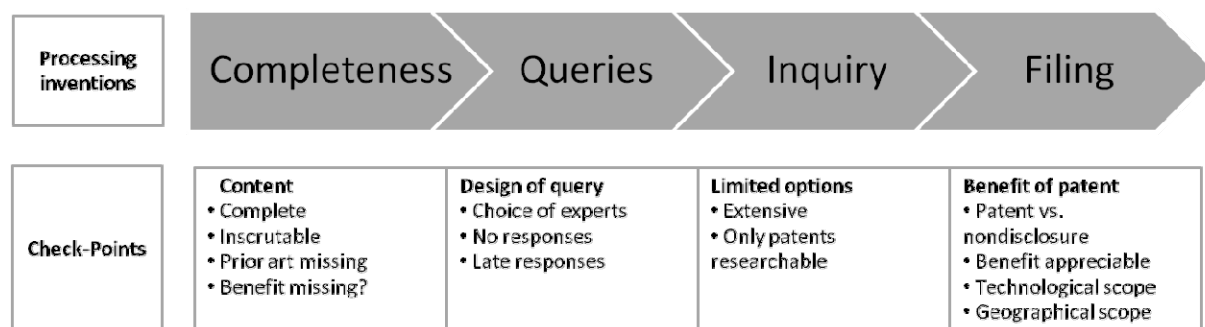


Figure 1: Overview: Processing inventions.

Another very important process that we found during the interviews is “dealing with infringements”. This process takes care of searching for illegal users of the company’s own proprietary inventions. For this purpose patent attorneys adapt requests of potential licensees, draw written warnings and negotiate licensing agreements. Furthermore, we found several other processes, namely “charge of inventor’s bonus”, “negotiations with the patent office” and “litigations”. As one result of our interviews the potential of these processes to be supported by social software is low, because there is only little connection and cooperation with other parts of the enterprise in these processes: “*Communication and collaboration is very high among patent attorneys. Especially in the case of difficult litigations are several meetings and mostly all attorneys are asked for their opinion.*”(I5) “*To work with the patent office is very special. A high grade of technical and legal knowledge is required.*” (I11) “*By charging inventor’s bonus, we are only sometimes asking the inventor: of course he will tell us, the benefit of his invention is very high.*”(I11) For this reason we will not consider them in the following, and concentrate on “processing inventions” and “dealing with infringements”.

Problems that appear in all Processes

In a next step, we asked the interviewees about difficulties and problems with the potential to be improved by using social software. These problems cannot clearly be attributed to one of the processes illustrated above, but rather appear in all of them.

Duration of the processes was often mentioned as a problem. Especially the most important process “processing inventions” is affected. Particularly time-consuming is the beginning of the process, the reporting of the invention: “*Nearly no reported invention is complete, so asking the inventor is necessary.*”(I8) Time-intensive are also the other necessary feedback loops, for example asking supervisors of the inventors about their opinion concerning the benefit of the invention: “*...they sometimes answer too late or even never.*” (I17)

Furthermore, **feasibility** and the number of reported inventions have been raised as problems. As a first result, we found that, the number of inventions depends on the area of expertise of the inventor, the attitude of the manager and on the degree of information about inventions and patents: “*Some departments are reporting many inventions, some rarely. (...) it depends on the attitude of the manager: is there time to report inventions or not.*”

” (I7) “Of course there are many differences between technological fields (...)” (I8) Many reported inventions are for different reasons not reasonable or feasible: the invention is not patentable, due to missing novelty or missing suitability for industrial application or the invention will not bring benefit to the enterprise.

Moreover, finding suitable **experts** within the enterprise was identified as a problem: “To decide about filing a patent, retention of a patent or filing foreign patents we always have to ask internal experts.” (I18) “I’m since 2 month here and don’t know many employees. It’s very difficult for me to find contact persons.” (I20)

As mentioned before, the detection of **infringements** is a problem for patent attorneys. To find these infringements is very difficult, and patent attorneys have to rely on information from inventors and other employees: “We are not able to visit all potential infringers. (...) Not only in our industry infringement of our patents is possible.”(I3) Other employees of the enterprise could get notice of (potential) infringements for example during their visits of tradeshows or during collaborations with other companies. So, they potentially gain a lot of knowledge about technologies other enterprises are using. Because the employees know about the technologies used in other companies and the patent attorneys know a lot about the specific content of the patents of the company, increasing communication and collaboration will support the detection of infringements.

PROPOSITIONS OF POSSIBLE CHANGES AND THEIR LIKELY RESULTS

As mentioned above, the processes “deal with infringements” and “processing inventions” entail the need for cooperation and connection to other parts of the enterprise. In the following section, propositions regarding the main problems in these processes will be derived. The first problem category mentioned in the context of the process “processing inventions”, is the duration of the process. The use of social software could improve the collaboration between patent department and inventors and will enable them to share information and to communicate in a more frictionless way. This could enable inventors to easily report their inventions to the patent attorney, it could speed up feedback loops and could also simplify the collection of information about the benefit of an invention. This leads us to formulate the following proposition:

Proposition 1.1: *The use of social software will improve the connection between the inventor and the patent attorneys, which will lead to a speedup in adapting inventions reported by employees.*

Connected with this problem is the duration of decision processes with need for backing through experts. To simplify expert search and to speed up queries due to the use of Social Software could bring forth this decision processes as well. This leads to the next proposition.

Proposition 1.2: *The use of social software will enable the patent attorneys to collect more expert opinions in preparation of decisions about retention of patents and filling foreign patent applications. This will lead to a speedup in the decision processes.*

The second problem category mentioned in the interviews is the feasibility of reported inventions. Many reported inventions are not patentable, often because of a lack of knowledge concerning patent law. The use of social software could enable patent attorneys to inform inventors about demands like novelty or suitability for industrial application. Furthermore, early and easy contact between patent attorneys and inventor could prevent inventors from reporting not patentable inventions and could improve the knowledge about patent strategy and potential benefit of inventions for the enterprise.

Proposition 2: *The use of social software will improve the connection between the inventor and the patent attorney which will lead to more feasible inventions reported by employees.*

Feasibility is measured by the relation of inventions to patent applications. The second process under examination is “dealing with infringements”. As mentioned above, most inventors do not know about own patents of the enterprise and are therefore not able to identify potential infringements. Through the use of Social Software, awareness of patents held by the won company could be improved.

Proposition 3: *The use of social software will improve the allocation of information between inventor and patent attorneys. This will lead to a better awareness of infringements of own patents.*

Patent attorneys know a lot about the inventions patented by the company and inventors often know a lot about technologies other companies are using. To bring together these source of knowledge will improve the detection of infringements.

Figure 2 summarises the recognised problems and the derived propositions about improving the situation through the use of social software.

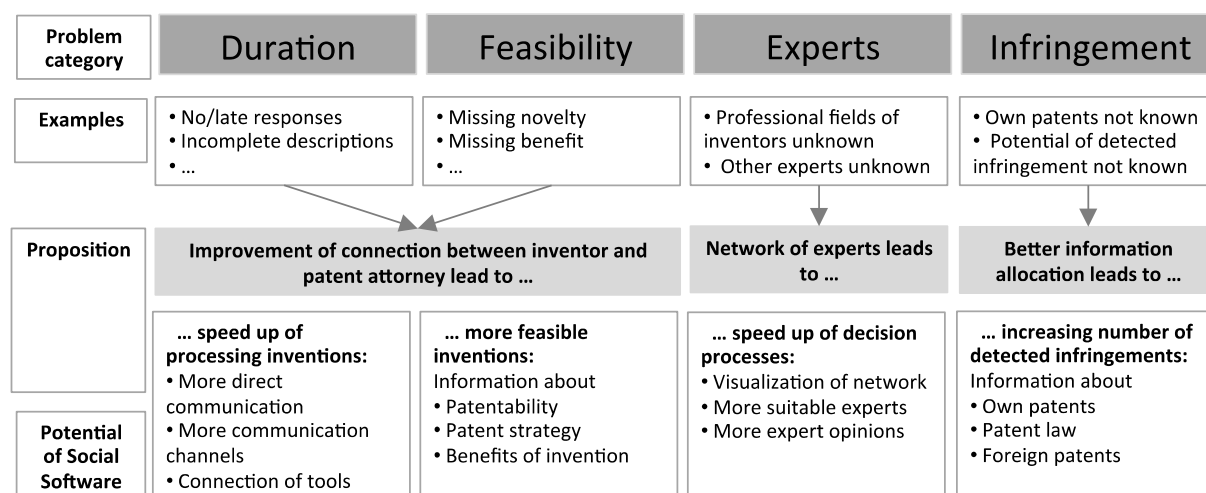


Figure 2: Summary of identified problems and propositions to improve the situation.

OUTLOOK: STUDYING CHANGES AND THEIR EFFECTS

To assist the work of the patent attorneys, and to test the propositions, a solution as described in the case section is currently being implemented by us in our case company. This platform will be available for the whole enterprise and will support idea generation, communication and cooperation as well as project management. In a first step data on the initial status will be collected and examined.

Recording the Initial Status

To study the effects of the platform implementation on propositions 1.1 and 1.2 we will analyse the average duration of processing inventions and of decision-making regarding patent retention or filing patents in other countries. Therefore, we will analyse processed inventions of the past two years. To discount other factors, we will separately measure duration for different technology fields, like defined by the patent office (International Patent Classification) and the company patent department. Moreover, we only consider processes with patent attorneys working in the enterprise for more than 5 years to avoid measuring learning effects. To record the initial status for decision processes we will separately measure the duration for retention decisions and decisions about foreign patent filings. Like with the measurement of processing inventions, we will use technology fields and the time that patent attorneys have been working in the enterprise. In addition, the number and diversity of experts involved during the process will be monitored. Diversity will be measured according to the department, the formal function and the professional background of the expert. For proposition 2, the relation of reported inventions to the patent department and patents filed out of these inventions will be formed. This relation has to be formed for each technological field separately in order to discount differences regarding prior art or general patentability between different technologies. This relation will be formed for inventions of the last two years. For proposition 3, the number of reported patent infringements through inventors in the last two years will be surveyed.

Design of the Social Software Platform

The second step will be to design the social software platform so as to achieve assistance of patent attorneys' work according to the requirements derived in the first step. To meet these demands, patent managers will play a special role, because comments or messages have to be clearly attributed to the function of patent attorney. Another reason is the high importance of confidentiality. As mentioned before, some inventions will be kept secret instead of being patented. Given that the platform is available for the whole enterprise, confidential communication has to be ensured. Up to now the communication between patent attorney and inventor is mainly driven by email contact. The social software platform will offer more communication channels by providing messaging, commenting and chat functions. Another design aspect will be the connection of the tool to report inventions to the patent department with the social software platform. This measure will enable inventors to easily report inventions to the patent department. The messaging and chat functions will be available right from the launch of the social software platform, the connection of the tools will be realised later. Hence, we will first analyse the effect of communication channels by measuring the use of the channels, the time needed for each feedback loop during the processing of inventions and the duration of the whole process. Subsequent to this we will find out the effect of the connection of the tools by analysing the use of the connection path and the second change of the duration of the process.

An explanation about the term invention in terms of patent law will be given, to avoid reporting of non-patentable inventions. Related to this measure there will be links to patent research tools, like commercial databases, to improve the search for foreign patents before or during idea generation and project work. Herewith reporting of inventions missing novelty will be avoided. To increase the number of reported inventions in general, there will be a hint near each idea or project to bring patents to mind. These aspects will be realised from the beginning. To form the relation of reported inventions and de facto filed patents, data will be collect at least half a year after the start. To capture all patents, decided but not yet filed patents will also be counted. Part of the social software platform will be an expert network. Members of the network will be classified depending on their department, their education, their professional interests and recent or past projects. Patent attorneys will get the possibility to complement the emerging groups of experts by their own professional definitions to easily find experts.

To measure the effects of the expert network, we have to wait for a distinct level of development of the network (depending on time, number of members, mapping...). After the network is established, we will collect data about the number of experts asked during decision processes and the diversity of these experts. Another design aspect will be to inform members of the social software platform about the company's own¹ patents. With this we will enable them to detect infringements. Information about own patents will be given related to ideas or projects that members are looking at or working on. Consequently, information about the patent stock will develop over time and collection of data will start after the first year of platform operation.

Table 1: Overview of planned changes and the analysis of their effects.

| Problem | Design aspect | Start | Measure | Initial data | Measurement of changes |
|----------------|----------------------------|--|-------------------------------|---|-------------------------------|
| Duration | Msg. & Chat functions | Beginning | Duration of processes | Processed inventions & decision processes of last 2 years | After 6 months |
| | Connection of tools | Start 6 months after msg. & chat functions | | | After 6 months |
| Feasibility | Patentability description | Beginning | No. of Inventions / patents | Relation of last 2 years | After 6 months |
| | Link to patent data base | | | | |
| Experts | Expert network | Beginning | No. & diversity of experts | Avg. No. & diversity of experts of last 2 yrs. | After at least 1 year |
| Infringements | Information on own patents | Beginning | No. of reported infringements | N. of reported infringements of last year | After 1 year |

CONCLUSION

In this paper we have presented an ongoing case study of a worldwide operating car manufacturer that aims to examine the potential of social software for supporting patent management practice. As a result of the first phase of our analysis using action research, we presented the current situation, i.e. the relevant patent processes and operational problems within these processes. We found two processes of special importance, the processing of inventions and dealing with infringements, and several problems connected to these processes. We identified four categories of problems: duration of the processes, feasibility and number of reported inventions, finding suitable experts and the detection of infringements. Next, we have derived four propositions on how the use of Social Software might help to overcome these problems.

¹ To inform developers about patents of other enterprises to avoid conflicts, is due to willful infringement rules in the USA connected with high risk (Lee & Cogswell 2004; Powers & Carlson 2001; Sterne et al. 2004; Moore 2004). So information about foreign patents should not be part of the social software solution.

In conclusion, we expect that using the platform will lead to a speedup in adapting inventions made by a company's employees, to a speedup in decision processes, to more feasible inventions, and to a better awareness of infringements of own patents. In the outlook we have described the next steps of our study, i.e. implementing a platform that helps overcoming the identified problems and studying the effects outlined in our propositions.

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