Pushing Firm Boundaries
through Research and Open Innovation

Aviaja Borup Lynggaard
Bang & Olufsen
Peter Bangsvej 15
7600 Struer, DK
+4531132618

Abh@bang-olufsen.dk

ABSTRACT

In this paper we will exemplify open innovation through a university-industry collaboration called Mobile Home Center (MHC). We will demonstrate how the model by Chesbrough can be used as a tool for mapping out a research process and furthermore illustrate what kind of outcast such project can provide into the company and bring forward the effect it has inside a company when performing open innovation together with research partners. We seek to bring forward how performing university-research collaboration can also change the practices inside a company and thus push the firm boundaries in new directions. Rather than looking at the firm as something static we will demonstrate how Chesbrough's model on Open Innovation can be used to illustrate the dynamics of a company's boundaries through Open Innovation.

Categories and Subject Descriptors

H.m: Miscellaneous

General Terms

Management, Design, Economics, Theory.

Keywords

Open Innovation, university-research collaboration, design research.

1. INTRODUCTION

Recent research has shown that university-industry collaboration is widely practiced in the era of open innovation[2]. This is revealed to be effect full in relation to creating shared patents and firm innovativeness, nevertheless not many look at the effect it has inside a company when performing open innovation together with research partners. In this paper we seek to bring forward how performing university-research collaboration can also change the practices inside a company and thus push the firm boundaries in new directions. This is exemplified in a specific project of a university-industry collaboration project.

2. OPEN INNOVATION

Chesbrough argues that we have entered a new era of open innovation[1], where it is beneficial to open up towards new sources and being less protective about IPR. If companies commercialize from both their own and external ideas and technologies, thus sell off internal ideas to external partners, they will advance their business.

There are two main aspects when performing Open Innovation. One is from inside the company and out, from where ideas and concepts should be commercialized by others. This means that if a concept or patent is not being used within the company, there is a business potential in getting it out to others for instance by selling IP rights. The other aspect is to gain from the outside and in, for instance through knowledge and development outside the company. This means that the company boundaries are opened more towards the outside world than what was seen in the traditional closed model. Chesbrough illustrates it in this model:
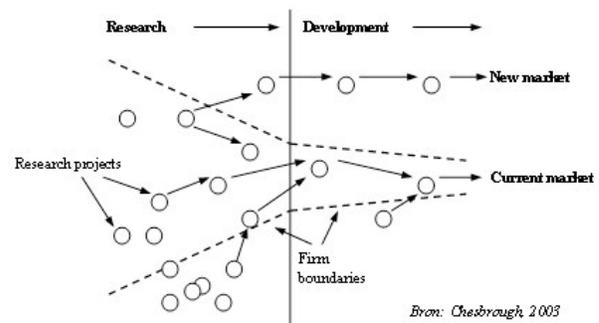

Figure 1: Chesbrough's model on Open Innovation[1]

Perkmann et al. argue that in the era of open innovation it is highly relevant to look at the dynamics of the relationships between universities and industry[2]. Instead of calling it links where information is being exchanged, they focus more on the actual relationships of people being involved in open networked innovation. They argue that industry-university links with high relationship involvement is the most appropriate link when working with open innovation. When examining the motives for the firms to participate in these university-industry links, it is most often the firm's expectations to gain on capacity building and learning perspectives rather than actual tangible outcomes in form of new inventions.

Fabrizio emphasizes that there is an open innovation paradigm when talking about university-industry collaboration[4]. Quick validation through publishing papers is a common procedure in

the research community. She reveals that universities are increasing their patenting, which is in conflict with a high level of knowledge exchange.

Pisano & Verganti point towards four different modes of collaboration[5]. They emphasize on the issue that there is a growing number of potential partners when companies have now opened up more towards collaborative innovation. It is therefore more and more crucial to look at which mode gives the best tradeoff to the specific cases in the specific firms. As Pisano & Verganti puts it, there are two main questions to pose before constructing a collaboration model: 1. How open or closed should the network be? 2. Who decides on the problems and the solutions? When opening up the network you receive a large number of possible solutions and it can be difficult to screen the solutions to get to the right ones. It may not always be the best problem solvers that participate, but on the other hand you may find innovators that you would not get in touch with if you do it in a more closed form. When making it more closed there are better possibilities for complex problems to be solved by elite players, but the number of participants and solutions decreases. So therefore it is a challenge of understanding the problem and the network dynamics in order to create the best-fitted collaboration mode for the specific projects.

3. A CASE STUDY
3.1 Introducing the Research Project
Mobile Home Center (MHC) is a three-year research project sponsored by the Advanced Technology Foundation. The Industry partner in the project is the A/V company Bang & Olufsen (B&O) that was founded in 1925 in Denmark. The two founders worked by the principle *"to persistently find new ways of improvement"* [3] by challenging what was technologically possible at that time for radios. This ability to push the limits is still an ambition for the company but the brand also has a reputation of distinctive and exclusive design where the company has prioritized design highly and hired external designers since the 1950's.

The main domain for the products is the home and in recent years the audio has also expanded to include sound systems for cars.

The objective of the research project has been to look beyond one home and develop concepts, products and services that support a global sense of home while away from a primary home. With researchers from the fields of Computer Science, Marketing and Interaction Design working closely with designers and engineers from Bang & Olufsen, this is a highly interdisciplinary project. The group consists of about ten people in average, where some have left the group and others have entered during the three years. The actual relationships in relation to Perkmann et al.[2] has been a very close interaction between industry and university as we have met every week for three years and worked closely on different prototypes in mixed groups.

If we evaluate the mode of collaboration in relation to Pisano & Verganti[5] there are indications that this project of MHC is at the closed level of participation, being a closed network, where it is a group of participants that jointly select problems and choose solutions. Asking the question of who should decide on the problems and the solutions, we find that in this case the best suited structure is a flat hierarchy, as it is both for the industry and the research partner to decide which directions to work the project. The industry has an agenda of making it profitable and the

researchers have an agenda of reaching new heights in a research perspective. This setup is what we found most appropriate in a complex research field like the MHC, where it is not a specific simple problem to be solved, but a whole area to be explored deeply by elite participants. The screening for good results in the MHC project is even complex enough, as it is mainly new areas for the company to explore. If the number of solutions would increase it would easily be too overwhelming.

In relation to the publication/patent paradigm there are also some conflicting agendas in an industry-research collaboration. In this case each publication is being scanned for potential patents, before being published. B&O can withheld a publication for up to 6 months, if they are applying for a patent. When that is being said it is rarely the case, as there is an average of one patent per PhD project. B&O has a long history of conducting research and know the importance of being able to publish, if they want to attract the best researchers in the field.

The primary motive for participating in university-industry link is, According to Head of Research[6], the image of the company as a company being in the lead of research. Second priority for outcast from a project is recruiting and thirdly is getting patents and implement new concepts. This is supported by Perkmann & Walsh who found that most companies engage in university-industry relationships in order to build on capacity and learning, rather than tangible outcomes[2].

3.2 The Model as a Tool
If we analyze the project in terms of Open Innovation we can start by running through the principles of Chesbrough's model. First of all we can approach from the company perspective on the issue of getting the best people to work for us. B&O have realized that not all the best in the area will move to the north of Denmark, but have also faced that the company does not have the capacity of employing all the best in all the relevant fields. One way to get around this is to participate in collaboration projects like the Mobile Home Center consisting of partners from leading research fields and include partners from relevant fields. This is a highly open way of getting to work with smart people in the field.

Getting back to Chesbrough's principles we will look at the structure for conducting R&D. In this case R&D is taking place in the MHC project, which is not internal R&D, but it is neither very open for others to use. This is also more towards the open innovation side, but not completely. A third principle is about the openness around the research and in the MHC case it is not something that we keep within the walls of the company, but it is an exchange with the ongoing research community, with only very few cases where the company withhelds the publications in favor of applying for patents before hand. An other principle is about whether or not the company is open towards sharing internal ideas from the company, which in this case is mostly being shared with the research community. The company is also open towards using external ideas, though the MHC project is only a semi-external collaboration, as it is not completely open for anyone to deliver external ideas, but more controlled input.

So overall the project is an example of open innovation, where the main external elements entering the project are from the research community and partners from external businesses and universities. We can therefore put the process of MHC projects into the model of Chesbrough[1] and it can be mapped out like this:
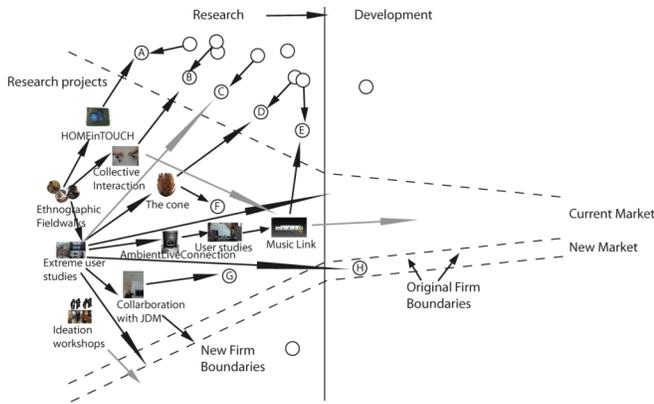
Figure 2: Mapping out the research project

Looking from the inside and out, the project makes output through engagement with the existing research community through articles and presentations of prototypes (A-E). This can only be done if the company is fairly open about their research. MHC does not generate new technology, but makes use of technology in a novel way. We have often discussed whether there was a need for IP and one has been signed in for both Europe and America concerning the Ambient Live Connection concept.

Looking from the outside and in, it is mainly inputs in form of engaging with the research community and building upon existing research and publications in the field.

It is quiet complex if we look inside the funnel, where the prototypes and case studies are mapped out. Some user studies were conducted in the beginning. An ethnographer started out by carrying out five fieldwalks with extremely mobile people, being the Ethnographic Fieldwalks. Together with other researchers we worked through her observations and deducted several findings on this. This has then informed some further studies of B&O customers also living a very mobile lifestyle. These are the Extreme User Studies (in the model). We found that a large group of the top segment customers live a very mobile lifestyle with multiple homes around the world and extreme amount of traveling. These were the wealthiest customers for this brand, as they can afford to live the global lifestyle and own several homes around the world. The studies of this group have resulted in various outcomes in the company that we will get back to in the next section but it has also given impact on the development of the prototypes and some papers have been published in the research community (illustrated as A, B, D in the model). We have discovered some essential elements in the prototypes and tests, that we have reused in other prototypes and in that way it has influenced other prototypes in the project. Some findings from these prototypes have also found their way into the company as awareness about new issues (F&G). This is for example the fact that a large number of the customers own multiple homes and we have discovered that the owners have interest in connecting not only to people, but also to the places themselves. These findings may influence the future perception of the customers.

3.3 Pushing the firms boundaries

We just demonstrated how to use the model of open innovation to map out a research project. This has been a useful tool to become more aware of the process and which parts have influenced what. We furthermore want to emphasize that the model may be used to

illustrate how the dynamics and results inside the funnel can also push the boarders of the firm's boundaries. We identified some changes inside the funnel/the company as result of the research:

1. The different stages of the project has influenced one another

2. There are some takeaways in relation to new ideas and concepts that will be brought into future products

One can say that the new concept ideas are directed towards a new arena and thus push the company boundaries to new markets:
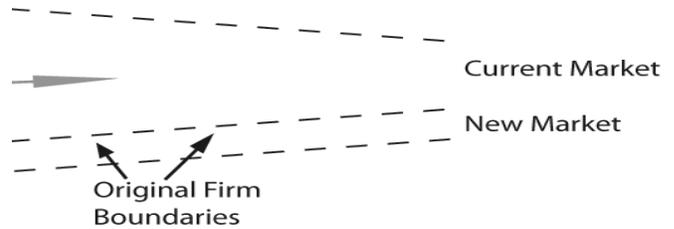
Figure 3: Zooming in on the model as a tool

In relation to the firm boundaries pushed, we have identified four places where it has actual resulted in a change of boundaries:

1. New knowledge about a group of the users

2. Cooperating with new partners

3. Integrating with more products and thus making products in a new part of the product portfolio

4. Luxury has become more articulated than earlier

The extreme user studies were presented to a large group of influential managers from the company and one can say that the presentation itself has given impact on how the company works around these people today and how they perceive them. This may lead to a change of products and thus leading to new markets.

An other outcome is a partnership with one of the interviewed as his expertise around home integration has found it's way into the company and has become a model for the expertise B&O wants to deliver to their customers.

A third result was that the findings from the interviews pointed integrating more with 3rd party products, for instance Apple. The empirical studies have been an argument for creating an app for the apple platform, as all informants were IPod users. The empirical studies also showed that though the users had B&O speakers and CD players, they couldn't manage to connect with the IPods that were actually the devices they used most frequently. This has given an impact on the company strategies in relation to Apple products. One can say that the company went from competing with Apple to open more up and complement Apple products, which can also be seen as a move towards more open innovation.

Fourth impact is that today the company is more explicit about doing luxury and the head of product management in the company recently articulated his point of view: *"We are a luxury company. We don't produce midrange products."*[7]. It may also have changed focus towards more user-centered approaches. Being user-centered and involving the users in the design process is also a way of conducting more open innovation[8].

In some ways it has moved the boundaries of the firm. First of all it has promoted a focus on these extremely mobile customers. The company has started to work more on tailored solutions for big customers and it has become more accepted to look into this specific group rather than always looking at more common people.

4. DISCUSSION

There are many conflicts when conducting open innovation in a construction like this industry-university collaboration. One conflict is around the research/profit contradiction, where researchers need to step new grounds and get into details in order to conduct actual research, whereas the companies most often need to take quick decisions and work in areas that are possible to provide profit. The company cannot have all the smart people work for them, so an industry-university collaboration is a good way of working around this and getting external expertise into the firm. The MHC project is a long-term project that has run for three years and thus resulted in a deep exploration of the field of home and mobility. This would not have been possible inside the company. When this is said, not all research in the project is being used within the company and there may be more "waste" of the knowledge than what is normal in the company, where all working hours are to be paid by the revenue. Nevertheless the outcome has actually been quiet commercial for a research project, with a concept, a patent, sub results from prototypes and useful user studies have been passed on to the company.

A second conflict is regarding patents vs. openness in relation to new technologies developed in a research project. This has not been the case in this specific project, as we have mainly worked around existing technologies and the new use of these. The company is still quiet closed when it comes to research in new technologies, as there are some core competences that still need to be protected against copyright in a time where being first with new technologies are still valued very highly. A company like Lego is also seen as an example of open innovation [9][10] but at the same time patenting extensively [11]. So though it seems like the companies are moving towards complete openness, there is still some way to go.

A third conflict is concerning the publish/patent challenge, where researchers need to be very open in order to validate their research in the research community and companies have a history of being more closed and protective about their innovations in relation to getting first to market. With the shift towards open innovation as a business tool, this has certainly reduced this conflict and thus makes it more desirable to conduct these kinds of collaboration projects.

This paper is a meant as a tool to understand and zoom out from these complex collaborations between industry and university and visualize the impact the different parts of the projects have resulted in, for example by pushing the practices and the boundaries of the firm.

5. Conclusion

It has been apparent that the university-industry collaboration is an example of open innovation. This has lead to some challenges in relation to conflicts of interests, but all in all been a very fruitful project of knowledge exchange.

Normally these kinds of collaborations lead to knowledge exchange and perhaps recruitment to the company, but this project has proved to be even more profitable for the company than what would be expected. This is observed both in the additionally use of empirical research in the company, how the project has influenced the practices in the company and the development of a specific concept that is now on its way to be realized. This can as well be observed as an indication that this type of collaboration is a desirable way to conduct open innovation.

Using Chesbrough's model has been very useful as a mapping of the project and illustrating which parts have influenced which and what has come from the outside and opposite. It is mainly built around the outcome of a specific product, whereas we also found the outcome of changed practices in the company just as important. This is illustrated by pushing the boarders of the firm, which may also result in pushing the design space for the end product.

6. ACKNOWLEDGMENTS

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