

Preface

This study is written in the context of my master thesis at the University of Hasselt (Belgium) in line of my study Applied Economic Sciences. In this report I try to create a coherent review of the available literature on the subject: "How can firms benefit from internal and external crowdsourcing" and seek to provide an answer to my research question which will follow later. To give an insight of managing crowdsourcing in practice, I interviewed innovative companies: General Electric (Paris, France), Janssen Pharmaceutica PLC (Beerse, Belgium), Cognistreamer (Kortrijk, Belgium), Bekaert (Kortrijk, Belgium), Liberty Global (London, United Kingdom), Crowd Expedition (Utrecht, The Netherlands) and ISMB - Istituto Superiore Mario Boella (Torino, Italy).

I have chosen this subject knowing it is a present-day topic for a lot of entrepreneurs. Each time a firm creates or applies new products, methods, ideas and so on, it faces the following dilemmas: search for the innovation within the company, internal crowdsourcing or try to find the new ideas outside of the company, external crowdsourcing, or choose a solution somewhere in between. Furthermore, since this is a very new and experimental subject, many managers still struggle with how to successfully implement crowdsourcing programs in their company. Therefore, I will thoroughly investigate the relationship between the benefits of internal and external crowdsourcing and their challenges in this thesis.

I could not have realised this dissertation without the guidance and cooperation of the below mentioned people. First, I would like to show gratitude to my supervisor Professor Dr Nadine Roijackers and my co-supervisor Dr. Joanna Robaczewska for their advice and for sharing their expertise about the topic with me. Next I would genuinely like to thank my interviewees: Mrs Anne Rhodinsky from General Electric, Mr Tom Aelbrecht from Janssen Pharmaceutica PLC, Mr Wim Soens from Cognistreamer, Mr Kevin De Caluwe and his colleague Mr Erik de Kempeneer from Bekaert, Mr Roel de Vries from Liberty Global, Mr Martijn Arets from Crowd Expedition and Mr Michèle Osella from Istituto Superiore Mario Boella. They all have helped me a considerable step further by sharing their knowledge about- and experiences with crowdsourcing at their companies with me.

Charlotte Nijs

Summary

In the last decennia, companies have been adapting from a closed to a more open innovation strategy. Instead of handling maximum secrecy in the field of innovation activities, companies have been generating an open business minds with more and more collaborations. Crowdsourcing is a small part of the Open Innovation model. It is not only the objective anymore to elaborate problems indoors and finding new innovations within the organisation. Companies want to work together with the outside world in their innovation processes to enhance creation of even more knowledge and better products, whilst still making substantial profits.

Crowdsourcing was defined in 2006 as 'taking a function once performed by employees and outsource it to an undefined and large network of people in the form of an open call' (Prpic et al.) It has become a way to cluster ideas for innovation and to find answers to difficulties that occur in the development of products or services. The knowledge of the crowd is thus used to solve problems or to gather new innovative thoughts (Afuah & Tucci, 2012) and even to help with research and development (Howe, 2006).

The question I ask myself in this study is how firms can benefit from internal and external crowdsourcing. In order to fill up the gap in the current literature concerning the benefits of crowdsourcing - which will be illustrated in '1.2 Problem definition' - I have set up eight interviews with seven international companies. These are a service provider namely Cognistreamer, the market leader in steel wire, that is Bekaert, pharmaceutical giant Janssen Pharmaceutica, leading international cable company Liberty Global, a research company, particularly Crowd Expedition, an Italian private research centre Instituto Superiore Mario Boella (ISMB) and finally a pioneer in the sector of electronics, namely General Electric. The results of these interviews are shown in 'Chapter 4. Findings'.

As a conclusion, I seek to look for a match between theory and practice. This master thesis shows my research on the ultimate benefits of crowdsourcing and most importantly what the key elements are to develop a beneficial crowdsourcing strategy within the company. I make a clear distinction between the key elements for internal and external crowdsourcing. The checklist I create counts as a guideline with the key elements on how to implement a crowdsourcing strategy in a company and thus set up successful crowdsourcing projects as a manager. Furthermore, I thoroughly analysed the possible managerial challenges and struggles in setting up a crowdsourcing program in a firm. Then I determine how these can be avoided. Finally, I will point out some recommendations. All these conclusions are retrievable in my last division 'Chapter 5. Discussion'.

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Chapter 1. RESEARCH DESIGN

1.1 Introduction

In order to create and complete my research on the subject 'How firms can benefit from internal and external crowdsourcing', I will perform my research in three fundamental steps. First I will do a wide and extensive literature review to create a thorough theoretical framework on this subject, this will be the basis. It will give me a clearer insight on this new web-based business model that includes creative solutions from individuals through an open call for proposals. After, I will conduct interviews from three to five important players in the terrain of crowdsourcing. This will show me how it is applied in practice and how firms can benefit from internal or external crowdsourcing. The second step goes along with the third step. Here I will take a closer look at Cognistreamer. This is a tool that, together with their consultants, guides firms into collaborative innovation and the co-creation of ideas and products.

I started my literature review with reading and analysing the two sources that I received from my promotor and co-promotor. The first is 'How to Work a Crowd: Developing Crowd Capital Through Crowdsourcing' by Pripc, Shukla, Kietzmann and McCarthy (2015). The second article is 'Using the Crowd as an Innovative Partner', an article by Boudreau and Lakhani (2013) from the Harvard Business Review. Besides these two articles, I searched for other suitable and beneficial sources. Hereafter, I will make a critical analysis that gives an insight on the various conclusions of the authors. These are further analysed in chapter two, my literature review.

The second step, conducting the interviews, will be my next information source. Here I will try to get a clearer sight on how firms benefit or what they do in order to benefit from crowdsourcing. This can be internal, external. If it is a mix between internal and external, I would like to know how they determine this boundary between internal and external. Furthermore, I will analyse the role of crowdsourcing in the open innovation strategy of the firm.

Then I will connect my findings of the interviews and my findings from the literature in order to discuss on how firms can actually benefit from internal and external crowdsourcing. I will end this master thesis with my own recommendations on this subject. Specific matters that are not yet sufficiently investigated and who form a gap in literature, will be mentioned specifically as a hint for future research.

1.2 Problem Definition

Crowdsourcing is defined as “the use of large groups of individuals by organizations to perform tasks traditionally performed by employees or designated agents”. Currently, organizations are tapping into the crowd to complete a wide variety of organization tasks. However, we know little about the types of tasks completed, the different crowds that participate, and the characteristics that manifest themselves in these initiatives. Preliminary findings from a grounded theory study designed to identify patterns and themes found in crowdsourced initiatives have revealed four common uses of the crowd (i.e., productivity, innovation, knowledge capture, and marketing/branding). Additionally, reoccurring themes related to the knowledge the crowd brings to the task, the location of the crowd, as well as organizational challenges and value capture have been identified. Emerging patterns and relationships among the four identified uses and these reoccurring themes are discussed. Crowdsourcing was defined in 2006 as ‘taking a function once performed by employees and outsource it to an undefined (and generally large) network of people in the form of an open call’ (Prpic et al.) Due to the rise of the internet, mobile technology and the huge variety of social media, it has become easier for companies to engage large crowds for their innovation and problem-solving use. Crowdsourcing has become a generic topic nowadays. Globally, organizations such as companies and governments use it to solve problems or to generate new ideas. Via internal or external crowdsourcing, companies use the knowledge of willing people for opinions, advice or to gather reviews on e.g. their innovations or their policy. It is thus an easy way to gather many different and mostly objective responses (opinion, reviews, etcetera) in a short period of time. Crowdsourcing brings almost no risk to a company, and that is the beauty of it. It is a process that brings very little costs to find out if certain ideas are worth further developing and producing or if they rather should be replaced. In recent years, much is already written on the advantages and disadvantages of crowdsourcing. It is only very recently that researchers have shifted their focus and specifically began to look at how a company can get effective advantage of crowdsourcing. I will try to draw a line between internal and external crowdsourcing activities and how to benefit from them as a company.

1.3 Research question and research objective

More concrete, with this master thesis, I will try to answer the following research question:

“ How can firms benefit from internal and external crowdsourcing? ”

In this study, I will first define crowdsourcing and how it was originated. Next, I will try to find the success factors of crowdsourcing and how these can be measured. Through literature and interviews I will try to find out what exactly are the ultimate benefits of crowdsourcing and what the key elements are, for a firm, to develop a beneficial crowdsourcing strategy within the company. Next, I will do a thorough analysis on the possible managerial challenges and struggles and how these can be avoided. I will try to develop a managerial guideline with the key elements on how to beneficially implement a crowdsourcing strategy and thus set up successful crowdsourcing projects.

So my sub-questions will be

' How to develop a beneficial internal crowdsourcing strategy? ' and
' How to develop a beneficial external crowdsourcing strategy? '

First of all I will start by analysing both the role of internal and the role of external crowdsourcing and explain the difference between the two ways of crowdsourcing. Further I will study how to determine whether internal or external crowdsourcing is necessary for a certain problem or idea gathering. Furthermore, I will look at cases where companies utilise a combination of both internal and external crowdsourcing and how or when this can be beneficial. With this research, I would like to figure out when using the crowd as crowd capital for your company is beneficial and in which cases a selection within that crowd is favourable. Next, I will do research on the conditions necessary for both internal and external crowdsourcing and the advantages that one or the other can offer a firm. With the information I will gather throughout my thesis, I will make a list of key elements that are necessary for developing a good crowdsourcing strategy, especially from a managerial point of view. This way I hope to develop a guideline for managers on how to set up a good crowdsourcing project. Because if a firm has a problem they want to solve through crowdsourcing, it is essential, especially for firms who are new to crowdsourcing, that they have a guideline. As I already mentioned, a firm can select a part of the crowd or they use the crowd in general so that every individual can give input on how to solve a certain challenge or problem or come up with new out-of-the-box ideas. But in either way, the crowd actually has to care about the problems of the company, they have to think of them as 'solving worthy', otherwise, they won't engage. Therefore it is very crucial for a firm to build an innovative eco-system that has people willing to engage in it. I will try to determine how firms can best do this and the managerial aspect in this whole process should not be underestimated. Crowdsourcing is a process of sharing, building and creating. So first of all it is crucial to investigate what exactly is attractive to the crowd in order for them to engage in your project. This may be different for internal and for external crowdsourcing. At last, I want to identify the managerial challenges or struggles that may occur throughout crowdsourcing projects and explain how they can be solved or maybe even avoided. My research objective is thus to try set up a set of managerial guidelines that a company can follow to successfully develop and deploy beneficial crowdsourcing capital and projects. Throughout this thesis I will try to make a clear distinction between internal and external guidelines as much as possible. Real life crowdsourcing cases from important players in the crowdsourcing industry will help me with this study.

Chapter 2. LITERATURE REVIEW

Themes	Theory
<p>Idea of Crowdsourcing</p>	<ul style="list-style-type: none"> • “Under the right circumstances, groups are remarkably intelligent, and are often smarter than the smartest people in them.”- Surowieki. • Companies no more exclusively depend on own capacities and internal distribution channels in order to innovate – thus employing the closed innovation model (Herzog, 2008) – but also handle certain innovation projects in an open-minded way where they use the crowd as an innovation partner • <i>“Simply defined, crowdsourcing represents the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call. This can take the form of peer-production (when the job is performed collaboratively), but is also often undertaken by sole individuals. The crucial prerequisite is the use of the open call format and the large network of potential laborers” – Jeff Howe, 2006.</i>
<p>Crowdsourcing in practice</p>	<ul style="list-style-type: none"> • 4 types of crowdsourcing: <ul style="list-style-type: none"> ❖ Crowd-voting ❖ Micro task crowdsourcing ❖ Idea challenge ❖ Solution Crowdsourcing • The crowd can be constructed of external or internal contributors • Different crowds obtain different knowledge, experience, skills or other resources resulting in dissimilar values that will be added to the company. (Prpic, et al., 2015). • Whether objective or subjective, contributions gathered through crowdsourcing, should be processed to be valuable (Prpic, et al., 2015) • <i>“With most things, the average is mediocrity. With decision making, it’s often excellence” – Surowiecki, 2004</i>

Challenges with Crowdsourcing	<ul style="list-style-type: none"> • Creating an open minded company culture • Making a clear problem definition • The significance of feedback for the contributors • How to govern and structure the ideas coming in
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Table 1: Summary of 'Chapter 2: Literature review'

2.1 Introduction

Throughout the latest years, crowdsourcing has become more and more popular in firms as a way to cluster ideas for innovation and to find answers to difficulties that occur in the development of products or services. The knowledge of the crowd is thus used to solve problems or to gather new innovative thoughts (Afuah & Tucci, 2012) and even to help with R&D (Howe, 2006). This in contrast to the traditional idea of depending on a small number of experts (Simula, et al., 2012 and Surowiecki, 2004). A crowd is much more efficient in solving problems in corporate settings. This efficiency is mainly due to the great diversity that prevails in a crowd because of its wide variety of skills, expertise and perspectives. Experts, whether they work as employees or are hired externally, are mostly driven by the traditional incentives such as their salary and potential bonuses. A crowd however, when a corporation uses them as an innovation tool, is mainly guided by a more intrinsic motivation. Their eagerness to learn and help solve corporate problems, offers a firm a bundle of resources that are not available through the traditional hired experts (Boudreau et al., 2013). As Surowiecki stated: "Under the right circumstances, groups are remarkably intelligent, and are often smarter than the smartest people in them."

Principles of a crowd	Principles of a small number of experts
Loose and decentralised	Well-coordinated
Varied skills, expertise and perspectives	Specialized knowledge
Intrinsic incentives: desire to learn	Traditional incentives: salary, bonus
Benefits of scale	Limited

Table 2: Contrasting principles of crowdsourcing and relying on experts.

2.2 Crowdsourcing and historic context

Knowledge is dispersed all over the globe, far beyond the conventional organizational boundaries of the internal environment of a firm. Therefore, a lot of corporations have changed their innovation strategy from closed to open. By adding third parties to the closed innovation model, Chesbrough clarified the Open Innovation model in 2011. When a company tries to produce and create new ideas or new innovation projects, it can depend on that dispersed knowledge by collaborating with their customers, competitors, consultants, suppliers, researchers and knowledge institutions such as universities. This goes far beyond the traditional internal resources of the closed innovation model (Bahemia et al., 2010). Chesbrough also stated that open innovation "is a more distributed, more participatory, more decentralized approach to innovation, based on the observed fact that useful knowledge today is widely distributed, and no company, no matter how capable or how big, could innovate effectively on its own." The company gets access to a whole new bundle of resources such as the knowledge skills, expertise from these third parties and the current knowledge from other areas of expertise (Laursen et al., 2006). In figure 1 it is made clear that there is a shift in mind-set from 'the lab is our world' to 'the world is our lab'. The knowledge you use to innovate, gather new ideas or solve problems does not solely come from within the company anymore. The knowledge may come from anywhere, even from all over the world. This way there is not only knowledge creation within the firm through learning and experience but also a knowledge connection over the whole world. All companies are connected to each other by one way or the other. Even customers in the crowd have become active co-innovators instead of the passive recipients that they used to be. This is part of the shift from a closed innovation model towards an open innovation model. Here the funnel surface has become porous instead of impermeable (Chesbrough, 2011, and Osella, 2015).

	Old Guard	New guard
Innovation paradigm	Closed Innovation	Open Innovation
Motto	'The lab is our world'	'The world is our lab'
Knowledge sourcing approach	'Not invented here' syndrome	'Best from anywhere'
Innovation patterns	Centralized and monocentric	Distributed and polycentric
Prominent R&D activity	Knowledge creation	Knowledge connection
Source of competitive advantage	Technical excellence	Absorptive capacity
Attitude towards IP	Ownership and protection	Selective Sharing
Role of customers	Passive Recipients	Potential active co-innovators
Innovation funnel surface	Impermeable	Porous

Table 3: The stark-contrast 1.0

Source: Osella, 2015.

Crowdsourcing uses the crowd of individuals as an innovation tool (Boudreau, 2013), available via the internet, mobile technology and social media. This whole community of innovators can be seen as a new medium for *organizational problem solving*. The term crowdsourcing is created by Jeff Howe and Mark Robinson in 2006 in their article for Wired magazine. Although there is no general accepted definition, Howe stated crowdsourcing as follows:

"Simply defined, crowdsourcing represents the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call. This can take the form of peer-production (when the job is performed collaboratively), but is also often undertaken by sole individuals. The crucial prerequisite is the use of the open call format and the large network of potential laborers" – (Howe, 2006)

And still Crowdsourcing is actually nothing new, back in 1936, Toyota organized a challenge where they asked people to redesign their logo. Almost twenty-seven thousand people participated in that contest (Osella, 2015). The term Crowdsourcing is a neologism, in where both the term crowd and the term sourcing can be found. The crowd should thus be seen as a resource (Vladislavlevna, et al., 2015). They are a group of people who are anonym and strangers to each other, who can be used to solve problems or generate ideas. The average result is generally not as good as the best result and as Bill Joy, co-founder of Sun Microsystems said: "No matter who you are, the smartest people work for someone else". The average time of fifty individuals in a race, for example, *lies* far from the winner's time. But when it comes to decision making, the average answer will be excellence instead of the usual mediocrity. This is the basic principle of crowdsourcing: the wisdom of a group comes from the aggregation of their solutions (Brabham, 2008). The expansion of the Internet and the mobile technology in the last decades and more recently the proliferation of social media, make it possible for corporations to use means at scale (Kietzmann, et all, 2011). These crowds should be visioned as a new, different medium for corporate problem solving. Although successes also occurred before the digitization proliferated, the diversity the web offers, is needed to create 'Crowd Wisdom' (Lévy, 1997). The internet has two main roles that are important for the innovation processes in companies. First of all the web provides the resources that make communication possible between individuals all over the world. The internet is thus the global contributor of communication resources. The second role of the web is that it is the technology that boosts innovation among his consumers (Brabham, 2013).

In a B2B context, there is a layered model for applying crowdsourcing. The inner circle represents the boundary of the firm, so any crowdsourcing within that boundary is called internal crowdsourcing and includes all employees of the company. The outer layers represents the external parties. These are divided in three layers: the trusted partners, the specific crowd and at last the general crowd. The thrusted partners are also called the value-chain partners. The specific crowd is a selected crowd. So instead of using the general crowd as a whole, you restrict the crowd by selecting certain communities or individuals who have specialised knowledge or expertise in the area you are looking for. This layer of external parties is called pre-qualified participants and communities on figure 1. This in contrast with the general crowd, which contains every individual, even concurrence (Simula, et al., 2012).).

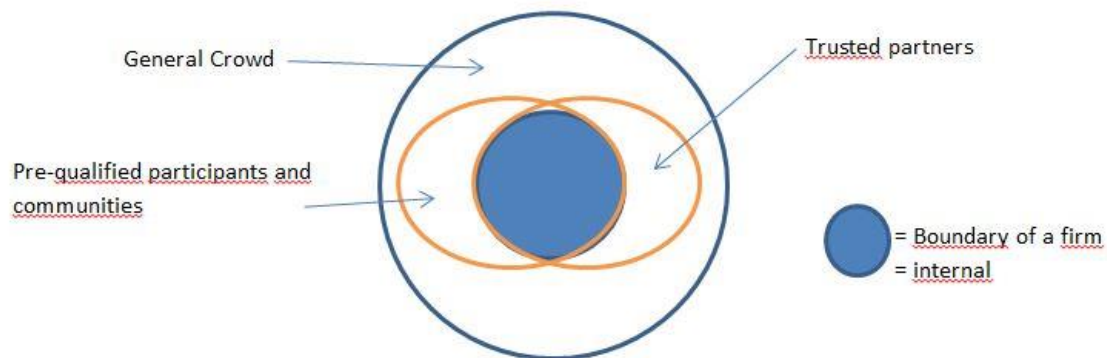


Figure 1: A layered model for approaching crowdsourcing in B2B context
Source: Simula, et al., 2012.

Internal crowdsourcing indicates that the crowd you work with as a company for your crowdsourcing activities, consists of the firm's own employees. Internal crowdsourcing is mostly used for internal idea competitions or challenges to help improve the innovation processes of the company. It helps to involve and link a bigger number of employees in that process. This large amount can boost more creative ideas because the company has access to more internal resources, his internal crowd and human capital as a whole. In a lot of cases, the purpose of internal crowdsourcing is to acquire access to the ideas, designs and concepts of employees. Further, it also stimulates interaction between the people who work for the company all around the world. Another advantage of crowdsourcing is that no time is lost by prequalification of people in the crowd (Simula, et al., 2012). Further, Internal Crowdsourcing is a stimulator for the transfer of internal knowledge and finally it promotes learning between departments.

External crowdsourcing with thrusted partners means that a firm engages in crowdsourcing activities with people who already have some affiliation with the company. This can be suppliers, business partners, or other stakeholders. With external crowdsourcing, the motivation and engagement depends on both financial rewards and commendation. Because you know who is contributing to your crowdsourcing project and the mass is limited, working with trusted partners

may in some cases be more beneficial than working with the general crowd. As a firm, you save both resources and money. External crowdsourcing with a restricted crowd states that the participants have to meet certain criteria, depending on the project. A disadvantage is that you lose the heterogeneity and limits serendipity, however, it has advantages as well. You get more useful answers as you are working with an expert-crowd group. For some challenges, a certain expertise, knowledge or skills are crucial, in these cases, a restricted crowd is recommended. External crowdsourcing with the general crowd indicating that everyone can access, can offer new creative ideas and products based on the experiences from everyday life. As a company, you tap into a large crowd of external knowledge, outside the boundaries of your firm. Interacting with both consumers, hobbyists, professionals and developers and this within the eco-system of the firm. (Simula, et al., 2012). Hereby, external crowdsourcing leads to superior ideas and facilitates out of the box thinking. It is thus a very novel way to engage the large public.

2.3 Crowdsourcing in practice

Crowdsourcing is currently a hot topic in the field of innovation. However, questions are being raised where crowdsourcing is actually heading to. The term crowdsourcing is a popular subject and has been associated with a lot of success stories over the years. Nonetheless, the concept of crowdsourcing lacks a comprehensive theoretical framework, guiding managers through the process of successfully setting up a beneficial crowdsourcing strategy. Specifically, there is no research that clearly clarifies the key elements for a firm on how to actually benefit from crowdsourcing.

Prpic defined four types of crowdsourcing in his article *How to work a crowd: developing crowd capital through crowdsourcing*. In crowd-voting, organisations ask a question or an issue to a larger crowd. Based on the responses of the people via online platforms, the company makes a decision on the issue. Another type of crowdsourcing is the micro task crowdsourcing. Firms here split a task into many tiny tasks and regenerate everything afterwards. The reason they split the task is mostly because of its complexity or size. The third type is Idea Crowdsourcing. Here, companies are looking for creative, new and inspiring ideas from the crowd. The crowd can thus be seen as a resource for gathering new innovative thoughts. By tapping into the larger general crowd, the outputs need to be filtered before an idea can be selected and implemented. The fourth type of crowdsourcing is solution crowdsourcing. This is the opposite of idea crowdsourcing. Instead of asking for general out of the box ideas, you are now looking for a solution to a specific problem. This problem has to be well defined to the crowd, best with a clear problem definition. The four types of crowdsourcing are all serviceable to accomplish different goals, depending on the objective of the crowdsourcing project that the company is working on or setting up. In all cases, a firm gains 'crowd capital'. These are the organisational resources obtained through crowdsourcing activities. Gathering access to crowd capital is a complete process that exists of three different stages (figure 2). First of all, a crowd needs to be constructed, that is phase one. As already explained in chapter 2.1, the crowd can be constructed of external or internal contributors. Different crowds obtain different knowledge, experience, skills or other resources resulting in dissimilar values that will be added to the company. The second phase is the developing of crowd capabilities. Here the company first needs to make a determination how it will acquire the

resources that are distributed throughout the entire crowd. Here for it is necessary for an organisation to have a good understanding of the interaction mandatory for the obtaining of the knowledge of their crowdsourcing project. Different types of knowledge ask for different ways of interacting. Secondly, the decision must be made on how to align the participants within the current internal process of the company. In figure two, these are referenced to as Acquisition and Assimilation. A well-developed framework is essential for this second phase. Finally in stage three, the firm can start harnessing their Crowd Capital. (Prpic, et al., 2015). This harvesting has become much easier in the past decade since the digitization and the communication technologies have advanced so much and have taken a central role in our existence. The internet supplies the framework for strangers from all over the world to communicate and become a community on itself in this specific environment of the web. To continue, the web provides the technology that allows a particular type of thinking. It stimulates a particular type of innovation. The web is not solely 'the means through which a flexible collective network intelligence has come into being' (Terranova, 2004) anymore but now is also attracts individuals from all over the world to come together in a single environment and construct ideas together within the walls of the internet. (Brabham, 2008).

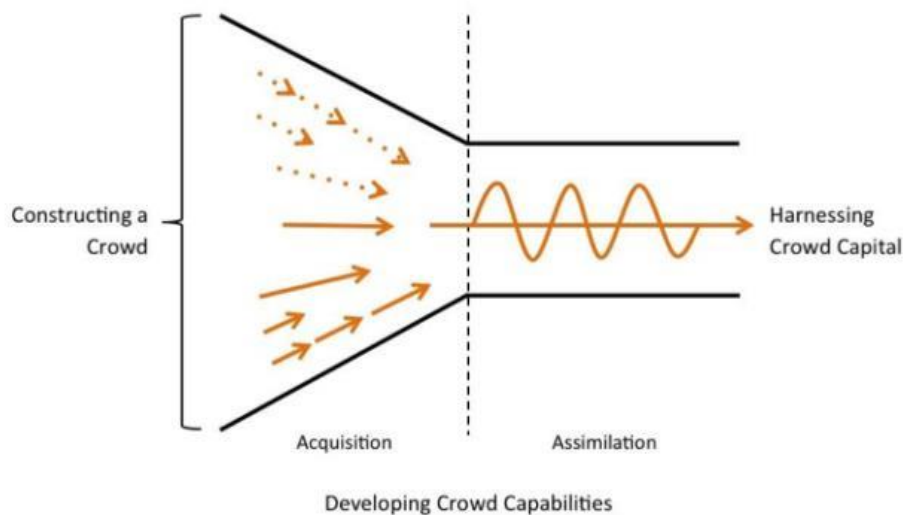


Figure 2: The Crowd Capital Perspective

Source: Prpic et al, 2015.

Although they are both collaborative problem solving models, crowdsourcing is definitely not the same as outsourcing. The definition of Open Source is 'allowing access to the essential elements of a product to anyone for the purpose of collaborative improvement to the existing product, with the continued transparency and free distribution of the product through the various stages of open development' (Parens, n.d. and Brabham, 2008). One of the main differences between crowdsourcing and outsourcing is that the solutions come from unknown participants from the crowd, instead of experts the firm is familiar with. The person who will be financially compensated is thus not known a priori. Another difference is that open source does not contain any ownership, no intellectual property rights. With Crowdsourcing however, the ideas generated are owned by the company posing the question or challenge at the end of the project. A common point between

crowdsourcing and open source is that the open character of these types of activities, is key for the cooperation and key to deliver new creative elements to the design process.

Organisations all over the world are more and more aware of the many benefits crowdsourcing has to offer. As mentioned above, it facilitates out of the box thinking. The potential for obtaining new ideas from people who are outside the boundaries of the firm, is being discovered. New, creative ideas generated through crowdsourcing lead to innovations and efficient problem solving, hereby decreasing the costs and time necessary to generate them. (Brabham, 2008 and Simula, et al., 2012). Crowdsourcing in practice offers thus benefits of scale since the crowd is seen as a community of innovators (Boudreau, 2013). It is an open call, directed towards the individuals of the crowd and not towards other organizations. That is one of the most interesting facets of crowdsourcing, it has the power to surpass any geographical, political or economic barrier (Sharma, 2010). Of course, firms can only benefit from crowdsourcing if the project is successful. Here for, the most important cause for a successful crowdsourcing project is still the involvement of the project team member and their high level of motivation (Lüttgens et al., ?).

2.4 Managerial Challenges

Even though crowdsourcing is a beneficial tool, there are also many challenges in the implementation of crowdsourcing activities. An issue concerning innovative thinking can be the company culture. If the open mind-set is not imbedded throughout all layers of the company, employees will not feel engaged and motivated to send in ideas and solutions to challenges posted on internal crowdsourcing platforms. Since Open Innovation has become a real subject in the company culture, the implementation of the openness may take some time. Evolving from a closed to an open business model and mind-set, is a slow procedure that needs the willingness and the engagement of the management in the firm. Once the external exchange tools are accepted in the culture and there is a firm belief in the advantages of collaboration, there will be an open way to new possibilities and new innovations. This innovative thinking and mentality is thus crucial. (Boudreau & Lakhani and Simula). Further, the importance of clear problem definitions for idea challenges are underestimated. As a manager, it is crucial that the idea challenge can be understood by each person in the crowd. This counts for both internal as external crowds. If the target group does not understand what you are looking for or what the problem is, there will also be a lack of qualitative and useful results. A good framework of the circumstances and the context is essential. Another challenge that is made clear by Simula et al. is the significance of feedback for the contributors. If someone sends in an idea and receives no feedback, he will not engage again in another crowdsourcing activity in the future. You lost him as a contributor. To avoid this, it is vital to give feedback to the users. A fourth challenge as a manager is how to govern and structure the ideas coming in. It is in human's nature to follow a leader. The same goes with crowdsourcing. If a participant produces a good and creative idea, a lot of the other participants will agree and follow this idea. The result is only few users actually create useful contents on the online platforms and the rest of the crowd follows without providing new inputs. However this is a common issue, people often miss the time to become committed. Additionally, the amount of ideas that can come out of an external crowdsourcing project may potentially be too much. As a firm, you need the resources

to analyse all of them. Some companies do not realise this until the project has already started, which is negative for further crowdsourcing projects since you lose a lot of contributors who did not get feedback. (Simula, et al., 2012). Finally, intellectual property may be an issue as well. According to Boudrea, unambiguous contractual terms and technical specifications are necessary to guarantee a correct ownership at the end.

Chapter 3. RESEARCH METHODOLOGY

In this master thesis with the research question on how firms can benefit from internal and external crowdsourcing, the 'triangulation' approach is applied. I employed two methods in order to check the results of the subject. The first method is a combination of a thorough literature review followed by seven interviews with six important players in the crowdsourcing field. The second aspect used in the study of this master thesis is a case-based research on these interviews. More specific, I will do my case study research by implementing the six-step-approach proposed by R. Yin in 1984:

1. determine and define the research questions;
2. select the cases and determine data gathering and analysis techniques;
3. prepare to collect the data;
4. collect data in the field;
5. evaluate and analyse the data;
6. prepare the report.

According to R. Yin (1981), a case study is "an empirical enquiry that investigates a contemporary phenomenon within real-life context, especially when the boundaries between phenomenon and context are not clearly evident". Internal and external crowdsourcing is a common present subject matter, therefore, the conducted research in this thesis is a case study. On the basis of conversational interviews, I connect the research to the reality of crowdsourcing in firms. My thesis is thus a 'qualitative and explorative' study since subject is rather new and therefore appropriate for case studies (Yin, 1994).

Step 1: Determine and define the research questions

In chapter one of this thesis 'research design' I analysed the reason and purpose of this study in '1.1 introduction' and '1.2 problem definition'. After the analysis of the research already done on this subject, I defined the following two sub questions, as already mentioned in 'Chapter 1.3 Research question and research objective':

1. 'How to develop a beneficial internal crowdsourcing strategy? '
2. 'How to develop a beneficial external crowdsourcing strategy? '

The most substantial effort of this thesis is to develop a consistent and coherent solution for these two sub questions.

Step 2: Select the cases and determine data gathering and analysis techniques

Company	Interviewee	Location	Nr. of employees	Revenue	Internal CS	External CS
General Electric	Anne Rhodinsky	Paris, France	305 000	\$ 117.38 billion	Yes	Yes
Bekaert	Kevin de Caluwe Eric de Kempeneer	Kortrijk, Belgium	30 000	€4.4 billion	Yes	Yes
Liberty Global	Roel de Vries	London, UK	35 000	\$ 18.248 billion	Yes	Yes
Cognistreamer	Wim Soens	Kortrijk, Belgium	25-30	/	Yes	Yes
Janssen Pharmaceutica	Tom Aelbrecht	Beerse, Belgium	4000	€ 2.010 million	Sporadic	No
ISMB	Michèle Osella	Torino, Italy	/	/	Research	Research
Crowd Expedition	Martijn Arets	Utrecht, The Netherlands	/	/	Research	Research

Table 4: Overview selected cases

The cases I gathered are Cognistreamer, Bekaert, Janssen Pharmaceutica, Liberty Global, Crowd Expedition and General Electric. First of all Cognistreamer is a service provider who offers 'collaborative software and professional services to drive and manage corporate open innovation'. It is a tool that, together with their consultants, guides firms into collaborative innovation and the co-creation of ideas and products. They have set up an international community of young creatives and digital minds. These can help solve the R&D challenges that companies struggle with. Cognistreamer was started as a business unit of a classical web developing company who creates different sorts of web-applications. In 2000 a customer asked them to develop an application for their internet to support the stage CAPE process of their R&D department. After the project was delivered, a lot of customers and suppliers who saw the application asked if it was commercially available. It gradually grew until in 2008 the business unit came to a point where it was self-sustaining. The company had to split up and that is how Cognistreamer originated. Since 2008, Cognistreamer is thus a free and independent company and is still growing in the market. Right now, they belong to the top five world-wide of providers of collaborative innovation software. After realizing that only selling the software to their customers was not sufficient. Customers needed guidance throughout and after the implementation of software. Cognistreamer thus needed to create the necessary governance structures around it and how to organize such an innovation structure. Now they develop software, implement it with their customers and help train the people how to work with the system. Although software development is still the core business through it

all. The second case is General Electric. This is a multinational electrical firm. The history of this pioneering company starts far back in 1878, when the famous scientist and inventor Thomas Edison invented the first practical light bulb. With this breakthrough discovery General Electric started a tradition of many life changing innovations. Ever since their breakthrough, this pioneer caused changes in everybody's common life. All their inventions are created thanks to GE's characteristic optimism and vision of future possibilities. In the beginning of the twentieth century, the company produced more conveniences, like electric toasters and refrigerators, which would change the daily life of people back then. Another revolutionary thing that GE did, was giving 'consumer finance' to its customers so they could pay for their new invention in those tough times during the Great Depression. In the late seventies, they identified that the needs of the society started to become more and more complex because of the natural resource issues. This led to new areas of business, for example they designed and produced the Mars Observer and launched the first website for a company outside of the computer industry. General Electric started to notice that new markets were emerging and new market places were generated. That is why GE moved his Global Research Centre to India, home of the brightest technologists. Since 2000, the company increased his speed of innovation after different breakthroughs in many different areas of research. Recently, the company continues to discover many substances and subjects in a wide variety of field. GE is known for their leadership in innovation. GE comprehends that in order to revolve some of the hardest problems in the world, collaboration is necessary. This pioneer increases the value of the customer and is making progress in all sectors by using both internal and external crowdsourcing. They firmly believe that by sourcing and implementing all sorts of innovative thoughts from all over the world, GE tries to serve their customers more efficient and effective. My third case is Janssen Pharmaceutica. Janssen was founded in 1953 by Dr Paul Janssen, he founded the company to achieve his life goal: improving quality of life thanks to development of better medicines. In, 1961 Janssen merged with the global market leader in the sector: Johnson & Johnson. This group has more than 128,000 employees worldwide. Janssen's core business is developing treatments for some the most devastating diseases and complex medical challenges of our times, like diabetes, HIV and cancer. Apart from medicines only Janssen is also known for the discovery, development and delivery of new innovative healthcare solutions in a number of disease areas such as oncology, immunology of infection diseases, neuroscience, cardiovascular diseases and metabolic diseases. The sector in which Janssen operates is characterised by a high need of innovative and fast solutions, since the patients' lives are at stake. Nowadays, Janssen is one the world's most innovative companies in the pharmaceutical sector, they continue to acquire more and new challenges for new medicines and continuously comes up with new solutions on the market. To find these new solutions they work together with all kind of institutions and companies, two well-known examples are: UHasselt and Stellar. Janssen is in constant search of new ideas to improve their current medicines, to achieve this all ideas from all kind of fields are welcome, as mentioned on their website. This can also be seen in the fact that their lab assistants permanently work together with external fellow scientist during every stage of the value chain. Janssen acknowledges the fact that science and technology are evolving is such a fast way that they have to work together with other parties in order to continue to make a difference. That is why Janssen does not only look for new medicines in their own lab, but it rather considers the whole world as one big laboratory. A fourth case is Bekaert. Bekaert is a the global market and technology leader

in steel wire and steel cord products and solutions. Their customers are in a very wide range of industrial sectors. The largest one is the automotive sector, where almost forty percent of their activities are occurring. The second one is construction and the third one is energy. Then it continues to agricultural raw materials and medical consumables. Bekaert was founded in 1880 by Leo Leander Bekaert in Zwevegem, Belgium. They have grown rapidly and now they have customers in over hundred twenty countries globally and in all markets and industries. Bekaert now employs over 30 000 people all over the world with their headquarters still in Belgium. Collaboration is key for Bekaert as their baseline 'Better Together' indeed demonstrates. They keep looking for opportunities and business development to create new future businesses. With their internal online innovation portal, where more than 6000 of the employees are connected to, they try to engage the whole internal population to participate in their innovations. Further, Bekaert also frequently engages in external crowdsourcing. A fifth case in my research is Liberty Global. Liberty Global is one of the biggest telecommunications and television companies in the world. It is an American company with headquarters in London and offices in the Netherlands and the United States. Liberty Global was founded in 2005 and has since grown to be the largest cable business in the world. The company has over 35 000 employees working in more than fourteen countries. One of the consumers of Liberty Global is Telenet. The company slogan states "Connect. Discover. Be Free". They are a very innovative company with a clear focus on technological improvements to transfer life-changing products and services. Finally my last case is Crowd Expedition. This is a four year project lead by Martijn Arets that analyses the real added value of the Collaborative Economy. With Collaborative Economy, all platform based activities are bundled. This includes the Sharing economy, Crowdfunding, Crowdsourcing and the Gig Economy Martijn was nominated for best entrepreneur in 2011 in the Netherlands and joined the European Young Leader Program '40 under 40'. With Crowd Expedition, Martijn and his team of experts, globally dispersed, want to analyse the collaborative crowd economy all over the world.

Now, I will however explain the way my data will be gathered and how I will analyse them afterwards. So in order to construct my theoretical foundation relating to Crowdsourcing and how firms can benefit from it, I divided my study as previous mentioned, in two main parts: besides conducting a literature review to compose a theoretical framework, I conducted seven interviews with main players in the crowdsource environment such as Cognistreamer, Bekaert, Janssen Pharmaceutica, General Electric, Crowd Expedition and Liberty Global. Professionals from these companies, occupied with the subject of innovation and crowdsourcing, gave me a clearer insight in the world of Crowdsourcing. Another reason why I chose these seven companies is because it is critical in case-based research to have decent interviewees to accomplish the goal of successful research (Yin, 2003).

In my literature review I started by studying the two sources which I received from my supervisors. The first was 'How to Work a Crowd: Developing Crowd Capital Through Crowdsourcing' by Pripc, Shukla, Kietzmann and McCarthy (2015). The second article is 'Using the Crowd as an Innovative Partner', an article by Boudreau and Lakhani (2013) from the Harvard Business Review. Afterwards, I searched via EBSCOHOST and Google Scholar on the university campus in Diepenbeek. Through these media, I found supplemental sources which I incorporated in

my theoretical framework. Since it is a very experimental subject, the literature is still undeveloped and stays very vague and superficial. Next to the theory, the second source of information were the seven interviews of the pioneers I have spoken with. Before I conducted these interviews, the questions were checked and moderated by my supervisors. This resulted in the interviews which can be seen in chapter 3 'Findings' and the appendix B to I of my thesis where the answers to the interview questions can be find. Thanks to the conversation with the professionals, I developed a clear picture on their point of view concerning Crowdsourcing, the key elements and the managerial challenges. As mentioned above I chose these companies because of their meaningful experiences with crowdsourcing activities in their sector.

I decided to conduct 'semi-structured informal conversational interviews' as outlined by Gall and Borg (2003) instead of structured formal interviews. They formulate informal conversational interview as follows: "The purpose of relying entirely on the spontaneous generation of questions in a natural interaction, typically one that occurs as part of ongoing participant observation fieldwork." I moderated this type of interview according to the needs of this research, which resulted in the interviews I have conducted (as can be seen in appendix). This is, in my opinion the best way to get to know someone's real vision on a matter. To analyse my data, I compared the statements of my seven experts with the conclusions I had drawn from the literature review in chapter two.

Step 3: Prepare to collect data

To formulate the questions for my interviews I divided them into three main parts: 'Introduction', 'Internal and External Crowdsourcing' and 'Termination'. In the first part, 'Introduction', I asked a standard set off general questions about the company, the interviewees and the ways the companies portray Crowdsourcing and embrace it. Then, in the second part, I focused more on the way the companies set up crowdsourcing activities, what the key elements are and the managerial challenges. At the end of this part each of the interviewees gave me a concrete case of one of their crowdsourcing projects. Finally, in the 'Termination' part I asked whether there was something exceptional about the company concerning crowdsourcing that he or she would like to emphasise.

Step 4: Collect data in the field

As a fourth step in my case-based research process I conducted the eight interviews. First, there was the interview with Wim Soens, founder of Cognistreamer. I went to the office site of Cognistreamer (Kortrijk, Belgium), where I conducted the interview. Secondly, I conducted an interview with Roel de Vries, from Liberty Global via a Skypemeeting. Next I conducted two interviews with Kevin de Caluwe, corporate innovation team leader at Bekaert and with his colleague Erik de Kempeneer, innovation manager at Bekaert via telephone. Then for my interview with Janssen Pharmaceutica, I had an appointment with Tom Aelbrechts, head of Janssen Campus Office at the HQ-site of Janssens PLC (Beerse, Belgium). Further I had an additional skypemeeting, this for my interview with Martijn Arets from Crowd Expedition. Finally, I had my last interviews with Anne Rhodinsky from General Electric and Michèle Osella from ISMB via telephone. I recorded all the interviews and typed out their transcripts afterwards, which made it easier to use the exact

quotes stated by the interviewees. All these transcripts can be found in the appendix at the end of this study. As stated before, I started with the basic interview format (Appendix A) and then moderated it towards the specific companies (Appendix B until I).

Step 5: Evaluate and analyse the data

In step 2, I already mentioned that I would compare the statements in the interviews with findings of my literature review so I can make a clear analysis. Further, I will do a within case analysis, so I will study my findings per case based on quotes of the interviewees as well as a cross-case analysis, linking the seven different cases and examining whether there were similarities and/or differences between them. The results of these analyses and comparisons will be shown in the third chapter of my research 'Findings'. In my fourth and last chapter 'Discussion', I will give a summary of what this study brought to light and try to develop a clear guideline for future managers on how to handle crowdsourcing projects.

Step 6: Prepare the report

The results of the preceding five steps will be put together in this master thesis. I divided this thesis into four chapters in order to present it in a more comprehensible way. These chapters are: (1) Research Design and Objective (2) Literature review, (3) Research Methodology, (4) Findings and finally (5) Discussion.

Chapter 4. FINDINGS

Themes	Cognistrea mer	Bekaert	Janssen Pharmaceut ica	Liberty Global	ISMB	General Electric	Crowd Expedition
Perception of crowdsour cing	"That you're going to open up a process of capturing insights. Could be problem insights, or solution insights or you do validation. And you engage a large communities to do that."	"Getting information from the crowds or from a group of people. Not even a big group of people that are maybe located in different locations or even globally."	"You have an objective and you're tapping into the masses of people, all around the world to get pieces of what you need to do to reach your objective"	"Source and refine ideas in response to real business challenges by tapping into the collective creativity of our employees and partners."	"CS is an unprecedented opportunity to access collective intelligence and to tap into this potential for a variety of purposes."	"Data collecting, gathering ideas from key stakeholders."	"And crowdsourcing is a form of sharing knowledge via platforms. So sharing knowledge and ideas."
Crowdsou rcing part of OI strategy	"But I do not link it to sourcing internally or externally. For me OI and crowdsourcing do not have the same overlap." "... employees that are being engaged in some kind of innovation program	"giving them opportunities to bring their ideas and also give them the opportunity to participate in discussion forums and become part of the whole innovation process."	"We have an open innovation strategy and an open collaboration strategy but we are not structurally using Crowdsourcing as a mechanism"	[question not clearly answered by this company]	"I would say that in a mid-term strategy, that is the goal." "CS is one out of many techniques and approaches to turn this porous OI funnel into reality.	"It's about fostering collaboration, it's idea generation, it's solving problems .. and it is also for helping to create culture within the company."	"We are starting from the believe 'you practice what you preach'."

	<i>and we call it crowdsourcing but it is not OI in a sense, because it stays within the walls of a company."</i>						
Key elements Internal Crowdsourcing Strategy	<i>"Set up the right governance structures, have good communication and engagement strategies and then manage the ecosystem you have created."</i>	<i>"You need to have also a very good process on how to follow up and have a clear understanding on how you will work with the people." "Second thing: is the challenge or is the question inspiring enough?"</i>	<i>"Feedback is the key element of success towards the future. "It is important that the people who have contributed are also acknowledged in the fact that they have spent time in it."</i>	<i>"Keep communicating, everyone has a lot on their mind so it is important to communicate so everyone stays involved in the project."</i>	<i>"Calling upon different divisions, departments and units is not only a way to exploit innovation potential but I think also to empower and engage the workforce. And this is something critical, especially in larger organizations."</i>	<i>"It's called communication." "Engaging managers to help spread the word of mouth of the importance is very critical to the process."</i>	<i>"You really need to arrange with the managers of the people you use, for your internal crowdsourcing, that people also will get a time off to work on that crowdsourcing project, I call this internal budgets."</i>
Key elements External Crowdsourcing Strategy	<i>"That is the main concern, that you have a good decent and fair IP agreement ... The second</i>	<i>"The starting point is a clear problem definition. Then a good follow up." "... how you will</i>	<i>"What is important is that you have a good alignment between what your business.. and that you have</i>	<i>"Really think upfront about what the next step is after the ideas" "Show return on investment on how the</i>	<i>"So the degree of openness, the governance structure and also, needless to say, what kind of remunerati</i>	<i>"You need to be careful at the content and not get overwhelmed. Because there is a lot of data and great</i>	<i>"A long term vision and strategy is the most important aspect." "About how are we going to manage our</i>

	<i>concern is openness."</i>	<i>evaluate proposals and you also need a clear legal arrangement."</i>	<i>them well defined and that you also commit yourself into following up to the input you receive from the crowd."</i>	<i>program is evolving and on the results."</i>	<i>on should be provided to innovators."</i>	<i>data so you need to be selective while being open."</i>	<i>crowds."</i> <i>"Also being able to ask the right questions to the right people."</i>
Specific benefits of crowdsourcing	<i>"It's the power of numbers which is the key aspect of why doing crowdsourcing."</i>	<i>"The biggest benefit is expanding your network." "There is a higher chance of getting a solution in your pool of ideas that you get from the crowd"</i>	<i>"The benefit is that you do not stick into the domains you are typically sticking to but you're really opening it up to other domains."</i>	<i>"The big benefit is that you get out-of-the-box ideas." "Involvement in general, the engagement because they [the crowd] feel valued."</i>	<i>"Considering crowdsourcing as a key pillar in an OI strategy, I would say reduce R&D cost." "The fact to attract solvers that are not part of the industry or not part of the business."</i>	<i>"Knowledge of what you're trying to achieve is a number one piece." "You have engagement in the fact that they [the crowd] participated and contributed .. so everyone has a stake in the game."</i>	<i>"The people have a really fresh look on what you're doing so people they are working in completely different industries and they can have insights into your project."</i>
Managerial Challenges	<i>"The more people you involve, the more benefit you will have. The challenge is how do you govern that. And how do you manage the</i>	<i>"..we underestimated the amount of time you need to evaluate all ideas." "Keeping the community engaged. That is</i>	<i>"How to convince your internal research to adopt an idea that comes from external, that really needs a mind-shift of the</i>	<i>"When you start, it is hard to get some real resources and a management that is really behind it, is crucial." "Ideas have to be</i>	<i>"Each time an organisation decides to embrace openness, the company partly loses control and this is counter balanced by</i>	<i>"Not influence the idea generation too much in what you're trying to do because you want to encourage out of the box thinking</i>	<i>"I think the biggest managerial challenge is how to manage a crowd." "..trying to think like okay how are we going to get this</i>

	<i>crowd and how do you motivate them?"</i>	<i>mainly about communication and feedback."</i>	<i>people."</i>	<i>realised as well. It can be hard how to fit the new ideas in the financial planning."</i>	<i>the fact that the company acquires additional brainpower. " "..the company loses the control of ownership.. "</i>	<i>when you're doing idea generation. You have to be careful that and the way you communicate within your crowdsourcing project."</i>	<i>group of people involved on the long term of our company?"</i>
Exceptional about the company	<i>"We're still also very much looking at business model innovation: what is for us the business model behind crowdsourcing?"</i>	<i>"Well, we have the innovation portal since 2000. The people are always a bit surprised that we are having such an online portal already that long."</i>	<i>"Open Innovation is a fundamental part of our strategy in getting access in getting new innovative top match science technology in order to be able to develop products towards the future."</i>	<i>"Innovation should be part of everyone's job: what I do is I facilitate everything to the business."</i>	[question not applicable to this company]	<i>"What is really interesting about GE is that anyone can have a great idea." "GE is very good at the follow through and ways to implement the ideas that are gathered through the crowdsourcing efforts."</i>	<i>"I think the 'practice what you preach' strategy is really helpful." "We are also experimenting with ourselves, so I think that is a really good thing to do."</i>
Examples of crowdsourcing project	<i>"The Nimble Bee project: we have created a global network of design universities and it's a closed network so not any uni can join the</i>	<i>"Welding is not of course a core technology of Bekaert. Well of course we use it but we are not the ones who invents or</i>	<i>"So as a company we have been shifting our strategy from a pure drug company towards healthcare solutions. So what</i>	<i>" I can't really tell you detailed examples of projects but currently in pipeline is a project to generate bigger ideas where</i>	[question not applicable to this company]	<i>"So it was all about going leaner and faster and it was with both engineering and IT and we were looking for new ideas for how to,</i>	<i>"The expert group. Because we started this crowdsourcing project with about eighty experts in different fields and it was really easy to find</i>

	<p>network.” “And then we launch those programs in the Nimble Bee network & the deal is that the schools who take on the challenge have to work on it during their curriculum, that’s part of the deal.”</p>	<p>develops a welding process. So we do have some internal developments there but there we went outside to the crowd to get, let’s say new ideas about how we could do that welding faster, cheaper and better.”</p>	<p>can we develop next to the drug? What can we do for prevention? And so on. So we did a challenge to the internal crowd where we had clear objectives. So we were looking for integrated healthcare solutions.”</p>	<p>you can think of different apps to simplify things in company or to make the work of employees more efficient.”</p>		<p>which priority to set in IT for the business. And it was used to generate ideas and to narrow them down to a certain group of ideas and then to forward them.”</p>	<p>them and also to convince them to work together.”</p>
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Table 5. Summary of ‘Chapter 4. Findings’

4.1 Perception on Crowdsourcing and the connection with the Open Innovation strategy

Before being able to create a representative interview for my research with the professionals of the crowdsourcing companies, I asked them how they see Crowdsourcing in their firm in order to check whether their view is more or less the same as mine.

When we look at the quotes in the table above, it initially seems like all interviewees more or less have the same perception of crowdsourcing. The basic element that they all mention is sourcing ideas from a big group of people. Tom Aelbrechts from Janssen Pharmaceutica states it as 'the masses of people all around the world' while Michèle Osella from ISMB refers to the crowd as 'collective intelligence'. Roel de Vries from Liberty Global looks at crowdsourcing as follows: "Source and refine ideas in response to real business challenges by tapping into the collective creativity of our employees and partners." As becomes apparent from the quote, he thinks of the crowd as partners. This means Liberty Global feels as if they are a part of the business. General Electric is the only interviewee who emphasizes along that idea, where she refers to the internal and external crowd as stakeholders. The other companies are still a little bit more distant towards the crowd and do not see them as potential future relationships for the company. Although if a company keeps involving them throughout the whole crowdsourcing process and not just in the up-front part, it shows they develop a more sustainable relationship with the crowd and results in a higher engagement in their future projects. Just like the theory in '2.4 Managerial Challenges' explained. I will come back to this issue later in 'Chapter 5: Discussion'.

Crowdsourcing originated from open innovation. First innovation was a closed funnel where all innovation was created and completed within the company itself. Throughout the years innovation became more open and evolved towards a porous Open Innovation funnel, as explained in '2.2 Crowdsourcing and historic context.' Boudreau stated that crowdsourcing uses the crowd of individuals as an innovation tool available via the internet, mobile technology and social media. Michèle Osella from the private research center ISMB in Italy finds that is it the mid-term goal of a company to use crowdsourcing as a part of their Open Innovation strategy. This way, he says, firms can assure that there is full-fledged reliable consolidated Open Innovation strategy present. According to him, crowdsourcing is one out of many approaches and techniques to turn the porous Open Innovation funnel into reality, resulting in an inflow and outflow of technology, knowledge and ideas. General Electric follows that interpretation. The pioneer in the sector of is known for their strong Open Innovation strategy and policy. GE engages in both external crowdsourcing, an example is the EcoMagination Challenge and internal crowdsourcing. It is about fostering collaboration, fostering idea generation, solving problems and making the business go faster. Furthermore, Anne Rhodinsky also mentions that internal crowdsourcing helps creating a good and sustainable culture within the company. As we saw in '2.4 Managerial challenges', the culture is one of the struggles studied by Boudreau. The culture in a firm can be an issue concerning innovative thinking. However it can be a solution at the same time, since crowdsourcing helps imbedding the open mind-set throughout all layers of the company, as Mrs Rhodinsky quotes. Further Bekaert, a market leader in steel wire and steel cords goes more in detail on how

crowdsourcing is a part of Open Innovation. Bekaert engages in both internal and external crowdsourcing. The internal crowdsourcing projects mostly leads to incremental innovation. They work with an online innovation portal and the ideas flowing into that tool are mainly improvement ideas for existing products and processes. Mr Soens believes this is a very defensive strategy. This way a company makes sure that they are producing a product in the most efficient way possible without any waste, and that you can deliver the product fast and effective to the market. The internal crowdsourcing at Bekaert is driven by the intention to engage the whole population of employees to participate in the innovations. They emphasize the importance of giving opportunities to their staff in becoming part of the whole innovation process. The external crowdsourcing on the other hand, lead to real breakthrough innovation ideas. Even though most cases believe crowdsourcing is or should be a part of the Open Innovation strategy of a company, both Janssen Pharmaceutica and the service provider Cognistreamer think differently on this matter. Interviewee Wim Soens believes that Open Innovation and crowdsourcing do not have the same overlap. Large companies with thousands of employees can be engaged in an internal crowdsourcing program but since it stays within the walls of the company, it cannot be called Open Innovation. On the other side is an Open Innovation program not necessarily crowdsourcing, he states. Janssen Pharmaceutica has experienced with crowdsourcing but due to negative experiences, they are not structurally using crowdsourcing as a mechanism. Janssen does have an Open Innovation strategy in place and has a strong collaboration strategy as well. We can say that there is thus some contradiction on whether crowdsourcing should be part of the Open Innovation strategy of a firm.

4.2 Key elements for an internal and external crowdsourcing strategy

When developing a crowdsourcing project, it is crucial to understand the key elements of a beneficial crowdsourcing strategy. Since not much is written on this matter in existing literature, these cases from companies over different sectors and industries can give a clearer insight on this subject. According to Martijn Arets from Crowd Expedition, a research company, highlights some valuable facets. First of all, a company needs a long term vision and a long term strategy when they want to succeed in crowdsourcing. Secondly, a company should be able to ask the right questions to the right people. Not all crowds are the same, they differ much, so asking the right question is very important. Understanding their crowd helps a company to build more long term relationships too. Third, the manager handling an internal crowdsourcing program or project, should make sure that the employees will get a time off to work on that crowdsourcing project. In most cases the staff already has their regular work so they will not be motivated to participate in the project if it means handing in their free time. This is called '*Internal budgets*'.

Further, managing the crowd you are working with, is another necessary element in the process. Mr Soens from Cognistreamer affirms this. A company chooses crowdsourcing as an innovation option because the more people involved, the more benefit the company will create. Wim Soens believes that a manager should know how to govern this process, how to manage the crowd and how to motivate them. Therefore they should set up the right governance structures in advance. Good communication and engagement strategies are the next step and finally a manager has to keep managing this eco-system he has created. A firm needs to build these capabilities before they engage in any crowdsourcing activity. One more key element Mr Soens addresses, is the

Intellectual Property (IP) and how to handle that. This is not an issue when applying an internal crowdsourcing program, almost every firm has a framework installed with agreements concerning IP between their employees and the firm. Usually it is written in the contract between the two parties. Internal IP is thus well-regulated which opens doors to internal crowdsourcing programs very easily. The moment a company decides to engage in an external crowdsourcing project, they need to set up a closed tight-lipped legal framework. It should be very clear in advance what will happen with IP that comes out of the program, even before anybody engages in the program. A good agreement avoids any kind of discussion afterwards because it closes all the possible doors for potential disputes. Since the goal of innovation is to have open knowledge sharing, an environment of trust is necessary. This is impossible however, when a company does not have that framework in place. So the crucial element is to have a good, decent and fair IP agreement in place. Further, succeeding in crowdsourcing projects also requires good governance, as Martijn Arets from Crowd Expedition mentioned as well. Mr Soens finds that funneling during the process is an example of good governance. A lot of information flows in through a challenge for example, so you need to design a clear flow and manage the amount of input and insights that comes in. So a company needs to figure out for themselves how they will moderate the crowd and set up the related moderation structure. Another important part for Cognistreamer is the design of the ecosystem. Who do you want to involve and how will you motivate people to involve. It is thus important to target the right people at the right time and as Mr Arets mentioned as well, with the right question.

Bekaert follows this pattern of ideas and agrees with the significance of a good governance structure. First, you need a well-defined community. Next, Mr de Caluwe believes that the legal framework is substantial and a clear contract on ownership of the potential ideas. The third criteria is the selection and evaluation of the inflowing ideas. This requires a combination of marketing, technology and process operations. Every idea that is send in, should be evaluated. In general, a clear process has to be in place continues Mr de Kempeneer. A clear definition of the problem statement, clear communication, good follow-up both internal and to the crowd, are the most important features of managing such a process. A problem statement should be straightforward: what is the problem or the challenge and how do you want the crowd to help you. Before you can elaborate such problem statement, the firm needs to have a good understanding of what they want the crowd to contribute and what not. A good definition includes enough information for the crowd to understand the challenge and at the same time it should include a clear expectations. So a good definition should be accompanied by good and clear communication. This is much for a company that is new to crowdsourcing. Nevertheless, Bekaert emphasizes that you learn a lot by doing, the first time a firm engages in crowdsourcing, that process will not always be in place correctly from the first attempt. Every company can learn the most through experience.

Janssen Pharmaceutica often throws light on collaborations, putting the emphasis on working together with a lot of people when executing OI and wanting to be open-minded in the business area. Developing a beneficial crowdsourcing strategy depends on two main pillars according to Janssen. Making crowdsourcing a structural part of the business is the first aspect. In order to do so, a company will need a good alignment between what their business needs in terms of problems

that need to be solved, a good definition and description of these problems and the commitment in following the received input from the crowd up. This is significant for the reason that feedback is the guarantee for the future. "For me feedback is the key element of success towards the future. Meaning that if you tap into the crowd to get ideas, then it also is important to outline to the crowd afterwards to tell what happened with the ideas, what solutions you picked and for what reason so that the people who have contributed are also acknowledged in the fact that they have spent time in it and it is also a success for the future challenges you like to do.", Tom Aelbrecht declares. This feedback is of even greater importance when engaging in internal crowdsourcing activities than in external crowdsourcing activities. The internal crowd is limited in contrast with the external crowds. So keeping them motivated and engaged is even more crucial for success chances the crowdsourcing project.

When I asked General Electric, the pioneer in the sector of electronics what they key elements were to them for developing a beneficial crowdsourcing strategy, they mentioned two main factors. First they believe a firm should be very open to the idea's that will flow in and not get overwhelmed. Anne Rhodinsky states: "You're gonna get a lot of different ideas, you're gonna get a lot of pageants that will come in and that aren't necessarily the focus you have, so I think you really need to be careful at the content and not get overwhelmed because there is a lot of data and great data so you need to be selective while being open. That is a tough thing to do." The second factor for a succesfull crowdsourcing program is communication. The interview showed an intense policy within General Electric. Whenever they launch an internal crowdsourcing project, they do not give their employees any incentives such as performance or rewards. If you work for General Electric, it is part of your job to contribute, to be accountable and to be responsible. However, when they notice low inputs and inflow of ideas for the challenge, the manager tries another communication tactic or rethink the whole crowdsourcing project. Mrs Rhodinsky firmly believes that engaging managers help a great deal. Engaging managers and Human Resources namely help spread the word of mouth of the importance of employee's engagement throughout the company. This is very critical to the whole crowdsourcing process or project.

For Liberty Global, it is critical to think upfront on what the next step is after generating ideas. The first time they launched a challenge with their internal crowdsourcing program Spark, they were overwhelmed with concepts and ideas. When launching the challenge, they did not thoroughly thought about how to implement these ideas. This had negative consequences for both their program and the future engagement of the employees. However, this is a critical factor for external crowds as well. The people who put effort in submitting their concepts, will not feel appreciated if nothing is done with their ideas. Another important element is that a firm should show the results. Mr De Vries noticed that once he started sharing the evolvments and results with the involved people, the general enthusiasm increased and the program got a lot more attention. Finally, Liberty Global believes in the strength of communication, an element that recurs in many of the studied cases.

4.3 The specific benefits of crowdsourcing

Throughout the interview, this was one of the easiest questions to answer for the interviewees. Janssen Pharmaceutica emphasised in particular that by opening problems and challenges up to a larger population, they are able to find a solution within days. So speed is an important benefit. A consequence of that is a decrease in costs. Mr Osella from ISMB affirms this by saying: "Considering CS as a key pillar in an OI strategy, I would say reduce R&D cost." Further, if a company is looking for a more breakthrough, radical innovation, crowdsourcing is a good expedient. The solutions and ideas that are generated, do not stay within the regular domains of the company. This shows that by crowdsourcing, you are opening the innovation up to other domains. Finally Mr Aelbrechts states that the power of numbers is much underestimated by companies all over the world. Kevin de Caluwe from Bekaert has the same point of views. The ultimate benefit of crowdsourcing is the access to a much broader amount of ideas. According to him, this diversity is crucial in achieving the best solution out of the pool of ideas from the crowd. His colleague, Eric de Kempeneer calls it 'expanding your network'. If a company cannot accomplish a good solution within the organisation, expanding their network is the only option. Cognistreamer goes along with this advantage. Likewise Bekaert and Janssen Pharmaceutica, they see the massive amount of ideas in a very short period of time as the ultimate benefit of crowdsourcing. He explains that it can act as a rocket charger for companies. "It's the power of number which is the key aspect of why doing crowdsourcing" Wim Soens says. Crowd Expedition mentions another benefit of crowdsourcing. Mr Arets declares that, as a firm, the fresh look on existing problems and solutions, is the most valuable advantage of crowdsourcing. The crowd involves people who work in different industries and who can have new, fresh insights on the project. Liberty Global agrees with this factor, the out of the box ideas are very valuable to a firm who is searching for innovation. Finally, both General Electric and Liberty Global remarked an additional benefit, namely the engagement as a result of the participation and involvement of people from the crowd. This applies to both internal and external crowdsourcing. The participators feel valued because the firm involves them in their projects and innovation. Roel de Vries concludes that the crowd is more engaged with the company in general through the medium of crowdsourcing.

4.4 Managerial challenges

When I asked what the potential managerial challenges were when developing and implementing a crowdsourcing project, the interviewees mentioned many different struggles that managers face.

Bekaert for example, emphasized that a firm should reserve enough time and resources in advance for the evaluation and selection of the generated ideas. The time necessary for this process is much underestimated, they declare. Bekaert admits that they sporadically still struggle with this time-aspect nowadays. Further, preparing the organization for crowdsourcing could be another managerial issue, as Bekaert continued. They believe that a company should communicate with their managers and other employees on what crowdsourcing means, what the company expects from it and how they should handle that and work with that. Everyone needs to be at the same page in order to succeed in a crowdsourcing project. "You need to make sure that evaluators have an open mind-set to say 'okay I understand you don't know everything from what we have but let

me look what is the key here that he can contribute from his expertise.' It's an example but it's just an indication that if you work with the crowd, you need to prepare your organisation to work with them. That is also part of the managerial function." says Eric de Kempeneer. Furthermore, Bekaert believes that setting up the right process with a clear problem definition and follow up can be a struggle for managers as well. Kevin De Caluwe adds that communication and IP may become issues for managers too. "I tried to involve other companies, industrial players, manufactures and there IP was definitely an issue. So if people or companies want to involve peers and crowdsourcing exercise, they need to take in account a lot of preparation time and convincing the peers to do such an exercise." Mr De Caluwe remarks. However non-disclosure agreements (NDA's) with external parties and agreements may prevent this problem. If it is too complicated for a company to set up the right legal framework, there rests the option of enabling a service provider such as Cognistreamer, one of our interviewees.

General Electric mentioned a managerial issue that none of the other interviewed companies listed. According to Anne Rhodinsky, a firm should be careful and not try to influence the idea generation too much. The goal of idea generation is to encourage out-of-the-box thinking after all. A manager should use appropriate language that does not influence the crowd. Further, General Electric finds that communication, as they already mentioned in '4.2 Key elements for an internal and external crowdsourcing strategy'. Finally she closes with some additional minor issues: "And of course as I said earlier in the discussion, is communicating it appropriately, when you launch it, making the visual interface, engaging and clear, easy to read and understand and providing the appropriate context to the project and we've referenced material that is valid to the project."

The steel wire fabricant Liberty Global addresses the issue of accessing resources for the crowdsourcing projects. If not the whole company is behind the idea of crowdsourcing and some managers are still a bit cautious and hesitant, the innovation manager will not easily get the right resources to develop and implement a good crowdsourcing project. This shows thus the importance of a supporting management. Further Mr De Vries finds that the selected ideas out of crowdsourcing programs should be realised and implemented. In practise, this is not always the easiest task for a manager. It is important to pause and meditate on the financial planning when starting a project. The financial planning is made at the beginning of each year in many companies so often there is no room left for projects such as crowdsourcing. Managers can solve this problem for example by planning it under unforeseen work, according to Liberty Global.

Futher, another potential issue for managers may be managing the participating crowd. Martijn Arets emphasizes that the relationship between the company and the crowd has to work in both ways. A company should look not only at the benefit of their project, the benefits for the crowd matter too. If a manager does not consider this, the collaboration will be a one-off. The goal is to build a long term relationship with the crowd so there has to be mutual respect for every participant and stakeholder involved. Crowd Expedition declares that that is the biggest challenge. The crowd is part of the strategy and more, part of the company.

Janssen Pharmaceutica believes that the internal research may be an issue in crowdsourcing. This because they are not adopting to ideas that come from outside the boundaries of the company.

This challenge can be avoided or solved by preparing the internal experts and staff to the external ideas flowing in. The world has evolved and the work ways too. There are experts in every subdomain of larger domains. If a company wants to retain their competitive advantage, they have to innovate and in order to do so, they must collaborate. The internal staff has to adopt to that concept, so a manager should convince the employees of the utility and the value of these external ideas. Therefore, a mind-shift throughout the company is needed.

The service provider Cognistreamer affirms and mentions again the legal framework and the governance, as explained in '4.2 Key elements for an internal and external crowdsourcing strategy' when I ask what he believes are the biggest managerial challenges in setting up a crowdsourcing project as a manager. The difficulty of funnelling of the generated ideas may be relieved by using a collaborative platform as they provide. This way, a manager has full control over what occurs in the process. He adds: "It [a collaborative innovation tool] also includes all the tools for the innovation manager to really control when we go to the next phase, what has to happen in that phase, who is involved in that phase and which tools are used in that phase and do what they have to do. That's basically the set up so you have full control."

Chapter 5. DISCUSSION

5.1 Crowdsourcing in practise

In the beginning of this research, I ask a research question that I pursue to answer throughout this whole master thesis: "How can firms benefit from internal and external crowdsourcing?".

To resolve this question, I analyse both theory and practice by making a comparison between Table 2: Summary of 'Chapter 2: Literature review' and Table 4: Summary of 'Chapter 4: Findings'. Both tables approach as a first theme the perception or the idea of crowdsourcing. The definition of crowdsourcing given by Howe (2006): "Simply defined, crowdsourcing represents the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call. This can take the form of peer-production (when the job is performed collaboratively), but is also often undertaken by sole individuals. The crucial prerequisite is the use of the open call format and the large network of potential laborers" is more or less also described by the interviewed firms, making all seven companies a representative fit for our empirical study which investigates our research question.

A second theme in the table of the theoretical framework is 'Crowdsourcing in practice'. This topic in the theory can be compared to the complete interviews, since they are an application of crowdsourcing in real life. In theory, the emphasis was laid on the types of crowdsourcing, their advantages and the different crowds a firm can approach. The findings affirmed what was already said in the theoretical framework. Nevertheless many new elements appeared from my research. To start with a whole crowdsourcing program consists of three different stages. The cycle starts with the problem definition. In this phase, a company tries to figure out what the problem is they want to solve. After exploring the problem domain they develop a clear problem definition. The next and second phase is solutioning. Once the problem is identified and the problem definition is developed, a company needs to find the best ways to solve the problem. The goal is to target the crowd that has the subject matter expertise in the solution domain, these can be experts, professionals, students, professors or even interested, enthusiastic amateurs. Finally the last phase is validation. After the company created a solution, they now can go back to the market space to validate and see if it is good solution. Those 3 phases are part of a methodology. If a company has a program that covers all three phases, it is called it a 360 degree program.

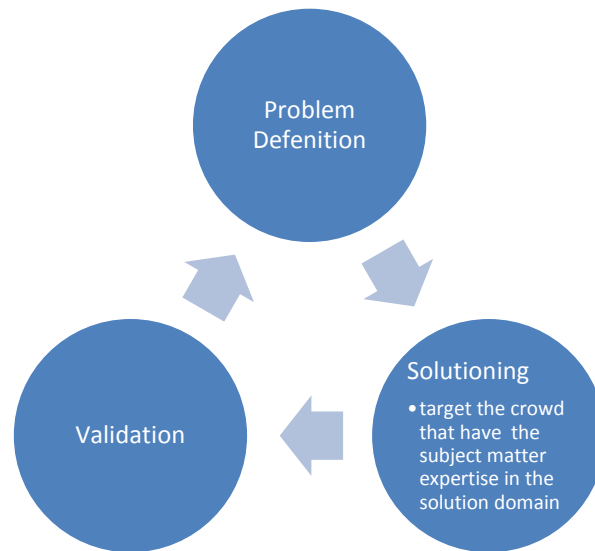


Figure 3: The 360 degree program of a crowdsourcing project

When a firm is eager to innovate, there are many ways in which they can fulfil that wish. Crowdsourcing is, as already mentioned before, one of the possible methods. There are of course much interesting benefits to applying crowdsourcing. First of all, the firm can access a massive amount of ideas and insights in a short period of time. As a result, a company can find solutions to problems in a shorter duration period than applying the general Open Innovation methods, for example by setting up collaborations with other firms. Nevertheless these long-term and sustainable relationships have other advantages. However, the power of numbers is the key aspect of engaging in crowdsourcing. By applying crowdsourcing in practice, the quality of the solution will increase as well. Consulting the crowd, generates more out-of-the-box ideas to domains and industries a company is not used working with. This results in valuable and innovative ideas that can help firms retain their competitive advantage. The last important benefit of crowdsourcing is the cost. A company can access more resources with less costs.

When a firm decides to engage in crowdsourcing, an important factor is selecting the crowd that is beneficial for their crowdsourcing project. But how should a firm do this? There is no clear or straight answer to that, it depends on what the company prefers or on what the objective of the project is. In some cases it can be useful to launch the problem or challenge first to the internal crowd and if that does not bring a clear solution, then tap into the external crowds. In other cases, it depends on the kind of innovation you are trying to achieve. Internal crowdsourcing is a good solution when a firm is looking for an incremental innovation. This means that they want to improve their core activities, current products and services. These improvements are based on the quality of the products or services and the efficiency of the production of the product. When a firm wants to launch a whole new product or target a new market, they are looking for a more radical and disruptive innovation. In this case, it is best to set up an external crowdsourcing project because the external crowd has a more out-of-the-box thinking than the internal crowd who is already influenced by the company and the company culture.

Another question that arises when developing a crowdsourcing project as a firm, is whether or not they should select parts of the crowd for the project or use the whole crowd to solve the challenge. For an internal crowdsourcing project, there is no restriction necessary in any case. Throughout my research I did not find any case or project where a restriction is more advantageous than using the whole internal crowd. Selecting the crowd externally however, has both advantages and disadvantages. As shown in 'Table 6: Selecting the right crowd for your crowdsourcing project' below, the biggest disadvantage of selecting the crowd for external crowdsourcing is the limitation on the out-of-the-box ideas. These ideas are a result of the large number of participants. On the other hand, selecting the crowd has many benefits as well. First of all, the quality of the ideas increases as a result of the restriction of crowds that have no expertise in the matter. Next, due to the selection of the crowd, less ideas of low quality will be generated which results in a more efficient process. Less ideas have to be evaluated and less ideas are non-useful, which is of course less time consuming for the evaluation process. Furthermore selecting the crowd depends on the phase of the project and what the objective is. It is best to determine case by case whether or not the company benefits from a selection of the crowd or not.

Internal crowdsourcing	No restriction necessary	
External crowdsourcing	+	↑ quality ideas
		↑ efficient evaluation process
		↓ time consuming to go through all ideas because less non-useful ideas
	-	Limit 'out-of-the-box' ideas

Table 6: Selecting the right crowd for your crowdsourcing project

5.2 How to develop a beneficial crowdsourcing strategy

For this thesis, I studied the key elements of setting up a beneficial crowdsourcing project. This way, I tried to develop a guideline or checklist for companies when engaging in crowdsourcing.

Type Crowdsourcing	Key Element	
Crowdsourcing in general	Communication	
	Governance	Clear process: <ul style="list-style-type: none"> - Problem statement/definition - Evaluation of the ideas (evaluation criteria) → funneling - Implementation - Follow up
	Open eco-system	<ul style="list-style-type: none"> - Culture throughout company - Open mind-set mngt - Internal communication about crowdsourcing
External crowdsourcing	Openness / IP / ownership	Clear legal framework: <ul style="list-style-type: none"> • Agreements • NDA / contract • Service provider
	Urgency / Business potential	
	Well-defined community	
Internal crowdsourcing	Feedback	

Table 7 : The key elements for developing a beneficial internal and external crowdsourcing strategy

I found that there are standard elements that apply to both internal and external crowdsourcing. One of them is communication. Communication is an important factor throughout the crowdsourcing process. It builds mutual trust and is the basis of a good relationship between the crowd and the company. Further, when a firm notices low inputs and inflow of ideas for a crowdsourcing project, they should try another communication tactic, that solves the problem in many cases.

Another general element is the governance of a crowdsourcing project. A company should set up the right governance structures in advance. First, a clear definition of the problem statement is necessary. A good definition includes enough information for the crowd to understand the challenge and at the same time it should include a clear expectations. Next, is the importance of reserving resources and time in advance to evaluate the incoming ideas generated through the challenge. In addition, determining the selection criteria in advance is a time saving method as well. Funneling can make this process even more efficient. Funneling is after all an example of good governance. A lot of information is generated through a crowdsourcing initiative, so the company needs to design

a clear flow and has to manage and evaluate the input that comes in. So a company has to figure out in advance how they want to moderate the crowd and set up the related moderation structure. After the challenge is launched, good follow-up both internal and to the crowd, are the most important features. The follow-up includes feedback to the participants and notifying the participants and the company stakeholders of the outcome and the results of the challenge. This will increase the future engagement because the crowd will feel valued. Last, an open mindset of the management is an important key element in succeeding a crowdsourcing project. The more open minded the management is, the more engaged they will be in crowdsourcing activities. And engaged managers help spread the word of mouth of the importance of employee's engagement in crowdsourcing throughout the company. This is very critical to the whole crowdsourcing process or project. In general, an open culture is beneficial. However, good and clear internal communication about crowdsourcing can prevent many struggles as well.

Internal crowdsourcing stands or falls with one important aspect: feedback. Feedback is crucial to assure success towards the future. When a firm decides to consult the crowd to get ideas, then it also is important to return to the crowd afterwards to tell what happened with the ideas, what solutions the firm picked. This is an acknowledgement for the people who have contributed for the time and effort they put into the challenge. Further it is also a success for the future challenges you like to do. Because the internal crowd is limited, this engagement and motivation is crucial.

A crowdsourcing project that approaches the external crowd has some specific elements to keep in mind. First of all, the issue of Intellectual Property (IP) arises. While this is not an issue for internal crowdsourcing program, since most companies have a legal framework set up. This framework is based on agreements between their employees and the firm concerning ownership of the future ideas. The moment a company decides to engage in an external crowdsourcing project, they need to set up a clear legal framework. It should be very apparent in advance what will happen with any Intellectual Property that comes out of the crowdsourcing project. A good agreement or contract avoids any kind of discussion afterwards because it closes all the possible doors for potential disputes. It is thus crucial for a firm to have a good, decent and fair IP agreement in place. When the firm is new to the matter of crowdsourcing or does not know how to set up such legal structures, applying a service provider may be a smart solution. They act as intermediary between the organization and the crowd and set up the agreements and contracts for the organization. Next, urgency is one more key element for external crowdsourcing. A firm has to give an indication on how urgent the problem or business potential is. For example, if a company has a technical problem that needs to be solved, they should determine first if it is linked to a huge business potential or not. If it is, then they should launch that idea campaign sooner than other topics, because it is more urgent. So it is best to sort the problems/challenges by their urgency based on their business potential and launch idea campaigns according to this list. Finally, a well-defined community is necessary as already mentioned above in '5.1 Crowdsourcing in practise'.

5.3 Challenges with crowdsourcing programs

The last aspect of my research was to analyzing the different challenges for managers that occur when they engage in crowdsourcing. After studying these, I tried to compose a short guideline on how to avoid or solve them as an innovation manager.

Managerial Challenge	How to avoid them
Amount of time	Preparation in advance
Engagement + motivation	<ul style="list-style-type: none"> - In general: communication - Internal CS: feedback !! - External CS: reward
Open mindset throughout the company	Culture imbedded (OI)
Resources	It takes time but is correlated to the open mind-set. When that is in place, resources will be easier given from higher up.

Table 8: Managerial challenges occurring throughout crowdsourcing processes

The different managerial struggles occurring throughout CS processes/projects are partly linked to the key elements from '4.2 Key element for an internal and external crowdsourcing strategy'. First of all, managers seem to underestimate the amount of time that a crowdsourcing project takes. With better preparation in advance, this can be avoided. Determining a clear problem statement, reserving the resources, determining the evaluation criteria and already reminiscing the follow-up procedure and the implementation of a potential idea, will give a clear process and time-frame of the crowdsourcing project. One more issue is keeping the crowd motivated and engaged. In general, communication the key issue towards success. External crowds are mainly interested in the up-front part of the crowdsourcing process, they are very engaged in the discussion but not in the parts that come after. Good communication throughout this upfront part is thus crucial. Another motivator for external crowds are rewards. These can be both financial or performance rewards. When handling an internal crowd however, it is important to keep communicating afterwards as well. They want feedback. This will also increase the future engagement because the crowd will feel valued for the input they have given. A closed mindset throughout the company may be a potential issue for a manager as well. Especially since an engaging and supporting management will result in more resources allocated for the crowdsourcing projects. An organization with an open company culture will also participate in collaboration activities such as crowdsourcing. Unfortunately, this is not yet achieved in every organization.

5.4 Recommendations for the future of crowdsourcing.

After my study of how firms can benefit from internal and external crowdsourcing, I still encounter many unexplored areas in this matter that need more groundwork. Besides all the existing literature and studies, I find more research must be done on crowdsourcing in general. Some is already written on the advantages and disadvantages of crowdsourcing. However, I believe that in the future, more research needs to be done on all other aspects of crowdsourcing. I will go more in detail in the following paragraphs.

There are many differences in the successes of crowdsourcing in different companies. Some even see their crowdsourcing projects fail. Examining these cases and the success cases, may help detect difficulties in applying crowdsourcing that are not yet uncovered. An additional review of how to apply crowdsourcing in practice can help the implementation of crowdsourcing for companies too. Another subject for new and further research is crowdsourcing for small companies. I noticed throughout this inquiry that mostly big, strong companies engage in crowdsourcing activities. Considering small companies often have restricted capabilities, they may have a disadvantage in crowdsourcing. However, what are further boundaries for the smaller companies and SME's not to apply crowdsourcing and how can they overcome them. This needs to be examined more. Further, I find more research should be done on relationship between an company culture and crowdsourcing. It seems logic that companies who have a very closed culture embedded throughout their company, may have a less chance in or cannot apply crowdsourcing innovation in practice. Although some literature mentions that a certain company culture is needed both for internal and external crowdsourcing, nothing is said on how to accomplish that or what is meant by that. Therefore, I believe 'how to grow the right culture in order to attract the right crowd', would for example be a good research question to be examined. Finally, I also suggest more research on the sectorial differences in the manner of applying crowdsourcing. In this thesis, I conducted interviews with seven companies from totally different sectors and industries but I did not concentrate on the sectorial differences. Examining each industry separately could lead to interesting findings according to me.

In practice, I suggest companies and managers to be more open minded towards crowdsourcing. To accomplish this, a change of their mentality is needed. Today, crowdsourcing is still very experimental and only big companies are using crowdsourcing. I personally hope that once organisations realise the value and benefits of crowdsourcing, it will become a more generic topic in the innovation business world. The final goal is to have all companies take crowdsourcing for granted when doing business. Unfortunately, there is yet a long way to go. Even firms that already apply Open Innovation in practice and thus understand that the collaborative approach is most beneficial, are still hesitant and cautious towards crowdsourcing. I hope this will change in the future! Furthermore I recommend managers to use the checklist and the short guideline that I created in 'Chapter 5. Discussion'. I firmly believe this will help and encourage the success cases of crowdsourcing. Good communication, feedback, legal framework, being open-minded are only a few of the key aspects that I listed. The division between internal and external crowdsourcing should facilitate the use for managers. Finally I am convinced more training regarding

crowdsourcing and open innovation is necessary. At present, economic students learn about open innovation and how to apply that in practise but crowdsourcing is not a subject in these courses. Therefore, I recommend that the master Innovation in 'Applied Economic Sciences' – innovation and entrepreneurship- handles crowdsourcing as a part of the open innovation lessons. Therefore, students will contemplate over this way of engaging in innovation and will be more open to applying it in practise when they become manager one day. This only benefits the innovation process and projects of the companies and thus the economy in general.

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Tapping into external knowledge, outside the company. We identified a sort of

APPENDIX

APPENDIX A INTERVIEW GUIDELINE

Introduction

Good afternoon Mr/Ms... First of all I would like to thank you for making time for this interview. I'm Charlotte Nijs, master student applied economics at the university of Hasselt

This interview is a medium to gather information on businesses that are engaging in Crowdsourcing activities. Specifically, I would like to investigate how innovative companies benefit from internal and external crowdsourcing.

Is it okay for you if I record this interview with a voice recorder so I can analyse the things you have said afterwards?

Instead of having a formal interview, I suggest to have a less formal conversation about your company, the crowdsourcing activities,

1. Can you tell me a bit more about the company you work for? What's the core business? What does the company stand for? And what is your exact function within the company?

2. (How) does [company] embrace Crowdsourcing?

→ What's your definition of 'Crowdsourcing'?

→ Did your company engage in internal or external CS (or both)?

3. What is the role of crowdsourcing in the organisation. Is it part of a larger OI strategy? How is it linked to corporate strategy/goals?

External and internal CS

3. How should a company select the crowd for their CS project(s) and why?

→ General crowd (everyone can access) or restricted crowd (pre-qualified participants and communities)

4. What are according to you the key elements for developing a beneficial CS strategy?

Here I would like to make the distinction between

→ In general

→ Key elements external CS }

→ Key elements internal CS }

trying to get differences in key elements external/internal!!

5. Which specific benefits of internal and external crowdsourcing do you identify from your experiences?

6. What do you think are the biggest managerial challenges in setting up a beneficial CS project? And how to avoid/solve them?

7. When should a firm use internal and when should a firm use external crowdsourcing to you?
Can they do both? If yes, when?

8. Could you give me concrete examples of Crowdsourcing projects/cases of [company X]?

- why was it initiated?
- how was it initiated?
- what were the challenges/struggles and how did you deal with them?
- what were the ultimate benefits
- Looking back at it afterwards, would you have done things differently.?

Termination

9. Is there something else you would like to emphasise that is exceptional of [company X] concerning your crowdsourcing projects?

I would like to thank you very much for your time and for the interesting and useful things you have shared with me during this interview.

APPENDIX B TRANSCRIPT INTERVIEW

Company: Cognistreamer

Interviewee: Wim Soens

C: Can you tell me a bit more about the company you work for? What's the core business? What does the company stand for? And what is your exact function within the company?

W: I'm the founder and managing partner of Cognistreamer. The company was started basically as a business unit in my previous company, which was a classical web developing company, we created web-applications. And then one of the customers, which was Bekaert, asked us to develop an application for the Bekaert intranet to support the stage cape process of the RD department. At that point we weren't specialists in innovation, just web developers. They told us all about stage cages, that was 2000. And then that project was delivered & a lot of customers or suppliers from Bekaert that the RD department worked with in close relationship saw the application & asked if it was available commercially. Bekaert then let us know that if we were interested, we could commercialize that software. There was obviously a market space for that which I considered & after doing my own market research I decided to jump on that opportunity & created a business unit inside the company to further develop the application, make it more generic, find some other customers for it. By the time, I think it was 2008, which was quite a long time because in 2000 there wasn't a very mature market for innovation systems, certainly not for collaborative innovation system and open innovation systems. But that gradually started to march so that this business unit was at some point self-sustaining but then it needed more investments in terms of development so basically it was a whole different business model. The company in the core was a project business models, assignment → calculated the cost → develop → deliver → invoice → .. The Cognistreamer business unit worked totally different: which was upfront investment, creating generic software, selling software licenses & having a recurring business. I started to 'canabolize' the income of the project business to finance the upfront development of the Cognistreamer business which was not very wise to do. In 2008 it became too big to handle & I decided to split the company. I sold the project business, that company still exists, they're doing well, focusing on e-commerce, application development but it is not my company anymore. So since 2008 Cognistreamer is a free, independent company and growing in the market so today I think we can say that we are in the top 5 world-wide of providers of that kind of collaborative innovation software which is a very niche .. , I have to say that & it's a complex market with not a lot players and it's still not a very mature business either. That is probably the reason why we are a very small company, with all the people here and at the offices, we are about with 25 people so a very small company to be in the top 5 players of the world is a strange thing. So competitors are in US: bright ID and Sprigit, in Germany: hype, in Israel: Q markets, and then there was a UK business but they reshaped themselves with going solely to consulting business. We also have an evolution: the story started as Cognistreamer with a naked software business model. Today that's not the case anymore, so we quickly realized that just selling the software for our customers did not do the trick so they needed a lot of guidance, creating the necessary governance structures around it, how to organize the innovation structure, help train the people how to feed this system with and give

guidance to the community that works on it, so all of that takes methodology, training, dedicated people that have back up from the top mgmt to work, so the software is still core what we're offering but around that, it's a whole package of services and programs that we deliver to consultants. At this point we have the core: the guys that sit over there, who are core development team, who work on the software. And everyone who is here above us are consultants and we also have a lot of partnerships with consultants around the world to help us deliver those package services. What else can I say? Your question was about OI also he? Basically to be very honest, I think OI is still very much an academic thing, a book written by Chesbrough. That being said, there are things moving in our business: it depends on the kind of industry, you have companies like Bekaert, so those are still our core/key customers STARTED in that kind of company so engineering companies, big industrial technology driven companies, that are b2B, not B2C. And those companies have absolutely not adopted OI yet, in the front-end. So they do have collaboration projects but mostly they are 1to1 so R& D that works with selected partners or universities but that is not in the front-end, it's when they have done the conceptualization and the validation and they know.. they have a project and once they have defined the project, they know who they want to work with & go into this classical -set up of creating a project team which might involve external partners but they don't start talking before they have covered the entire legal framework & know what is going to happen with the IP and everything is defined & focused before they even engage in that kind of collaborative project. This is not what I talk about when I talk about OI, we are really focusing on the front-end of the innovation process, the output of everything that we do with customers is validated innovation concepts that are ready to be developed into products that can be mass manufactured and transferred to the market so this is in the middle of the innovation and in that front end space, that kind of customers, it's very rare that they open up about their innovation processes, the only kind of collaborations that we see happening there is when a company like Bekaert is stuck with some kind of technical problem and they tried to solve with their internal expertise and they didn't succeed & then they open up the innovation portal that they're using to a few selected partners that they think have the subject expertise to help them out with that very specific problem so it's kind of opening up the system in a very controlled way, very narrow and they only get access to that one specific problem & it's very short term, it's only one month and that's it. They solve the problem or they don't & they close the system. So it's not like it's about long-term open innovation stuff happening there. But there is another industry which is more B2C strong brands like Procter & Gambel, AB Inbev, Heineken.. and with them we do OI projects: but there I think the reason why that kind of companies do it, is not necessarily because they are interested in OI, it's because they see it as a marketing instrument, so it gives them the image of a very innovative company that gets ideas from all around the world & does something with that like the kind of challenges we see that coca cola launches on big crowd sourcing platforms for the design of the next bottle or ecofriendly stuff, that is not because they're really interested in that kind of innovations because they are perfectly capable of doing that their selves. They're just doing it because it involves their customers, it's a way to find new customers also, to make their brand even stronger & to create an image of a company that is innovative & cares for the environment. That's something where you always have to be very careful if you see OI initiatives: if the core objective is truly about innovation; So we don't engage in that kind of programs, we don't set up that kind of public crowdsource platform but what we do, and it's quiet

successful, is the Nimble Bee program. So you can find it on <http://www.nimblebee.eu/universities/>, the website of the project & we have created a global network of design universities and it's a closed network so not any uni can join the network, they have to deliver some kind of quality & they have to agree on the terms and.. of how the system works, especially in terms of legal framework & IP. And we then scout companies like P&G, .. to give us real live challenges, some things they are really looking for well-designed solutions but only in the area of package & product design. And then we launch those programs in the Nimble Bee network & the deal is that the schools who take on the challenge have to work on it during their curriculum, that's part of the deal. So they have to work on the challenges in a classical context and with guidance of the professors which has a tremendous effect on the quality of the result. That is the first phase, each school gets his own private space to do that. They don't see what the other schools are doing so that's kind of a competitive element. At the end of the first round, the teams can submit their final submission and then everything comes together & they can see from other schools what people submitted. From those designs, the ten best are selected. We go with these designs into the second round, this is mostly the most interesting round, it's the consumer sparring round which means that we have also on the platform then mobilized 50-100 carefully selected lead consumers so based on the briefing we get from the company & they will kind of iterate with those 10 designers to challenge their assumptions & to improve the design so several iterations to do that & then they can submit their very final design which should be improved after that iteration. And from those, we select the winners, they get an award and then we go into a negotiation round to transfer the IP if the company wants it and if not, the IP stay with the students/schools. So that is kind of the lessons of nimble bee program which makes it different from a classical open source or crowdsource program in the sense that it is a closed network which is very important for the companies because if it would be an open public network, they would not be eager to put sensitive challenges on that because then they tell the whole world what they're working on & which is not what they want to do. So for that reason we made it a closed network. Then the fact that it is mandatory for the schools to work on those programs in the curriculum is an important mission of foreign.. because a lot of companies have and coca cola is one of them, they say: we don't work with universities because they're too far from reality, the professors are like 5 years behind, they don't know about the new technologies, they have old methodologies and.. so they don't believe those programs can deliver those *programs* that they want which is absolutely a false assumption because we're now in the 4th generation of nimble bee & customers keep coming back & buy the IP, so it means that it gives the solutions & quality they expect from it. It is a mission of Nimble Bee to close the gap of the first year of the industry → by bringing those two together, the programs of the schools & the awareness of the professors will also increase, by participating in the Nimble Bee network, those universities are getting better and better because we bring them closer to reality, we .. With those big corporates that have a lot of knowledge which they are perfectly willing to share so it's a win-win situation. For the students of course as well, if they get a chance to .. themselves, they might get a job after that so if they win, then it's a nice bit of money, they can buy a car with it. So it's all very interesting, that's what we're trying to do with that program. And we believe that is the kind of Crowdsourcing programs which will make the difference in the future, not the ones you see now like the Nike designs, which are huge public freelance communities, I don't think that this will .. in the future.

C: Do companies benefit more if they work with a selected group instead of the whole crowd?

W: Well it's a crowd, so the universities network but it's carefully selected in terms of the subject matter expertise yes. Nimble Bee, the young program we have there is for product and package design . So if a customer would ask us to do an engineering challenge at Nimble Bee, we wouldn't accept it at this point. But that has not really different from open Crowdsourcing programs like 99 designs, because the freelance communities there are also designers.

C: What is your definition of Crowdsourcing?

W: The simple definition for me is that you're going to, for me the most important word there is crowd. That you're going to open up a process of capturing insights. Could be problem insights, or solution insights or you do validation. And you engage a large communities to do that. For me that is what crowdsourcing is about. Then of course the question emerges what is the minimum size of crowd? At what point can you say you are crowdsourcing and under that limit, it's not crowdsourcing, that is a difficult question. But I do not link it to sourcing internally or externally. For me OI and crowdsourcing do not have the same overlap. We have large customers that have thousands of employees that are being engaged in some kind of innovation program and we call it crowdsourcing but it is not OI in a sense, because it stays within the walls of a company.

C: So it's not always part of a larger OI strategy?

W: No. For instance: ING. We have a Crowdsourcing program with ING that runs two times a year and it's a complete 360 program that maybe I should explain our model for you to understand what I mean with 360. Basically it's a full cycle program that starts with exploration of the problem domain so trying to figure out what problem we want to solve with the bank than going into the phase of solutioning: once we have identified the problem, what are the best ways to solve the problem. And the last phase is validation: we created a solution, now we can go back to the market space and validate and see if it is good solution. Those 3 phases are part of a methodology and if you have a program that covers all three phases, we call it a 360 degree program. For ING we do this 360 degree program two times a year and the whole program takes six months. We target 65 000 people which is every employee of ING world wide. That's a Crowdsourcing program but it's not an OI program because it stays within the walls of ING, internal crowdsourcing thus. Here I clearly make the distinction. On the other side, OI is not necessarily Crowdsourcing, right. So the example I gave from Bekaert is OI but only with a few selected partners. The only programs that we do that is both external Crowdsourcing and OI is the Nimble Bee program.

C: How should a company select their crowd for their crowdsourcing project, how do you know which crowd to target?

W: Well it depends in which phase of the program and what the program objective is. So if you take the example of Nimble Bee, that's not a 360 degree program because it starts with a clear problem definition, that's a given. So we do not do the exploration problem phase. So the start point is a problem definition, but the next two phases are solutioning and validation. The first round of the program, solutioning, there we target the guys that have the subject matter expertise in the

solution domain. Because the NB program focusses on product and package design ,and obviously the universities or the departments that we target to bring the solutions are people that have the expertise necessary of that solution domain. For the second round, that's a fixed of the first rounds, is a fixed community, it's always the same kind of universities. For the second, the valuation, that is each time a new set of people. Because it depends on the kind of challenge. For instance: in the first programs with procter & gamble we did a campaign that targeted young people so millennials between 18-25 years old that just left their homes. So who were becoming independent, so away from their mother and low -income market. People that are not really have the money for luxury in Mexico. So that was the kind of very segmented user community. For another challenge, we had to target people in India because the challenge was about redesigning a very specific way of packaging washing powder which is something that they use in that market. The issue was that it's very clumsy with those plastic bags to open and close and to get the washing powder out of it. Kind of a challenge on how to solve that problem but targeted that very specific market of India because here washing powder is not being a very competitive problem. So then we have to try to find the user communities there that could help. The only common factor is that it must be people that have access to internet and are a bit digital say so that they can access our platform, that's the only common ground. The answer is based on where you are in the project. If you are in the problem domain, the solution domain or the validation domain. You have to target different people. The criteria or the selection criteria if you're in discovery you need people that have a good insight about the market so looking kind of people so that you can capture insights of the market in a certain problem domain on what are interesting problems that could be solved. Once you're in the solution phase, you need solution experts. You need to find the guys that have the subject matter expertise to bring technology or to bring in the necessary knowledge you need to shape a solution. Once you're in the 3th phase of validation, you want to target the people that eventually will buy the product. But kind of the early adopters, the lead users that have an open mind and that can bring extra additional insights on what is a good pricing strategy, if the usability of the product is okay, if it has just enough essential features and so on. So people that have a good mind set for that.

C: What are according to you the key elements for developing a beneficial Crowdsourcing strategy and with the distinction between in general, internal and external CS strategies?

W: In terms of strategy, I think that for any kind of innovation problem, crowdsourcing is an option. The more people you can involve, the more benefit you will have. The challenge is how do you govern that. And how do you manage the crowd and how do you motivate them so they engage. These are the kind of challenges you're confronted with here. Being able to solve those challenges, set up the right governance structures, have good communication and engagement strategies and then manage the eco system you have created, are essential capabilities that you need to build before you can go into crowdsourcing. But once you have that, there is basically no situation or innovation objective where you could not benefit from involving the crowd. To answer the question: if it needs to be internal or external crowdsourcing, depends on the level of innovation you want to achieve. You have incremental innovation which is kind of improving you're core activities, your current products and services, looking at the quality of the product or the way

you produce the product. That is a very defensive strategy: to make sure you keep your margins intact, that you can produce the product in the most efficient way without any kind of waste, that you can deliver the product very fast and effective to the market. Basically how you organize your core business and all the aspects that involve that business can be the subject of incremental innovation. I don't think you need external involvement to do that, because you're in your comfort zone as a company. However there are exceptions. You probably could involve your close stakeholders and your customers to give some feedback on how your products are performing, to get more insights on how to improve the product incrementally. Or you can involve your suppliers to help even reduce the cost of your product. This could be a material cost, you could work with your suppliers to do that. But in most cases, that would not be kind of a crowdsourcing approach. You know those customers so you would create smaller customer panels and have them test your product, you're in the more classical approach. You know your suppliers so you will just work in a 1 to 1 relationship with your suppliers to help you with improving the performance of your product. That kind of innovation could go external but it will probably not be in a crowdsourcing program. If you go out of your comfort zone and you stay in the problem domain, we call that a market pool kind of innovation, you're looking for completely new ways to solve the problem. An example: if you envision a company like P&G and their business unit Gillette: that kind of innovation would mean that Gillette is not looking to add another blade to the shaving device which would be only incremental innovation but looking at how they might disrupt their own product by looking into epilation cream and look if they can use that technology to solve the problem of men shaving their beards instead of using their razor blades, have some kind of other technology in place and do it with a cream, you wipe off the cream and it is done. That would be another kind of radical innovation which has a disruptive effect on their current business which completely brings them out of their comfort zone. In the solution phase they need other technology, they need to figure out how does this epilation cream work, they're on a completely other scientific domain, it's about chemistry. They don't have that core expertise in the company, so at that point they have to go outside. It might be organized in the form of a Crowdsourcing program, especially if they don't know yet what the possible technologies are, then they can really go open and say: listen we have this problem. There is an engineering community like Innocentive and we throw out that problem & see what kind of smart people can bring us interesting insights on what technology can be used to find an alternative for shaving with razor blades. This was one example, the other example is called a tech-push, if a company wants to find other problem domains that they can tackle with their core knowledge. So again, if you would look at the Gillette example, if Gillette would say: how can we use our razor blade technology to go into the market of scratching dirt of ceramic cooking plates or scratching paint of walls, that would be a tech-push kind of innovation. So they're not leaving their comfort zone in the solution phase, they're trying new applications for their technology but exploring. They're going outside of the comfort zone anyhow, so they have to go external with that, they have to find people that can give them insights in other market spaces where their solution for their kind of technology could be a benefit. They could go into crowdsourcing adventure but it's less obvious, they probably totally will work with companies that have like Creax which is a company that has all those engineers in different subject matter domains and they have a methodology to scan the problem domain. They will come up with a number of focus areas or problem areas where that kind of technology could be used. Then there is the unknown kind of

innovation, it's you're approaching invention there, which is usually set up as collaborations with universities and research centers where they do core research but that is something very fussy and fluffy, I don't even know if that is part of it of the crowdsourcing potential. It's just looking at what is out there in terms of basic core research and if we could do something with that.

C: Are there other key elements if I'm a company and I'm setting up a Crowdsourcing project and its internal or external, what are the main differences, where should they pay attention to?

W: As a manager, the main issue is IP and how you handle that. If it's an internal program, most if not all companies have an agreement with their employees what happens with IP. So that's already covered, that's usually in the contract. If you have knowledge workers like we with the developers, they have in the contract that each line of source code they write in their office hours so if they're working for Cognistreamer becomes IP of Cognistreamer. If you don't have that in the contract by default, it's their IP. So a lot of companies research companies for sure have that kind of framework installed. Also what happens with patents, who can claim the ownership of patents and so on. That is usually a very well-regulated which opens doors to internal crowdsourcing programs very easily. It's thus not really an issue internally. The moment you go external, you really need a very good legal framework. For the Nimble Bee project, that is very well covered and it's part of the service and part of the reason why companies like the nimble bee program cause it's very clear in advance before anybody engages in the program what will happen with IP that comes out of the program. That is the main concern that you have a good decent and fair IP agreement. Which avoids any kind of discussion afterwards, you have to close all the possible doors that might dispute, if you don't have that, it's impossible to create an environment of trust which is necessary to have open knowledge sharing in those kind of settings. So for me that is the main concern for an innovation manager. Then the second concern is the openness. So if you go external, do you go external all the way and will you choose for a public CS platform? Or are you going to work with an intermediary that gives you a full confidentiality. So you are sure that although you're crowdsourcing, you can be sure that nothing will leak of IP. So again in the Nimble Bee program, that's part of the deal, that we guarantee as far as we can of course that as long as the program runs and during the non-disclosure period after that, there will be no leaks in social media or wherever of the things that the students are working on so the universities that sign in to the program are made aware of that and we also have kind of finds in the program if they would still post something online. Our employees here are checking that regularly throughout projects. Of course if it's a very sensitive problem and you don't want your competitors to know you're looking for solutions, then don't go public with the process. If it's like I said in the beginning rather something to spread this image of a very open and innovative company that is concerned of the environment, then please go public, that's the whole purpose. The whole program that GE did with the Eco Challenge is an example.

C: Which specific benefits of internal and external did you identify from the experiences you've had with companies?

W: The benefit directly connected to the fact you're working with crowds is that you have a massive amount of ideas and insights in a very short period of time. That is the main reason why

companies will engage in Crowdsourcing programs, it's fast and it's a boost, it's kind of a rocket charger especially if they have been working on a program internally and got stuck, it's kind of eye opening for them if they engage in CS programs. How many inputs they can get in a very short time, really can help them to get things back on track. It's the power of the numbers_which is the key aspect of why doing Crowdsourcing.

C: What do you think are the biggest managerial challenges when it comes to setting up beneficial crowdsourcing projects?

W: Two I mentioned before: the legal framework is crucial, then the governance: the governance is about how you're going to set up the whole process. You don't want it to be something like FB where you have this nice platform and you have a community and then you launch a challenge and people start talking & it becomes kind of a café. Half of it is not even relevant and then you say: ooh what the hell can I do with this? In no time you have a lot of information and then you have to figure out how to find the stuff that is of use for you. So that's absolutely not where you want to go with Crowdsourcing programs. So you need to design flow and make sure that you can manage the huge amount of insights and input you will get. It's good that it diverges cause that would give you very interesting and surprising insights but it cannot go in all directions and you need to funnel things a bit and make sure that at some point you start to converge again to conclusions. So that is a challenge in how you design that and especially with large crowds is to figure out how you're going to moderate them and make sure that they keep on track and discussions don't go in directions you don't want them to go. So setting up moderation structures is important and also figure out how tools can help you with that. How you can use technology for instance to detect sentiment on a platform which will help you to guide you where your attention is needed in all the discussions that happen, you can't be on top of everything. That is quite a challenge. Then of course the ecosystem design: who are you going to involve when and how are you going to motivate the people to do that. So I think there the idea or the concept behind it should be that you cannot funnel the participation and you target the right people at the right time. For instance in the NB program it would be a mistake to have this open platform where the designers and lead consumers are there from the beginning cause the lead consumers bringing them into contact with the designers when they are still in their first thinking phase and sketches, would be a bad idea. Cause they were start influencing the designers and already telling them what they think is good or not, which would not give the designers the freedom and the space they need to be very creative. So in that phase, you're diverging. So it's not a good idea to use people you'll use to validate in that early stage. So shut them up from that phase, that's what I mean with funneling. Like you will also have review boards, you don't want the reviewers to be on the platform at all points of time.

C: How do you keep them out of it?

W: A collaborative platform is always designed in a way that you have full control over who can see what and when. So it has similar functionality as you would see in a Facebook application: so basically it's sharing knowledge and being able to express value in the form of likes and comment on it. In the core, that's it. On an advanced system like Cognistreamer, below that are collaborative flows that try to lead the discussions towards some point of conclusion. There's much more

advanced ways to share knowledge and to validate them. We go much further than offering a thumbs up or down system. We can have several assessments: modules like five star rating or pair wise voting or value curves or portfolio idea comparison and all that kind of stuff is very advanced. If you're in the shaping process of designing ideas, we have collaborative SWOT modules so where designers can think about strengths and weaknesses and mitigate those and have ppl who help them with that. So it's much more advanced in terms of the workflows and the mechanisms that we have to reveal insides and all that matters. So there's also semantic technology so it's completely different ball game. It also includes all the tools for the innovation manager to really control when we go to the next phase, what has to happen in that phase, who is involved in that phase and which tools are used in that phase and do what they have to do. That's basically the set up so you have full control.

C: If you could give me a concrete example of Crowdsourcing project and how it was initiated, why it was initiated, what the ultimate benefits were, what the struggles were looking back at it now..

W: Basically we have as far we're talking about external Crowdsourcing programs we only have one which is the Nimble Bee program. What we're doing now is so I said the NB program today is dedicated to a product and package design. We're looking into the possibility of a new kind of Nimble Bee program for engineering challenges. That program will be governed in a different kind of set-up. It will be for other kind of university departments and IP framework will be different so the same idea of having a network of universities but dedicated to solving engineering challenges. That's probably going to be the next step in an open Crowdsourcing program. Internal Crowdsourcing there we have several other programs. I mentioned the 360 program that we do for ING which is a program that runs two times a year. It takes 6 months. But we also have very dedicated small programs if a company wants to launch an internal crowd campaign, mostly incremental to solve a very specific issue. Basically technology behind all of that is the same stuff, just used in different ways. It's a modular approach so you can configure what kind of flows you're going to use and what kind of assessment.

C: If there something else you would like to emphasize that is exceptional concerning the crowdsourcing strategies of your company?

W: I think I covered most of what I wanted to say about Crowdsourcing programs. Is there anything I can add? Maybe that we're still also pretty much looking at business model innovation: what is for us the business model behind Crowdsourcing? What is it that we use to earn our money and what does the customer pay for? You have different approaches there: you could say we have this platform and this community and if you want to launch a challenge than that's what it costs. That's one way to approach it. You could also say well you know it's free to use but if something comes out of it, we'll take part of the benefit and everything in between. So I think you will see a lot of new Crowdsourcing models emerge that innovate more in the domain of the business model rather than the actual Crowdsourcing program itself. I think that most of the possibilities are now explored and it's quite clear what the Crowdsourcing program is and how it should be managed. I think the potential is now in finding out what business model that allows you to scale the Crowdsourcing program and earn a lot of money with it and make anybody happy. It does not feel

like you're exploiting one or the other community, it has to be fair for everybody who is joining the program. Otherwise it won't have a very long steady life.

C: Well that was it. Thank you very much for your time and for the effort. When my thesis is finished, I will definitely send you a copy so you can have a look.

APPENDIX C TRANSCRIPT INTERVIEW

Company: Liberty Global

Interviewee: Roel de Vries

C: Can you tell me a bit more about the company you work for? What's the core business? What does the company stand for? And what is your exact function within the company?

C: How does Liberty Global embrace Crowdsourcing? What's your definition of 'Crowdsourcing'?

R: I don't have a specific definition of crowdsourcing but the definition from Spark is: Spark is Liberty Global's innovation initiative, designed to source and refine ideas in response to real business challenges by tapping into the collective creativity of our employees, and partners. So they collect ideas or source ideas from the cloud.

C: What is the role of crowdsourcing in the organisation. Is it part of a larger OI strategy? How is it linked to corporate strategy/goals?

R: Idea generation campaigns, online, time based, everyone can submit ideas, based on a specific challenge from one of the partners
or by offline sessions or idea collaboration sessions to help people or to train them even

We approach both internal & externals to help innovate,

Intern: online idea campaigns where employees are invited to help an existing challenge: not per se for the most ideas but for good qualitative ideas & those also support online communication → idea improvement also

Both idea generations improvement are supported with offline sessions → also idea improvement sessions & provide trainings to employees to how to innovate & how to submit proper ideas

External: online campaigns external partners main vendors, based on

→ more difficult than internal, a lot of partners have more or less given up

or they give just a sales pitch instead of a real idea.. → copying the website

→ in offline way = better

partners are afraid with their IP when they post online & if you just talk to them with a cup of coffee = better

We also work with TU of Delft every half year

Designers in spark lab & students again: it is coming from the business Disruptive innovation: looking further ahead

final: in london just loanced: excellerator → start ups that registration process: 100's registered → now still 10 → to push the best ides

C: How should a company select the crowd for their CS project(s) and why?

So should they work with the general crowd so that everyone can access or more a restricted crowd with pre-qualified participants and communities?

R: External: restricted crowd, based on a specific question → difficult challenge !!

TU Delft cannot share anything qua IP and what they deliver at the end is our property

external vendors: restrict IP policy

→ this limits the activity in those campaigns & when you meet with them with cup of coffee, they talk more, are more open & get better ideas

internal: sometimes the same, when it is a technical question only field engineers are relevant to involve.

But other campaigns: the best ideas come from the strangest locations: normally I go for a wide group internally, all employees (only sometimes less due to confidentiality)

C: What are according to you the key elements for developing a beneficial CS strategy?

Here I would like to make the distinction between → In general

R: 1. really think upfront about what the next step is after the ideas. When he started with spark & ended with so many ideas but had no plan on how to implement them so bad for the program & bad for the engagement of the employees, they won't feel appreciated if nothing is done with the ideas that are generated

2. keep communicating: for employees: they might have also another job, externals may have another company: everyone has a lot on their mind → so it is important to communicate: so everyone stays involved in the project!

3. Show ROI on how the program is evolving & the results: as long as he didn't do that, no enthusiasm but once I started showing results: I got much more attention

Internal: Communication is fragile.. so you really have to think and see them face to face to get proper inputs. External crowds are mainly interested in the upfront part, the discussion but not on the rest. Internal: Important to keep communicating afterwards → not only interested in the upfront but also afterwards

C: Which specific benefits of internal and external crowdsourcing do you identify from your experiences?

R: involvement in general: the engagement, they feel valued that you involve them for their ideas, even see with internal: ppl who participate are more engaged with the company in general
external: feel more involved: reaching out to customers & how they can be involved in the efforts

Of course: the big benefit is to get out of the box ideas → product department, a lot of managers, with great ideas but sometimes they just can't come up with something completely different

C: What do you think are the biggest managerial challenges in setting up a beneficial CS project?
And how to avoid/solve them?

R: 1. Question 4: when you start: it is hard to get some real resources, of course we couldn't show any value, a lot of ppl were afwachtend & weren't really completely sure that this would pay off so getting resources in was difficult, it took almost 2 years!! I started in 2011 as a strategy consultant
→ I set up spark as a dutch operation but I still had a lot of other things to do, this was not my fulltime job
→ in 2013 I could finally do this as full time function because at that time: we have a lot of employees who are really enthousiastic & 1,5 year later: financial support
now: mngt is really behind it

I am also very happy with our senior manager: have been figure heads for the program from the start

2. ideas have to be realised as well: how to fit new ideas in the financial planning because mostly the planning is made at the beginning of the year so there is no room for these projects
→ you could for instance plan it under unforeseen work

3. IP

C: When should a firm use internal and when should a firm use external crowdsourcing to you?
Can they do both? If yes, when?

R: Internal: best for close by innovation: can we speed up our process, can we make it simpler for our customer on our websites..

Employees only think on current products and services & they are usefull to find improvements

But external: like our excellerator with startups, and TU delft:

= this is disruptive innovation, total new ideas, look far ahead

& they also think of new product that needs to be developed, the longer the process, adding some change to things, ..

C: Could you give me concrete examples of Crowdsourcing projects/cases of Liberty Global

R: I can't really tell you detailed examples but some examples of results: we got a lot of ideas on small improvement ideas that saved a lot of calls of troubles: (for example that decreased the times we have to send someone outside to fix the network or go to customers at their houses to fix something)

saving those is a big goal of the company, those in total 100's of kinds of ideas & these save them millions of money

currently in pipeline: bigger ideas where you can think of different apps to simplify things in company or to make the work of employees more efficient

→ I would like to push for more financial support

→ direct link between enthusiasm of the senior management

How to those implemented + initially he started with very broad questions but got too many responses, 80% was not even relevant for the question! And it takes a lot of time and effort to deactivate the ideas that are not relevant or useful

Now use very specific topic → of course this limits the amount of ideas

However: the ideas are way better quality!!

Advantages: Less ideas to deactivate & it increases relevant number of ideas that can be implemented

C: Is there something else you would like to emphasise that is exceptional of Liberty Global concerning your crowdsourcing projects?

R: Talk to other innovation managers: what others do is they have a central innovation team and that functions as a separate business unit for innovation → not the right way to go

Innovation should be part of everyone's job: what I do is I facilitate everything to the business, The platform that has to be set up, the communication, the topic, question come from business: they do campaign: they are the evaluators

I once had a network campaign: that is way too technical for me, I couldn't even understand what it was about so the business has to do the campaign, it has to be everyone's job

C: I would like to thank you very much for your time and for the interesting and useful things you have shared with me during this interview.

APPENDIX D TRANSCRIPT INTERVIEW

Company: Bekaert

Interviewee: Kevin De Caluwe

C: Can you tell me a bit more about the company you work for? What's the core business? What does the company stand for? And what is your exact function within the company?

K: I work for the company Bekaert we make steel wire and steel cords. The steel wire and the cords have different applications and end markets. The biggest end market for us is the tire industry where steel cords is being used to reinforce rubber of car tires and truck tires. Steel wire is being used in hundreds of different applications so we have an expose to a broad variety of industries and applications. So I cannot go into detail on all of that but we are active in automotive mainly, energy, consumables as well like champagne wire and construction with steel wire that is being used to reinfuse concrete. Myself I am working in the corporate innovation team, it is a small team that is looking to opportunities and business development to create new future businesses for Bekaert. And why is it corporate? Because we have the budget and time to give enough time to more opportunities and ideas that do not fit the business units. So it is a more longer term development we are focussing on. And that is why, because it needs time, several years to develop a certain business, that is why it is on corporate level and not on a business unit level. My role in that team is the front end of innovation so making sure that there are enough ideas flowing in into our tunnel, innovation tunnel and also proactively looking for new opportunities for Bekaert.

C: Okay thank you very much. Now how does Bekaert embrace Crowdsourcing, what is your definition of 'Crowdsourcing'?

K: It's getting information from the crowds or from a group of people. Not even a big group of people that are maybe located in different locations or even globally. And the type of information can vary. We use it mainly for ideas but it can also be used for other information as well. That is what I see crowdsourcing, that would be my definition.

C: And does Bekaert engage in internal of external crowdsourcing or both?

K: Both.

C: What is the role of crowdsourcing in the organisation. Is it part of a larger OI strategy?

K: Well so for the internal crowdsourcing, so we have an innovation portal which is an online tool to gather ideas from Bekaert employees. Everybody who has a Bekaert.com email address has access to that portal. And the ideas that are flowing into that online tool are mainly improvement ideas for products and processes. So more incremental innovation. The crowdsourcing activities with external partners is more for breakthrough innovation so for example we have done to get new ideas for really a lead in energy reduction in our processes. We normally have always ideas to, jah, that can increase or decrease our energy consumption by one or two percent. But we really wanted to have a stretched idea fears so we put the target at 20 percent energy reduction. And that is why

we involved one external company to think about it, of course that is only one company. We also used platforms like Innocentice where Innocentive is more the broker company that is reaching out to a network of more than hundred thousand clients that can hand in ideas on a specific challenge. I think we have done 3 or four times a challenge with Innocentive.

C: And how is crowdsourcing linked to the corporate strategy or goals? Do you use it every time when you're looking for an improvement.

K: No. How is it linked: it can be even on project basis. If we have an R&D project and we cannot find the right solution to a problem in a specific project, we can go out to our internal platform or our external platform. But then you're in such a detail that the link to the strategy is, there is a more loose link to strategy of course. We also have our must win battle. So company wise, I would say strategic exercises or strategic focus points and you can imagine that we have in the future also, exercises on these must win battles or strategic focus areas through crowdsourcing or through open innovation. But I cannot give an immediate example.

C: How should a company select the crowd for their CS projects? Should they use the general crowd or more a restricted crowd?

K: Good point. If you go through an external broker like Innocentive, I think they post it to the whole community they have access to. And for the idea campaigns we are posting internally we do that also for the whole Bekaert community however I do not feel that this is the most optimum way. But we don't have the time or the tools to segment our audience or segment the community. But I think it makes sense to do that because some idea campaigns or topics are really specifically for one I would say job profile and then such a segmentation would really help in better focussed communication etcetera. The down side of course or the disadvantage is that you avoid ideas coming from an audience you would first of all haven't thought about and excluded because of your segmentation. You cannot expect where good ideas come from so that is a disadvantage.

C: Then what are according to you the key elements for developing a beneficial CS strategy?

K: Well we start an idea campaign we of course before launching it we have different criteria to evaluate the criteria for the idea campaign. Some subjects fit well and other subjects don't fit well and we arrange or evaluate the subject on six different criteria. First of all is there a well-defined community? Can we imagine where we expect ideas will come from? Or have in mind what kind of job profiles will most likely have ideas for this specific question of the idea campaign? So do you have a defined community in mind first of all. Second thing is challenge or is the question inspiring enough? Is it feel to people and evaluating that criteria is maybe based on gut feeling. If I can come up with two or three ideas already by hearing the question I think it will be an interesting idea campaign topic. The third one is all about ownership. Who will be the owner of the selected ideas afterwards. And that is really critical because if you do not have an owner or you do not have somebody who has the accountability or responsibility to follow up on selected ideas then I don't think you will organise a good idea campaign. You need to keep your community motivated and one of the most crucial things is feedback on ideas that were posted. That is why ownership is

really critical. So you need to identify who will take up the ideas. The fourth criteria is who will select or evaluate the ideas. You also need to have that upfront and you also want a diverse team evaluating the ideas. So marketing, technology, process operations all combined. And we do that live as well, so in a live meeting we go over all the ideas that are posted in the idea campaign. The fifth is the urgency. Maybe that is a bit less of importance but to prioritise different subjects, I also gave an indication on how urgent was the topic or you can maybe say business potential, that is quite linked to that. The more interesting or if it is really for example, if we are talking about a technical problem we have to have solved. If that is linked to a huge business potential then I would launch that idea campaign sooner than other topics, that is linked to urgency. And the last criteria is: are the decision or are the evaluation criteria clear? Because you need to communicate to your community how you will evaluate ideas. So before launching the idea campaign to the crowd you need to define how you will evaluate the ideas and also communicate these. So these are the six criteria.

C: What are the differences in setting up a good crowdsourcing project internally or externally. So you have said the criteria but are there differences between these in internal or external crowdsourcing projects? *(his answer covers the question: when should a firm use internal and when should a firm use external crowdsourcing to you?)*

K: Yeah definitely. When the subject or the question or the problem you want to solve cannot be solved by internal competencies then you need to go externally. And so if you're responsible to launch these crowdsourcing activities, you need to be well aware what we can solve internally, what our competencies internally are. And these involve technologies we do not have in house for example or it's involved in industries we are not familiar with, then it is maybe better to involve an external partner.

C: Is it possible to do both? Internal and external crowdsourcing at the same time?

K: Yeah we've done that. I launched two idea campaigns posted on our internal innovation platform but I involved in the first exercise one company, well it is quite a technical innovation solvency company, and in the second I did that with two of these type of companies. So they have consultants, they are mainly PHD people from backgrounds so they were involved in the idea generation parts of this idea campaign. And that works, so we had a blend of internal people and external people. And it was also nicely split up. The amount of ideas coming from internal employees was making up 35% of all ideas and the other 65% was nicely split up between the two service companies.

C: Another question is: you have mentioned the six criteria but is there a difference between internal or external or do they apply to both?

K: I don't know. I was less or even not involved in launching campaigns like Innocentive. For the idea campaigns I launched on our internal platform but where I involved the external companies, the same criteria applied yeah. But for Innocentive I don't know how this was evaluated.

C: Which specific benefits of internal and external crowdsourcing do you identify from the experiences you have had so far?

K: That is quite easy. They give you access to a much broader, the amount of ideas or the types of ideas will be much richer and broader than if you ask it to one or two people. So the diversity is interesting and crucial and there is a higher chance of getting a solution in your pool of ideas that you get from the crowd.

C: What do you think are the biggest managerial challenges in setting up a beneficial CS project? And how should you avoid or solve them?

K: With Innocentive for example we underestimated the amount of time you need to evaluate all ideas. And also on our internal platform, we often underestimated that. So that is the first point, it is not only on launching questions to the crowd but there is a lot of time involved in evaluating the ideas. Second of all is, especially for our internal platform, is keeping the community engaged. And that is mainly about communication and giving feedback. And that comes down to time and resources. We had previously, I could spend 20% of my time on the portal but now it is almost zero unfortunately and we immediately see the effect on the activity of the online community: it goes down dramatically. So that is why I am currently hiring a person that is responsible almost fulltime for the innovation portal and that is definitely an influence on the engagement of the community and the amount of ideas that are coming out of it. So it's about engagement and communication, that is the second managerial issue you need to take in account. And maybe a third one but it is more or less, it is not that big of a problem, is IP. I have internally quite some questions on IP. Especially when I involve the external companies. But with agreements that is covered. We have NDA's with the external companies. They are service providers so they would not be in business if they would not comply to confidentiality agreements. I tried to involve other companies, industrial players, manufactures and there IP was definitely an issue. So if people or companies want to involve peers and crowdsourcing exercise, they need to take in account a lot of preparation time and convincing the peers to do such an exercise.

C: Could you give me concrete examples of Crowdsourcing projects from Bekaert?

K: That is a difficult question to answer because of IP reasons. I can give you I think I have two or three slides of successful campaigns. I will send you that. But then I have some time to see if the information on the slides is confidential or not. And on the slides you have maybe not the topic or the question but at least the amount of visitors, the amount of ideas that were handed in, how many were selected at cetera. That information I can give you. But the ideas that came out of it, I cannot share that.

C: Is there something else you would like to emphasise that is exceptional of Bekaert concerning your crowdsourcing projects?

K: Well, we have the innovation portal since 2000. The people on my peers external at other companies, they always are a bit surprised that we are having such an online portal already that

long. So maybe that is a bit exceptional if you look to or if you would talk to other companies. And we had our ups and downs. We had years we had even two or three people looking for the innovation portal and the ideas that were coming in and the communities and how the effect on the ideas that came in. And we had our lows, so years there was not a lot of focus on the portal and that translated into not a lot of activity. So the tool is good but you need to have people behind it that drive it, that can communicate with the community etcetera.

C: I would like to thank you very much for your time and for the interesting and useful things you have shared with me during this interview.

APPENDIX E TRANSCRIPT INTERVIEW

Company: Bekaert

Interviewee: Erik de Kempeneer

C: Can you tell me a bit more about the company you work for? What's the core business? What does the company stand for? And what is your exact function within the company?

E: Bekaert is a company that focusses on steel wire and steel cords products and solutions. Our customers are in a very wide range of industrial sectors. The largest one is automotive, where about 40% of our activities are occurring. The second one is construction. The third one is energy and then it continues to agricultural raw materials, medical consumables, so a very broad range. My role in the company well I work with Bekaert since 2002. I've always been working in the corporate technology of Bekaert. Started as R&D project manager then became head of department with resource responsibility. For some time also active as innovation manager and today focussing on portfolio management so let's say the whole process of decision making in which projects we want to do, how much resources we allocate to these projects. And doing that not only for technology but in collaboration with our business platforms. So that is basically my role today.

C: How does Bekaert embrace Crowdsourcing and what is your definition of 'Crowdsourcing'?

E: It is sourcing the crowd for solutions, so basically it starts from our perspective with a problem that we can't really solve internally. Secondly where we wanna go outside but maybe we don't know who to approach, we don't know who has the knowledge to help us. And therefore you try to approach the crowd in a bit more broad way. And then hopefully also attracting people who have the knowledge you are looking for.

C: Does your company engage in internal of external Crowdsourcing or both?

E: yeah it is both in fact. So we have an internal platform, a portal where let's say more than 6000 of the employees are connected. Basically everybody who has a computer and a log in to the network has access to that. So that is the internal crowdsourcing. I would say that the external crowdsourcing we also apply. Not in a frequent matter I must say but I can explain a bit more in detail later.

C: What is the role of crowdsourcing in your organisation. Is it part of a larger OI strategy and how is it linked to the corporate strategy or to the corporate goals?

E: I would say before you have to make a bit a difference here between the internal and the external crowdsourcing. The internal crowdsourcing is basically driven by engaging the whole population of employees to participate in innovation in this case. So there I would say yes that we want to get ideas and inputs from different people but it is really also the engaging and engaging people to participate and giving them opportunities to bring their ideas and also give them the opportunity to participate in discussion forums and become part of the whole innovation process.

So for me it is more an engaging and a corporation platform. The external crowdsourcing are indeed linked to the maybe corporate strategy but certainly a vision that we need to have an outside-in mind-set. And we have to go outside, see what is there and see who are the right partners that can work with Bekaert and can make good contributions to Bekaert. So the outside-in mind-set is certainly there. We have a lot of external collaborations and crowdsourcing is let's say a small part of that.

C: How should a company select the crowd for their Crowdsourcing projects and why? So should they use a general crowd or better to work with a selected crowd?

E: Well that is a difficult question. I would say preferably you want to select the right people. And of course if you don't know it, then you really approach a more general crowd. In fact what we do is we use let's say companies like Innocentive for instance that have their own network of crowds. They connect with people from universities, from companies, private people so they have their network. And we approach such companies like Innocentive to help us in accessing the crowd which is their crowd.

C: So you think in general it is better to work with a selected crowd rather than a general crowd?

E: From a principle I would say yes. Why? Because if you can select the right group of people, the whole process becomes much more efficient. Both for the people who are in the crowd and need to do something for you but also more efficient for you because you get more valuable inputs from the people who have the right knowledge and expertise. So I'm sure that is the most efficient and preferred way of working but again you need to be able to identify that right group. And I would say if we go to Innocentive it is because we don't know that, we don't know who we should approach.

C: What are according to you the key elements for developing a beneficial CS strategy? Here I would like to make the distinction between in general, or more specific setting up an external crowdsourcing strategy or internal crowdsourcing strategy.

E: Well I think you need to have an understanding first of all when to apply it and when not to apply it. I mean crowdsourcing is not a solution to do everything. It can be a solution to very specific things. So I think first of all, you need to know and understand when you want to apply it and when not. And then secondly, when you decide to apply it, you need to be able to do it in a very professional way, there needs to be a clear process behind that. What I mean is that a crowdsourcing, if you would be able to pick up a phone and speak to a crowd and do that in five minutes, that is probably not gonna be very helpful to you. That is a bit too easy. You need a process like a very clear definition of your problem statement. What is it that I want to tell to that crowd? You need to have a good understanding of what you think the crowd could contribute and what not. So you need to be able to provide sufficient information but also then clearly define what you expect from them, what you want to see. So that is a starting point: a clear problem definition, clear communication, what you expect. Then a very good follow up, I mean you receive a lot of proposals or ideas or whatever so you need to be prepared for that so you need a very good follow

up, a good evaluation. You need to have also clear understanding with your crowd, how you will evaluate proposals and you also need a clear legal arrangement between you and the crowd. Who owns IP, what are the rules of the game? So all of that is part of a process. So you need to have that process in place before you start crowdsourcing. These are probably the key ones. I work mostly with external crowdsourcing but I guess also from an internal perspective it is more or less the same in fact. Also there if you work with challenges for instance that you want to expose to your internal crowd it is the same process. It needs to be very clear what you want, you need to have also a very good process on how to follow up and have a clear understanding on how you will work with the people. It is more or less the same: there has to be a process behind.

C: What are according to you the specific benefits of internal and external crowdsourcing that you identified from your experiences?

E: The biggest benefit is that you are expanding your network. So I will say, especially within your existing network, if you cannot come to the right solutions or you cannot find the right opportunities, then of course you have the need to expand your network. I would say it depends a bit on how you already are connected today to solve your business problems. The need you have to expand your network, I think that is probably is one of the benefits of crowdsourcing.

C: Then what do you think are the biggest managerial challenges in setting up a beneficial CS project? And how to avoid or solve them?

E: Well I guess the first one is related to make sure you have that process in place. Like a clear definition of a problem statement, clear communication, good follow up, so you need a certain level of organisation or at least you need people that have the time to spend on that process and managing that process. So that is one element. Second element is let's say preparing your organisation for crowdsourcing. What you need to see is that people need to be open to these new ideas and particularly willing to invest some of their time also to work with the crowd. And that is something you need to also, I mean, you also need to communicate internally with comics about what crowdsourcing is, what we expect from it and how you need to work with that and you need also to make sure that anyone is at the same page there. For instance: if you post a problem in a crowd and you look for solutions, you get a lot of proposals written out on papers and of course that needs to be read and valued that you cannot do by your own. So you need people to help you do that. All these people are reading this with the right mind-set. And also are willing to expand some effort. Sometimes the crowd is never a concrete expert in your internal process or technology. So they have their own expertise, so they bring some new elements but sometimes they also make very crazy remarks or comments. Because they don't know our internal technology and of course you need to make sure that evaluators have an open mind-set to say 'okay I understand you don't know everything from what we have but let me look what is the key here that he can contribute from his expertise.' It's an example but it's just an indication but if you work with the crowd, you need to prepare your organisation to work with them. That is also part of the managerial function.

C: How do you keep the crowd motivated to keep helping you and keep engaging in the project?

E: So if you work with Innocentive for instance, basically there is a reward, a financial reward. So if you accept the solutions from somebody in the crowd, they get a reward, a financial reward. So that is one possibility and I guess for the external crowd that is the most efficient. Internal crowdsourcing in fact we don't have a reward system per se. Let's say we keep people motivated by showing them that we are doing something with their ideas. Bekaert employees they may bring an idea, they do that just to make a benefit from Bekaert to be a part of that. So the real reward for internal people is making sure that their ideas are heard, valued and that something is being done with it. And that does not mean that every idea becomes a project in the business of course. Sometimes ideas are just not good enough or not realistic. But then you have to give clear feedback to people: this is the situation and this is the reason why we do not do anything with it. So at least give a good feedback. But their motivation to bring ideas is hopefully to become the trigger of a new project or a business.

C: How do you decide with external crowdsourcing, how open you are with the crowd. From what I understand you need to have a certain level of openness in order for them to understand what to look for but you can't be too open cause then you share too much. How do you know where that boundary is?

E: Well we evaluate that case by case of course. So again it is part of how you write down the problem statement. You need to make sure that you can share enough information for the crowd to be effective. I mean if upfront you know you cannot share critical information for them, then you better don't do it. Because if they don't have the information they need to do it in a good way, then you need to be able to provide that information. So that is sort of a filter I would say. But I think in most cases, there is usually a way you can make abstraction to your problem and explain it in a way that still has the possibility to get the information from the crowd you're looking for but without disclosing too much of your details. And for instance if you work with Innocentive you even can stay anonymous, you post basically a problem and you don't even have to disclose that you are Bekaert for instance. There are quite a number of ways that you can, let's say, protect your information and still have a good way of communicating with the crowd. Of course if you move to a next step and you try to really work out solutions and implement it, then of course you need to work with people from that crowd. But I would say then it's about setting up a legal framework for that. The first step is I think a little bit of a balance: how much do I want to disclose, how much do I need to disclose. Can I do that by making certain elements perhaps abstract so they don't really know about the application or who we are. Things like that. In the experience we've had, this is mostly not the most difficult part.

C: When should a firm use internal and when should a firm use external crowdsourcing according to you? Can they do both? If yes, when?

E: You can do it both at the same time but I think it's smart to do it first internally and then go externally. I mean externally it's usually the cost, you have to pay for certain services and then it's a bit stupid then find out that the answer was also internally available. So it's just I would say it would be smart to first try it internally and do we have an internal solution available and is that the right solution. And if not, then go externally. But you could also do it in parallel, if you say yes I

want to do it internally but I also want to hear what's the view outside Bekaert, then of course you can do it in parallel as well.

C: But are there certain projects where you know: for this project it is better if we go external immediately?

E: that could be, I mean if you're talking about a project and you have let's say a problem where you know one hundred percent sure that there is no relevant experience inside the company, then of course you can go outside. But even then, I mean, you hire a lot of people that have so different back grounds, come from different companies, from different universities so the people working for Bekaert also have their past and sometimes they have a whole world of expertise that you didn't know off. So I would say always do it also internally. But the further away from your core expertise, I would say, the more easily for you to go outside.

C: Could you give me concrete examples of Crowdsourcing projects/cases you engaged in? So throughout the entire project: why was it initiated, how was it initiated, the challenges and struggles and how did you deal with them?

E: Yes I can give an example but just let me think here. One case, a recent case we had in fact, was when you produce wire products, I mean this is always long lengths and it's always continuous equipment that does something with the wire: make it thinner or make it stronger or whatever. And that of course is very high speed and sometimes, especially when you go to very fine diameters, the wire breaks as a result of that process. And then in your manufacturing in some cases basically you make crap, you have to throw it away but in some cases luckily we can solve that by actually welding the two ends. So welding again together and then basically starting up the machine again. So that welding operation is, let's say an important operation, the welding needs to be done in a good way, you need to do it fast, preferred in an automated way so that it doesn't become a costly delay in your process. If making the welt is taking a lot of time, goes wrong or stuff like that, then basically you start losing money in your manufacturing. So that welt itself needs to be done very well, very fast, very efficient. And of course welding is not of course a core technology of Bekaert. Well of course we use it but we are not the ones who invents or develops a welding process. So we do have some internal developments there but there we went outside to the crowd to get, let's say new ideas about how we could do that welding faster, cheaper and better. So that was a concrete case.

C: Did you have any challenges throughout that project and how did you deal with them?

E: Well challenges, it was not the first case for us so we did have some experience. We did not really have challenges with the process. It went rather well so basically we had a good definition of the problem and in this case in fact, we asked the crowd first to make a written proposal. And then we evaluated those written submissions. And then the second phase was basically making samples so we sent out samples to selected groups of solvers and they were asked then to demonstrate that process and we then made that evaluation. And that went actually rather well, it takes time obviously but the whole process went rather well. And let's say the outcome of it was that they

gave us some insights in new approaches that were not really known to us so what they actually concretely didn't work. But some were relevant ideas and at least we were able to look at it and see that that brings something. To be honest I have to say in conclusion, our conclusion was that what we have done so far is quite well and quite good and it outperforms what is out there in the crowd. So we did not find a solution that is better than ours. But that is also an answer, I mean it gives you a confirmation that you are on the right track. Which is already something good. And secondly there were some new ideas that could be relevant in some particular situations and I would say if we would encounter those situations, that we probably would look more carefully at these new techniques.

C: What were the ultimate benefits from that project?

E: Well as I said, it gave us a bit, let's say, a view on other ideas, on other ways of doing it. And it gave us comfort that we are already working in the right direction. We have not found anything that is significantly better than ours. Which also means that our competitors probably don't have something that is significantly better than ours and that is also comforting to know.

C: Okay, then my last question: is there something else you would like to emphasise that is exceptional of Bekaert concerning the crowdsourcing projects?

E: Exceptional compared to other companies or?

C: Yes for example.

E: I don't think so. I think there are different ways of using crowdsourcing depending on the type of company and the business you are in. We are very, well technology in Bekaert is important and we often face technical challenges so we are looking for this path of solutions. So we are looking for technology experts. But there are other companies like, you probably know the example of Lego that basically approaches its own customers to develop new Lego games or whatever.

C: But that is marketing also, no?

E: Yes it is probably marketing but I would say, depending on your business and environment you have a different need so you probably use this whole crowdsourcing thing in a different way. But I would say, within our industry context we are not unique, let's say in how we apply.

C: Okay, I would like to thank you very much for your time and for the interesting and useful things you have shared. I will definitely send you a copy of my research when it is done. So thank you very much.

APPENDIX F TRANSCRIPT INTERVIEW

Company: Janssen Pharmaceutica

Interviewee: Tom Aelbrecht

C: Can you tell me a bit more about the company you work for? What's the core business? What does the company stand for? And what is your function within the company?

T: I am Tom Aelbrecht, I am working for Janssen Pharmaceuticals. Janssen in short. I'm heading the Janssen campus office which is a strategic group of Janssen of the Janssen sites in Belgium. And Janssen pharmaceuticals is known for the discovery, development and delivery of new innovative healthcare solutions in a number of disease areas. So neuroscience, oncology, metabolic, cardiovascular diseases, immunology of infection diseases. So that is what we are.

C: And what is your function?

T: As head of the Janssen campus office, I am responsible for the strategy of the sites. So in Belgium Janssen has a number of sites so Beerse one, Beerse two, Geel which is a chemical plant, in Merksem in Antwerp we have the phase one unit of the general hospital of Jan Palfijn. And then in Diegem we have an office building and in Koersel we have a distribution centre for European distribution of products. We as a strategic office we are looking how as a campus, so the landlord of Janssen here in Belgium, how we can add value to the businesses. So for instance, we have on this campus on this site alone we have research activities, manufacturing activities, we have commercial activities, .. And what we do is trying to find out how on the campus we can add value, for instance research, so that they can better get access to new products or develop them more rapidly or bring new products more rapidly to the market.

C: How does Janssen embrace Crowdsourcing and what is your definition of 'Crowdsourcing'?

T: Crowdsourcing for me is where you typically as an individual or as an organisation, you have an objective, that could be a problem, could be something you would like to develop, so I call it in an objective and you're tapping into the masses of people, brains, all around the world to get pieces of what you need to reach your objective. And I really put it that abstract because it could be a problem that you have in manufacturing that you're tapping into the brain power of the crowd to get ideas around solutions. But it could also be that you're trying to develop something and you're reaching out to the masses to get pieces of your puzzle to get to your solution. So that is why I say you have a certain objective and you're tapping into the large population, it could be a professional population, it could be everyone, to help in reaching your objective.

C: What is the role of crowdsourcing in the organisation. Is it part of a larger OI strategy? How is it linked to corporate strategy/goals?

T: Not really no. it is not so we definitely have an open innovation strategy and an open collaboration strategy. But we are not structurally using crowdsourcing as a mechanism. We have experimented with it in the past, we have experienced with it in terms of giving, if you have a

certain ambition or a vision as a company where you like to go or what kind of products you would like to make to get from the crowd ideas. We have used it to solve certain manufacturing issues that we had but it's not on a structured basis. And I think we have a handful projects done with it but it is not like we say on a daily or on a monthly basis, now we are going to do, let's say a challenge or whatever, that is not something we have done yet. Some of our competitors do it. But as I said, there are examples where we have done and experimented with it. So last year and two years ago we did it as well, so we did an internal company challenge where we focussed around certain themes, healthcare solutions or preventive solutions and there we used a tool from a company called venture spirit and you might have heard of 'battle of the talents' which is an initiative in Belgium and it is sponsored by Fortis, so BNP Paribas Fortis. Where they invited all master bachelor students at universities to come up with creative ideas. And it is an online business tool, business game and we have used it twice in the organisation here for all of Europe to get new ideas from the company, from the employees around certain themes. That is what we have done. Also in relation to for instance a VLIO, which is a Flemish institute that is reaching youngster students at secondary school, college or universities, to challenge them to coming up with creative ideas, that is also something we do. But again it is really individual initiatives but not a structural part of how we do business.

C: How should a company select a crowd for such a project? Everyone or do you think you should select certain people?

T: It really depends on what you're trying to achieve. So what we have done for the manufacturing issue that we had, there we involved typically universities. So where you have professors, where you have experts in a certain domain, to get students or a PHD or whatever. If you really have very special issues, you're not going to send it to the entire crowd. I am a firm believer that it is about innovative ideas, you have to involve as many people as possible. Of course as a company you can choose between internal people or also involve the customers. But it really depends on what you're trying to achieve. You have to really select in my opinion some focus, some target group you would like to reach in order to get the best results. Because otherwise you get rubbish and you have to filter through all the ideas to get to the point.

C. Which are the specific benefits of internal and external crowdsourcing that you identified from your experiences?

T: So the manufacturing issue that we had, we were actually already looking for solutions for about three or four months. And it was only when we opened it up to the larger population that we were able to identify a solution in just a couple of days. So I think speed is an important benefit. And as a consequence of that also cost in our case. For the more innovative things that you're trying to, the solutions, the benefit is that you do not stick into the domains you are typically sticking to but you're really opening it up to other domains. And sometimes you can get an innovative idea or even a solution to a problem from a business that you're not, that was not top of mind when you were looking at it. And so they sometimes you get real innovative solutions to something you're trying to achieve and so that is something I think is an important benefit. And you always

underestimate the power of the numbers. So if you have large numbers, you always come up with something better than when you speak to a small number.

C: What are according to you the key elements for developing a beneficial crowdsourcing strategy?

T: If you really make crowdsourcing a structural part of your business, then what is important is that you have a good alignment between what your business needs in terms of new products or in terms of problems that need to be solved and that you have them well defined and well described and that you also commit yourself into following up to the input you receive from the crowd. And why is this important? And that is for every challenge that you do: for me feedback is the key element of success towards the future. Meaning that if you tap into the crowd to get ideas, then it also is important to outline to the crowd afterwards to tell what happened with the ideas, what solutions you picked and for what reason so that the people who have contributed are also acknowledged in the fact that they have spent time in it and it is also a success for the future challenges you like to do. And that is what I see quite often is that people go to the crowd, they receive solutions, they implement it, there is no feedback and if next time they try to reach out to the crowd again, you don't get any involvement anymore because they are not being acknowledged. So having the right people to facilitate the right crowd. Sourcing mechanism and link them to what your business means, that is for me crucial. Cause otherwise it is going to happen once, twice but then you won't have any contributions anymore.

C: Do you think there is a difference in setting up an internal or external crowdsourcing project?

T: Yeah I think in the first case, the internal, giving feedback to your employees is even more important than external. Because it is by definition already a limited set. On the other hand, if you go externally it is sometimes also a marketing thing, it becomes part of your brand. There you have to be cautious that you don't damage your brand because of misbehaviour towards the crowd. I think also the difference for external is that for external rewarding can be some kind of a financial reward. Internal this is a little bit less important, people do not participate in this kind of internal challenges for the financial reward, it is more for recognition and that kind of things. So you can give them an award or a reward or whatever but it shouldn't be let's say thousands of euros.

C: What do you think are the biggest managerial challenges in setting up a beneficial Crowdsourcing project? And how to avoid or solve them?

T: I think when you set it up, and that is what we have seen internally as well, is how can you.. so for instance if it's a new idea or it's a problem, is how to convince your internal research to adopt an idea that comes from external, that is really a managerial issue or challenge.

C: And do you avoid or solve that? Just by communication or..?

T: No it goes deeper than that because, what we have seen, and that is independent of what you described, is that if you do external collaborations really depends on your business. In our business you have to imagine that for half a century, all products that came to the market were discovered

and developed by internal scientists. And in the 60's, 70's, 80's, even the early 90's, it was a fact that the brightest people, the experts in a certain disease area, they were part of the company. So suddenly in the 90's and the years of 2000 and so on, you saw that universities, because of the education, more and more experts and top experts were part of universities. So now we as a company we decided to go more to open innovation, we had to really prepare the internal experts who were used to being the top experts in the world in their minds, we now had to prepare them to say: no maybe you are not the expert anymore but now there is person A, B and C in that area of that university there and there and there. These are experts in there subdomains of larger domains. So we have to collaborate with them and you have to see, really you need to see and adapt yourself. And if you're now trying to get solutions from a crowd, maybe from angels that you don't expect anymore. Really convincing our internal staff to adopt these ideas that could really be an issue. And that goes beyond just a crowdsourcing initiative, crowdsourcing for me is also part of a strategic exercise where as a company you decide now you're going to structurally reach out to knowledge institutes, with start-up companies and so on. And that really needs a mind-shift of the people, which is also required when you do crowdsourcing.

C: When you go to the crowd, you have to have a certain level of openness for them to engage but how much? I mean, you can't share everything because of IP but you have to share something. Where is the boundary in how much you share so you still have enough quality coming out?

T: That is really a fundamental question that you have to answer as a company: what as a company is important or what is the real core IP that you would like to protect? For us, this is quite easy. For us the core thing to protect is the molecule, the molecule structure, that is the thing because that in the end becomes your product. So we will never share any molecule structure but that is something that every company needs to know for himself. What is the key core asset that you have to protect? And if you cannot protect it or if it's really required to expose some of that IP, then maybe you need to ask yourself the question if crowdsourcing really is the best solution. But for me, that is a core element of how you do business. In our case for instance, we have patent lawyers, we have scientists, .. But scientists typically expose a bit too much but that is because it is in their field of passion, their energy, so they would like to tell the world what they were working on. So we have patent lawyers to really help them protect the key asset that needs to be kept, and that is what you need to do as a company. If you cannot get the good results from the crowd without exposing your core assets, you shouldn't do it. And typically what we see for crowdsourcing, in many cases, it is in the precompetitive space. So for instance in our case it is manufacturing. So there you don't really need to expose any IP. The other way around is also important. And some of our competitors like Buyer they do that, they use crowdsourcing, so for instance let's say you're interested in molecules that are in these and these disease areas, right. And they have a website 'targets for grant' and 'molecules for grant' or something. So they say: we are interested in these disease areas and we invite the community, the crowd to submit targets or molecule compounds to a website and if they are successful, then there is an upfront agreed incentive to the organisation that have some method. But there as a submitter, when you contribute, you know upfront, these are the terms and conditions that when I submit something and it is a hit afterwards, then this is what I get in return. But buyer does not expose any IP.

C: How do you keep your crowd motivated and engaged? You already mentioned feedback, but is there something else you think is important?

T: Internally, feedback for me is the key. And the only way to keep people motivated is to give feedback, positive feedback but also feedback why they are not chosen or why their solution was not chosen or why it was not a good fit or why it didn't fit the strategy so feedback is key. And then also feedback on what solutions were selected for what reason so that people can start to understand what is important for the company, how do they deal with people. Because I had an example for myself where we did the idea generation and there was somebody at a certain point, and we tried to give feedback on every idea that came in and we missed out on one. And a couple of months later in a meeting, somebody raised his finger and said: "yeah but I never had an answer on what happened with my idea". And then you know, you lost her, she dropped out because of that. And it goes for everybody, people want to be acknowledged for the time and effort they put into submitting something so for me feedback is key. And then for the external community, financial rewards could be a motivator, depending on what your soliciting for. If it is really innovative solutions, scientifically driven, yeah universities only take part on the challenge or whatever if they get a financial return. Because they are always competing for an income.

C: then if you could give me a concrete examples of a Crowdsourcing project or case from Janssen that you've worked on? So you already mentioned two but more in detail from the start on: why and how was it initiated, what were the struggles, what would you have done differently looking back at it ?

T: The one of the two I was the closest to, because I was a sponsor of it, was two idea generation challenges we did where the idea was: so as a company we have been shifting our strategy from a pure drug company towards healthcare solutions. So what can we develop next to the drug? What can we do for prevention? And so on. So we did a challenge to the internal crowd where we had clear objectives. So we were looking for integrated healthcare solutions for instance I think it was in the area of oncology, so that was one of them. And the other challenge was: how can we increase a therapy adherence? So what solutions can we come up with to really help patients to stick to their treatment? Because a better treatment regime has better outcomes on the treatment. And so we selected the entire European community, 8000 people. And actually we could have known it cause also the culture of the company is important when you do something like that, out of the 8000 people only 400 participated in one way or the other, ending up with 20 ideas. That is not a lot hè.

C: What do you think is the reason for that?

T: We did it twice, so first time we thought: people didn't know about it or didn't heard. So the second time we've put a lot of time and effort in advertising, marketing the idea. So people were aware that this was happening. But our company culture is one where there is a lot of pressure already on the people, we have a very ambitious goals in bringing products to the market so people are really fully booked on their activities and so people just didn't have the bandwidth to participate in that. Now it was a business game so what it meant was that it's not something that

you submit an idea and that's it in ten minutes. No the challenge was something, it's a game, an online game which runs for 8 to 10 weeks and so the idea is that you have a challenge and you have three types of participants in the program. You have the entrepreneurs, so the people with the ideas. You have the talents, these are the people who have a certain capability in marketing, finance or whatever but they don't have an idea. And then we have the investors, people who evaluate an idea. So the entrepreneurs, they put in an idea and each week, the investors had to review the ideas, give feedback: I would change that or I would add this and this, or I would add somebody with a marketing background or finance background. And then they went to the pool of talents and there was also some kind of a job market where really the people who wanted to participate in an idea, with a certain expertise, could solicit or apply to get part of the team. And so you saw people being matched. But each week, they had to further develop business idea and it was quite time intensive and it really took them 8 to 10 weeks. And so people after a while, they just dropped out, because they were fully booked on other activities and they said: we stop. And so that's why in the end only ended up with 20 or 23 ideas out of the 8000 people that we approached. So it just didn't work in our company, I know the system is also being used by Philips and there it works perfectly but it's also a different business environment. And I come from that industry like they are all technology geeks, they love playing games on a website, yeah here that is not the case.

C: What were the ultimate benefits from this project, if there were some?

T: It was two benefits: one was that you got some access to new ideas. The spill over effect in this particular set-up was that the system also connected people in the organisation. So people never saw each other or never knew each other and by the system they got connected and that was a spill over effect.

C: Then my last question: is there something else you would like to emphasise that is exceptional of Janssen concerning the crowdsourcing or OI strategy?

T: Yes for me, OI is a very important strategy. We are one of the front runners when it comes to OI and the kind of models that we apply but it's not really crowdsourcing. I mean, what we do is we have on the level of J&J, so Johnson and Johnson, we have a J&J innovation strategy where we have created four innovation centres around the world where we have scouts that go to universities, start-up companies, conferences, and continuously look for new innovations. So last year alone we established 80 so eight zero deals with universities, companies for collaborations. That is pure Open Innovation. I mean, you collaborate with them. You bring science, they bring science and so like that. But it is not crowdsourcing. This is a fundamental part of our strategy in getting access in getting new innovative top match science technology in order to be able to develop products towards the future. But at this point, crowdsourcing is not, crowdsourcing in the strictest sense of the word. Also because with crowdsourcing there is a longer distance between the submitters and the receivers and we believing in building relationships, building trust. So really interacting with the people and building that relationship is not something we can achieve through crowdsourcing.

C: So that was it, I would like to thank you very much for your time, it was very useful and helpful. Afterwards, when my thesis is finished, I will send you a copy so you can take a look at it yourself if you would want.

APPENDIX G TRANSCRIPT INTERVIEW

Company: General Electric (GE)

Interviewee: Anne Rhodinsky

C: Can you tell me a bit more about the company you work for? What's the core business? What does the company stand for?

A: Well I don't know what you know about GE? Do you know GE at all?

C: yeah my aunt works there so I know the company

A: So GE is the world's only .. industrial company. We are focussed in finding solutions, our customers .. Some of our solutions include healthcare, appliance lighting and energy, all over the world. We make generators, as well as we make devices to help make women pregnant, we do washing machines as much as we power steam generators and power plants. So it's quite a variety of activities. We are known at GE for our leadership and our innovation. And we're known for creating the world's best leader. And now we are in a digital world where we are creating solutions with digital technology to help our employees go faster and be more competitive. And we're looking at ways we can make our machines talk and give up data. So because we are focussing more and more on digital of course for your purposes Crowdsourcing is a natural way for us to get information from our employees and find out new ideas and get people's thoughts and purposes are a very big part of what we do.

C: And what is your exact function within the company?

A: Well I am working on the corporate team that manages the integration of a company we can called 'Aalstom' which you may or not have heard of. They make the TGV train and also make very similar products as we do like gas turbans for powering cities. You know they help put electricity on the grid in different cities. They're well known for the TGV and their train that have changed modern transportation. But we did not acquire that part of their business. But there are French multinationals so I'm working on communication, primarily for internally for all different whether it's governance or external or whatever.. And prior to that I had the great great pleasure to work for your aunt. So I've only worked with internal crowdsourcing projects to come back to your research.

C: How does GE embrace Crowdsourcing and what is your definition of 'Crowdsourcing'?

A: My personal definition is very similar to the name. I think that you know the person who came up with the concept made a lot of sense. My definition in general is getting data collecting, is gathering data from key stakeholders.

C: Does GE engage in internal of external Crowdsourcing or both?

A: We do both.

C: What is the role of crowdsourcing in the organisation. Is it part of a larger OI strategy? How is it linked to corporate strategy/goals?

A: Absolutely, I mean externally we are very big in Open Innovation. But internally it's about fostering collaboration, it's idea generation, it's solving problems, making our business go faster. And it is also for helping to create culture within the company.

C: How should a company select the crowd for their CS project(s) and why? Is it a general crowd so that everyone can access or more a restricted crowd that you select yourself?

A: I think it depends on what you're trying to achieve quite honestly. So it depends on what your strategy is. Are you trying to talk to a select group of employees and come up with new ideas on how to implement culture? Is it about finding solutions for IT? It depends on what you're trying to do, like we use it for engineering, we use it for IT, to find better ways to go leaner and faster in our business,.. So I think it really depends who you're after. Like we did Crowdsourcing where our extended leadership team because we wanted there to be accountability to the process so we had the idea generation at one of our leadership events.

C: What are according to you the key elements for developing a beneficial CS strategy?

A: Well I think first of all I think you have to be very open to the ideas you're gonna get and no idea can be a bad idea. I think that you need to really be as a manager open to considering ideas you wouldn't typically think off, something that may automatically seem stupid in some ways you need to open up your mind and consider that there may be something going on there that is not totally worth disregarding. So having that openness, you know, why do crowdsourcing if you're not gonna listen. So for me that is the number one thing you need to be ready to when you're doing a crowdsourcing program. And you need to look at all alternatives and figure out which ones come out of your .. scope your objectives and which ones are in scope because you're gonna get a lot of different ideas, you're gonna get a lot of pageants that will come in, that aren't necessarily the focus you have so I think you really need to be careful at the content and not get overwhelmed because there is a lot of data and great data so you need to be selective while being open. And that is a tough thing to do cause generally speaking we'll get lots of information.

C: Are there differences in setting up an internal or external crowdsourcing project, what are the key differences?

A: Well, when you're looking, first of all I mean on any side you're gonna have people who are loyal, you're gonna have people who are always wanna go against the grain, and either get pleasure out of being deconstructive and then you're gonna have people who are very constructive. I think you have that on both internal and external sides. So when you're looking on the external side you need to be careful on who are the participants. What is the scope of the participant? Are there competitors, are there influencers, you know you have to think about all those and how much information you're gonna get out and what happens with those ideas once it's done.

C: But how do you keep the crowd, whether it is internal or external, motivated and engaged in the project?

A: It is called communication and that is my job.

C: Is that enough to keep them motivated at all times?

A: You hope but not necessarily. I think you know, we always do for internal Crowdsourcing ideas, we keep them equal in terms of the people who answer. We don't give them incentives like performance or a reward or anything like that. Just you contribute and that is a part of your job to be accountable and responsible and contributing. And so if they're not responsive, you try different communication tactics or eventually maybe you close out your Crowdsourcing project and you have to rethink it. And think of another way of collecting the data. Whether it's focus groups or whatever. But I guess you know, usually it's gonna have communication tactics that help. And engaging managers help a lot. Engaging managers and engaging HR and engaging teams to help spread the word of mouth of the importance is very critical to that process.

C. Which are the specific benefits of internal and external crowdsourcing that you identified from your experiences?

A: I think knowledge of what you're trying to achieve is a number one piece for the internal part. And everyone knows what you're trying to achieve and everyone has solid experience with it so the projects that we've done. In some cases, I think some of it was very particular and so maybe some of the people who could have participated didn't have the clarity. So select a group of ideas that are commonly agreed upon and where you got, you know you have unified ideas that people thought into and brought in. You know I think you have engagement in the fact that they participated and contributed and that they kind of helped vote that process along so everyone has a stake in the game as they say in English. And I think that's internal and external.

C: What do you think are the biggest managerial challenges in setting up a beneficial CS project? And how to avoid or solve them?

A: I think you have to be careful how to event what you're trying to achieve. And not influence the idea generation too much in what you're trying to do because you want to encourage out of the box thinking when you're doing idea generation. You have to be careful that and the way you communicate within your crowdsourcing project. I mean you should test it first with different stake holders, with your peers or with your team. And then you should take a dummy set of people and test it first to avoid any challenges. You have to be careful on language that you employ to not influence but to not use inappropriate language. And that is internal and external language, if you're doing an external project, you wanna test it with a neutral group of people that will be able to give you feedback before and that is kind of the best way to help you avoid issues and then you need to really test and check your group and make sure that those people are the ones who are gonna give you the answers you are looking for the ideas that you're looking for. Is it the right target? Is it the right, you know, grouping? Is the timing right? When do you launch it? So there

are a lot of considerations you have to give to avoid having your project gone right. And of course as I said earlier in the discussion, is communicating it appropriately, when you launch it, making the visual interface, engaging and clear, easy to read and understand and providing the appropriate context to the project and we've referenced material that is valid to the project.

C: When should a firm use internal and when should a firm use external crowdsourcing according to you?

A: I think when you're doing idea generation or considering how to make your company work better or improve how they work internally, when you're trying to come up with new ideas on how to present materials, when you're looking at communications like for example for my role: what you're employees wanna lead, what things are they interested in, what topics, .. So Crowdsourcing is a great way to get that data from our stakeholders and to hear what they like. You know, what everyone agrees upon is important to be heard. And I think from an external standpoint, we're very into Open Innovation at GE and I think that hearing from our customers, hearing from universities and influencers can be a very helpful way to .. ideas and they come up with concepts on how to work.

C: Is it possible to do both external and internal crowdsourcing at the same time?

A: You can do both, separately. At the same time in one project? I think you can do one project and do one target audience is internal and one target audience is external and there are some new answers to each to represent that target group. So I think you can absolutely do both but it can't be exact the same. I think that you're opening your company up to issues if you do that. I don't think legally they would necessarily be in favor of that because you never know what ideas are gonna come through and negative ideas from externally or internally can influence externally or internally. You shouldn't mix it up, I don't think. This is my personal view, not my company's view by the way.

C: Yes of course, noted. My next question: could you give me concrete examples of a Crowdsourcing project from GE?

A: I will give one from when I was still working in the same business as your aunt when we were working on a crowdsourcing project in my business. And it turned out we were using the same tool as our division was. And what happened is that we did three concurrent crowdsourcing projects with this technology but they didn't, there was no interference let's say. The topic for the engineering site said: 'The innovation session will be re-facilitated by a new idea gathering crowdsourcing tool that is socially interactive allowing everyone at GE Power Conversion to collaborate, network and build on best ideas. The event will be open from 8am on this day until 10 pm three days later. The event will be full Power Conversion employees and we have also invited the EM engineering team to participate during the same period to enhance our solution generation. Our goal is to identify ideas that each of you can own and feel empowered to make the change on your work every day and also to identify some breakthrough ideas that will have a mayor impact for our business which suggests 40 areas to focus on ways to make your job simpler, ways to make

to work with customers easier, ways to accelerate structuring effort and increase efficiency in systems engineering and product management, and ways to better serve our customers and reduce according recycle.' So it was all about going leaner and faster and it was with both engineering and IT and we were looking for new ideas for how to, which priority to set in IT for the business. And it was used to generate ideas and to narrow them down to a certain group of ideas and then to forward them. So we came up with logo's and a whole website for them to work on. And I think they were very happy and they followed up and they actually put them into motion and they did, if I'm not mistaken, they are still working on it now and it has been a little while since I did it, about two years since it happened. So that is a year and a half later. Another one is that we were at a company extended leadership meeting and so we had a crowdsourcing tool that was part of our event, a digital tool. And so we used it to do breakout groups so we had about twelve breakout groups. And the objective was how we could be leaner and faster and so the teams had the opportunity to go into the tool and give their ideas what what would make the company leaner and faster. During the seminar and afterwards they got to vote on the ideas that made them leaner and faster. And at the end, they had breakout every afternoon to go to the top and the winner of each crowdsource item and by the end of the event, they had narrowed it down to sixty key ideas to go leaner and faster. And so we were able to get project teams and after the leadership meeting we were able to assign those leadership teams the talent ones to work on those. There were follow up reviews and they started implementing the ideas and that was a good use, I think we really made sure we followed up on all the work.

C: So you were satisfied with the results?

A: Yeah although my personal feeling is that we didn't go all the way and we could've done better. This is my personal feeling, they felt like it was too much at the end with what the company was asking them to do and what crowdsourcing was asking them to do so they tried to mix them into the daily activities were and from that perspective I didn't see as much visible results because it got you know, looped into a combined project so the speak. But I do believe the essence was there and the work was done and some of it was put into practice. So yeah we were satisfied.

C: And externally? I heard of the Ecomagination challenge GE launched a while back.

A: Yeah we do a lot of external challenges as well and other crowdsourcing projects but that is not my business. I personal have only worked with internal crowdsourcing programs. But I believe you can find a lot on it online, so just look up 'GE Ecomagination challenge' and you will find a lot about it. But I only did internal crowdsourcing with internal stakeholders.

C: Then my last question: is there something else you would like to emphasise that is exceptional of GE concerning your crowdsourcing projects you do?

A: Well I think I said it earlier, what is really interesting about GE is that anyone can have a great idea. So you could be twenty and have a good idea and be looked into. And the fact that management and the people that decide to do these activities rally want to generate good information and they want to employ that information that they get so it's not generally stuff they do and there is no follow through. And I think GE is very good at the follow through and ways to

implement the ideas that are, you know, gathered through the crowdsourcing efforts so you know, from my perspective, GE is very very good about listening responding and bringing into motion. And generally very quickly, very reactive. It may take a while to implement through but they respond immediately and get on it right away. They are not gonna waste time by doing something and then not use it.

C: Okay, one last question I had: you said you have to have a certain level of openness for the crowd to engage but how much? I mean, you can't share everything but you have to share something. Where is the boundary?

A: As I said, you have to make sure that you don't get tracked from your target so a lot of people will have a lot of great ideas but you can't get distracted by too many ideas, you have to pick the ones that are really the priority in what you're trying to achieve and focus there.

C: Is it a whole team that is selecting the ideas that are good?

A: Generally there are a few people involved in that process.

C: I would like to thank you for your time, it was very useful and helpful.

APPENDIX H TRANSCRIPT INTERVIEW

Company: Crowd Expedition + Crowdsourcing Week (CSW)

Interviewee: Martijn Arets

C: Can you tell me a bit more about the company you work for? What's the core business? What does the company stand for?

M: I'm working with my company. The name is 'Forget the Box' And what i do is, it is a research company and what we do is, we do expeditions. So we're looking to things that will happen in the future. And then we find different partners to get a recount to explore. What is new developments, will it have impact on the different stakeholders. So now we're busy with crowd expedition and that is a part in the collaborative platform economy. So we're interviewing about 150 entrepreneurs and experts in throughout the year all around the world and we're sharing all the interviews through our media channels, especially through YouTube so the videos and we share the insights in books and giving keynotes on conferences just like on the crowdsourcing week where you got my name from if I'm not mistaken. And I'm the founder thus of this company.

C: How does your company embrace Crowdsourcing and what is your definition of 'Crowdsourcing'?

M: Ah good question because everybody is busy with different definitions. Crowdsourcing for me is part of the collaborative platform economy, where the platform is a central entity where demand and supply comes together. It is we thrust each other and it is also to create or share things together. And crowdsourcing is a form of sharing knowledge via platforms. So sharing knowledge and ideas. So you have the sharing economy, that is sharing stuff, you got crowdfunding, it is sharing money, you have the gig economy, that is sharing labor and you have crowdsourcing, that is sharing knowledge and ideas. So I know there are many different people like the crowdsourcing week, there many people say crowdsourcing is like the sharing economy, like crowdfunding but for me these are very different.

C: What is the role of crowdsourcing in the organisation. Is it part of a larger OI strategy? How is it linked to the corporate strategy or goals?

M: We are starting from the believe 'you practice what you preach'. So we're doing many researches in crowdsourcing, crowdfunding, sharing economy and the gig economy, but we also use these techniques ourselves. So we funded three projects through crowdfunding, and we're also using crowdsourcing to get knowledge and to get insights for the practices we are doing. So like we have an expert team of 60 experts all around the world and we use them for getting extra inputs for the interviews that we do. So that way we also use crowdsourcing for our own activities.

C: How should a company select the crowd for their CS project(s) and why? Is it a general crowd so that everyone can access or more a restricted crowd that you select yourself?

M: I think it depends on the goal that you have of crowdsourcing. What is the definition of crowdsourcing that you use for your research?

C: Well that if a company wants to solve problems or is searching for new ideas out of the box, then they can use internal or external crowdsourcing. And it depends whether on internal or external crowdsourcing which crowd they use.

M: Okay that is clear. So you're already on the knowledge and idea focus on crowdsourcing. Good to know. So to come back to your question about which crowd to use. I think it really depends on the goals of the crowdsourcing campaign. You see, many companies are doing crowdsourcing just for marketing, so it is really just like a really smart marketing strategy. It is more like okay, we want a new flavor for our chips so everybody just think about a new flavor and we're having a vote and share. And that way they will get maximum attention. For this kind of crowdsourcing, but I would just call it a smart way of marketing, everybody gets involved because of course they probably have different step. First they start with engaged users and afterwards or the less engaged users but in the end the target group is very broad because of the marketing instruments. But if you really want to have ideas that can help your company forwards, you would have to focus on a more specific target group. And also trying to think like okay how are we going to get this group of people involved on the long term of our company. So not only 'okay thank you for your idea, have a good day and here you have a voucher or whatever' because I think that is really the biggest challenge in crowdsourcing how to really get crowdsourcing in the really innovation strategy of your company. Not only as a marketing tool or as a thing you would do for only one time. Because I really believe you will only get the maximum results if you have already build a relationship with the crowd. And it also really forces you to think like, okay how open are we going to be? Because many crowdsourcing projects I see from organizations, it is: okay thanks for your idea and now we're going to decide what we are going to do with it. That will never help you to build that long term relationship with the crowd because in the end, you really need to make them part of your company.

C: What are according to you the key elements for developing a beneficial CS strategy? So in general, for internal and external Crowdsourcing.

M: I think a long term vision and strategy is the most important aspect but also a way and that you implement it in the different of the organizations. About okay, how open are we going to be and also about how are we going to manage our crowds? Because I think one of the hardest things is how to manage a crowd on the long term. I also try to make my own crowdsourcing campaigns and I experienced that is really hard to do. I think also being able to ask the right questions to the right people. So of course you will begin with a really broad audience of a crowd but in the end when you get to know them, who are these people? What are their main professions? What are the things they know about? Because then you can start by asking the right questions to the right people in the crowds and that will also help you to build more and more long term relationships.

C: Are there differences in setting up an internal or external crowdsourcing project, what are the key differences?

M: I think first but that doesn't answer any question, but that is you don't need to see it as a project I think but as a fundamental part of your strategy. But because when you see it as a

project, that is the first failure and that won't help to make it better. The difference is.. lets see. I think that it is a different strategy. Because when you look at internal crowdsourcing, there you already know the people. So maybe you can scale up faster. But you have also people who are used to their culture of the company so it is harder to get them on board. Especially when they are not full time on your team, it is really hard to get their attention. Because everybody wants to join but then in practice it is really hard because they also have ten thousand other things to do. So it is really hard, you really need to arrange with the managers of the people you use, for your internal crowdsourcing, that people also will get a time off to work on that crowdsourcing project, I call this internal budgets. The motivation factors for the external crowdsourcing is not completely but still quite different. Because they don't really have a relation with the company but the nice thing is: because they are from external and probably you're going to attract your biggest fans, so they really love your brand or your company. So you can also with rewards, especially in the beginning you don't have to give them money because they just like to help your company. And you would give them by saying: okay come and visit us for a presentation or a tour so you can give different rewards then with internal crowdsourcing projects.

C. Which are the specific benefits of internal and external crowdsourcing that you identified from your experiences?

M: I think the biggest benefits are that people, especially from external crowdsourcing (and that is also internal but it is more external), that the people have a really fresh look on what you're doing so people they are working in completely different industries and they can have insights into your project. And I think that is the most valuable thing you can have.

C: But isn't it difficult for a manager how much you can share because of the IP and all of that?

M: Well that is quite a challenge of course. But I really believe, especially in this time we're living in right now, you can really make speeds when you share and of course because the benefits of sharing your ideas is that everybody knows that is your idea. So with all the participants we do, is will throw it in the open as fast as possible. Because then you can make speed because when everybody knows, everyone will also share the story but also start thinking about and start giving us feedback. And when you're only discussing it behind closed doors, you will never be able to make that speed. And of course this depends on the sector you're working in because there are of course sectors where closed doors are a really good solution. But I think with most things, and especially the way I see crowdsourcing right now, I really think this open approach is much better because then it also forces you to make speeds so the others also kick you in the ass to make speeds.

C: What do you think are the biggest managerial challenges in setting up a beneficial CS project? And how to avoid or solve them?

M: For internal or for external?

C: Both, so if you can make a distinction, that would be even better.

M: I think the biggest challenge is how to manage a crowd. And also to not only look to your own benefit but also for the benefits for the crowds because if you only look into your own benefit, then it will work for one time. But you will never be able to build up a crowd on the long term so you really have to, need to have respect for every stake holder involved. It's the only way to build a long term relationship so I think that's the biggest challenge in crowdsourcing. Because it really has to be part of your strategy and part of your company because you're really inviting the crowds into your company. I think that is the hardest thing on different aspects to do as a company.

C: when or for what projects should a firm use internal or external CS

M: I think the most logical one is when you really can't share it with other people. And I think when you, I think we don't really want too much marketing attention around, then also have an internal campaign may be best. But I also want to challenge people to make a combination of internal and external crowdsourcing. Because we're now talking about internal or external.

C: Yes that would have been my next question. So you think it is possible?

M: Oh yes I think it is. So maybe not with the whole company but with certain groups of people from the company. But I think it is really interesting for companies to think of this combination.

C: Are there already companies who have done that, do you have an example?

M: I would have to check, I don't know an example right now. But I think it should be possible.

C: Okay, then could you give me a concrete example of a crowdsourcing project from your company that you worked on yourself?

M: I will take the example of the expert group. Because we started this crowdsourcing project with about eighty experts in different fields and it was really easy to find them and also to convince them to work together. Because they really all loved the subject. But I soon saw, especially because I didn't really knew how to structure our own projects, it was really hard to, at the same time, find structure for the external crowdsourcing. So we were pioneering on two parts and that was really impossible so in the end there were times that we didn't contact our crowds for maybe six months because we were just really internally busy with finding out and working on our own stuff. So I really learned from that that we really need to, really need to have the strategy of okay: how to use your crowd. But also that you really have to first fix your own internal processes before you turn to others from outside to help and join you.

C: And what would you say now were the ultimate benefits from that project?

M: For me or for our company, the benefits were that we really had access to a really big amount of different experts. So because the experts that were involved or also the experts who are involved, they really work in different industries. So it really gave us access to a really big network of many different people. People we couldn't hire for ourselves. And the benefit for the crowd was, they were also really curious about the developments so in that way, joining the expedition as an expert also gave them the opportunity to be the first people to know about the new developments in this collaborative economy. So it was also really a good knowledge platform for them.

C: Then my last question: is there something else you would like to emphasise that is exceptional of your company concerning the crowdsourcing projects you do?

M: yeah I think the 'practice what you preach' strategy is really helpful so of course we used internet and extra crowdsourcing, external crowdsourcing but also to do experiments with all the tools ourselves. And like I told you we did three crowdfunding campaigns ourselves on three different platforms with three different types of crowdfunding. So in that way we also are experimenting with ourselves. So I think that is a really good thing to do.

C: I would like to thank you for your time, it was very useful and helpful.

APPENDIX I TRANSCRIPT INTERVIEW

Company: ISMB - Istituto Superiore Mario Boella

Interviewee: Michèle Osella

C: First of all, can you tell me a bit more about who you are and what your job is exactly?

M: So my name is Michèle Osella, I am the head of a business model policy innovation unit at ISMB: Istituto Superiore Mario Boella. It's a private research centre, it lies in the north west of Italy and the private research center has a mission related to applied research in the area of information and communication technology. In particular targeting high impact innovation, primarily for a society benefit so this means that we work both with private sector organizations, so we work with many companies both SME's, large enterprises etcetera and during recent years, so we have intensively cooperated with public sector organizations, helping them getting the most out of information and communication technologies and also helping them to make the leap from innovation to tolerance to innovation governance so frequently there is this idea that the public sector struggles to innovate and what we're trying to do is to combine the technological innovation with other types of innovation so process innovation and other kind of innovations. And as you may imagine, crowdsourcing related topics are part of this trend of activities. This is let's say my primary activity so as a research manager here at ISMB, then I am also a joint professor at the politecnico torino that is the key engineering university in Italy and specifically I teach topics related to business modelling, business strategy, business planning and more in general innovation management in the private sector. Finally I am also lecturer and consultant at the United Nations and in particular the international labor organization and within the scope of the United Nations, I am more active in topics related to public sector innovation so in how developing countries may embrace the new opportunities assured in by digital, especially the government, the procurement etcetera etcetera.

C: Okay that is quite a lot. I contacted you because I was looking at the crowdsourcing week and then I saw you because you did an interesting presentation there on crowdsourcing. That is how I thought you could be very helpful to my research.

M: Thanks, thanks. I am glad for having be contacted and I hope to be useful for your studies.

C: First of all, what is your definition of crowdsourcing?

M: Well there are plenty of definitions. So the literature already provides a wealth of definitions. I think that from my point of view Crowdsourcing is an unprecedented opportunity to access collective intelligence and to tap into this potential for a variety of purposes so I think that my definition probably goes beyond the technicalities of open call or the fact that the network of solvers should be larger etcetera. So I think from my point of view the key aspect characterizing crowdsourcing is the fact that it is the very call for accessing collective intelligence and to access a body of knowledge that is constantly enhanced and therefore a way to complement the knowledge base and the organization intelligence that every organization already has.

C: What do you think should the role of crowdsourcing be in an organization? Should it be part of a larger OI strategy?

M: Well, I think that ideally, so if we consider a medium term approach: so taking in account both the organizations that we have studies and also some of them that we have cooperated with as consultants, I would say that in a mid-term strategy, that is the goal. So to assure that there is full fledge reliable consolidated open innovation strategy. So ideally the metaphor of the innovation funnel becomes porous so there is inflow and outflow of technology, of knowledge, of ideas. And crowdsourcing is one out of many techniques and approaches to turn this porous OI funnel into reality. So in the medium term I think that this is absolutely the goal and to ensure this becomes reality. The key getaway is the customization of CS according to the needs to the problems that need to be solved to the kind of community governance that an organization wants to establish etcetera etcetera. More: in a short term prospective and this is something that we have been involved in with several organizations public and private sector as well, as consultants we may say that CS is also a way in the short term to experiment. How internal knowledge and internal innovation capacity could be combined with something that has his origin outside the boundary of the company and a sort of asset-test for the company of the capacity that the company has to absorb inputs coming from the outside world. So I think that this short term mile stone is also a way to understand to what extend CS could become the mainstream practice. So in many companies, let's take the famous case of Procter and Gamble: they started in 2000 with the idea of rolling out a full-fledged program for open innovation and in very few ears they have been able, under one hand, to take a substantial portion of innovation thanks to outside innovators and at the same time to benefit a reduction in terms of costs because the R&D department has become more giant because some of the competences that needed to be accessed rarely, were outsourced rather than insourced etcetera etcetera. So in some cases, as the case of Procter & Gamble, it could become the mainstream. In some other cases it is a sporadic activity that may occur rarely when needed. So to summarize I think that in the medium term absolutely CS is one of the key building blocks of an OI strategy and CS I think in the medium term should be seen as a sort of process. In the short term, drawing from our experience with the several organizations, I would say it is a project so each time is a different, unique and diverse endeavor and the result may help to capitalize and to establish this kind of routine, process that in the medium term, we think, could be established.

C: So you think that it should be linked to the corporate strategy and the corporate goals?

M: Yeah absolutely, needless to say that today is not so easy to identify who is the head of CS into an organization. Now so in an organization but probably you have investigated this aspect better than me. So within an organization you may look at the organizational chart and you may identify a lot of 'chief something officers' , each of whom has a core expertise and each of whom has a specific responsibility in the governance of the company. At the same time it is not so easy to understand who is the head of the crowd. Probably because the set of competences or because the role at decision level and the position in the organizational structure have yet to be codified. No so implicitly in every organization having a mayor approach to CS, there is someone that is implicitly the head of crowd. Probably the head of crowd currently wears another head. So it's probably by

analogy, I would say it has some similarities with what happened with the data scientists. So data science has become today a buzzword and for sure, in the past there were a lot of guys cranking data but they had different qualifications, then data scientists a few years ago became a buzzword. And data scientist has become the sexiest job of the twenty first century. So probably by analogy we may say that in a few years head of crowd will be the sexiest job of the world perhaps. That said, today probably in many companies CS is already linked to corporate innovation. Let's take again the case of P&G but I would say also companies using CS innovation as key inputs, let's say companies such as Treadless or companies leveraging crowd design or crowd creation of content etcetera etcetera. So in such cases, it's obvious the fact that corporate innovation capacity is deeply intertwined with CS. Probably my comment is that the person or the team in charge of CS governance in many cases are operating let's say in the same or with different labels and different job positions. So on the way to CS maturity, this will be one of the next milestones: better identifying who is in charge for CS endeavors, also into the organizational chart.

C: If a company engages in CS, how should they select their crowd for their CS projects? Should it be the crowd in general or more a restricted crowd that they select?

M: Well, regarding this point I don't think I have the golden answer saying A or B. Although it seems to be simple, I would say the answer is that it depends. So in some cases the volume of solvers is inherently a source of richness and a "parmayor" of diversity. I would say, let's take an example with some cases of crowdsourcing for collecting suggestions or for collecting ideas regarding how to tackle a tough challenge. The so called 'wide crowdsourcing' is a source of richness and a source of diversity. On the flip side, there is what we call the 'wise innovation'. So not necessarily cases in which the size of the community is the key factor but cases in which there is the need for a very selective approach that could be due to one hand that the fact that there is the need for for instance competences already tested, or competences already certified by someone. And on the other hand, because in some cases due to confidentiality or for preserving information having high competitive value restricting the group of solvers or putting in place a prequalification process, could be needed in order to make the CS endeavor more productive. Of course we have to say that in some cases, in which let's say the analysis of the information and results is automated.

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