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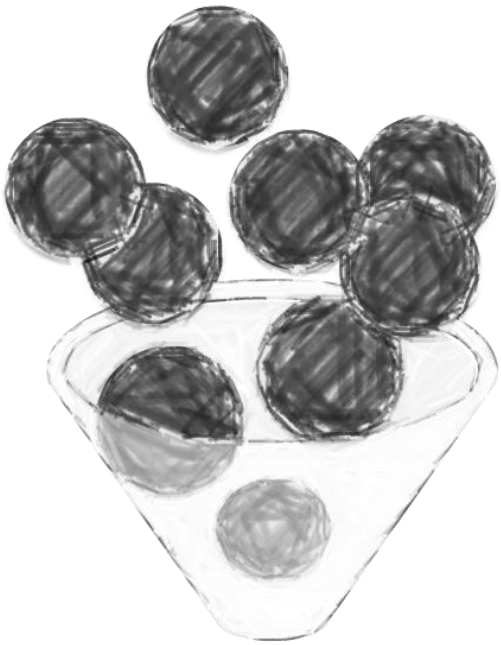

Internal crowdsourcing for innovation development

How multi-national companies can obtain the advantages of crowdsourcing utilising internal resources

Master of Science Thesis in the Master Degree Programme,
Entrepreneurship and Business Design

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Abstract

Innovation processes are becoming progressively more open, and companies have to explore several new paths when selecting innovation strategy. *Crowdsourcing* is one new type of open innovation companies are increasingly seeing the potential of. An even newer concept is that companies are beginning to utilising its existing network using *internal crowdsourcing*. The purpose of this thesis is to provide an overview of the concepts in relation to innovation development, and aspects to contemplate when considering different crowdsourcing alternatives.

The main research question is: *How does internal crowdsourcing differ from external crowdsourcing in relation to innovation development?* To answer this question, the main benefits and drawbacks are identified, and recommendations are made. The method used is a literature study and an empirical study, which is analysed. These are compared to each other and analysed in order to outline the differences. The empirical study is comprised of interviews with employees of multi-national companies, and with crowdsourcing companies.

As crowdsourcing can use either an internal crowd or external crowd, and crowdsourcing in relation to innovation development can be carried out either through crowdcasting or through idea jams; four Crowdsourcing Models in relation to Internal and External interaction (CMIE) are identified.

Conclusively, the main differences are identified to be related to innovation strategy and culture, incentives, intangible benefits and IP. The main identified benefits with internal crowdsourcing are that it captures underutilised resources and aggregates innovation insights. It offers a possibility for social collaboration and enables an agile informal innovation department unbound by hierarchy or position. It can enhance the innovation culture and increase the transparency between management and employees. The main identified drawbacks with internal crowdsourcing include less wildcards, risk of resistance and not generating external PR or customer intimacy.

Acknowledgements

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Definitions

Crowdsourcing: Crowdsourcing is the act of taking a job traditionally performed by a designated agent (usually an employee) and outsourcing it to an undefined, generally large group of people in the form of an open call (Howe, 2006).

Throughout the thesis, *crowdsourcing* refers to both types of crowdsourcing, if not explicitly expressed as *internal crowdsourcing* or *external crowdsourcing*.

Key definitions for the thesis

External crowdsourcing: Crowdsourcing that uses an unknown crowd for e.g. solving an innovation problem, or idea generation. The crowd may be selected by a crowdsourcing company, such as InnoCentive which has their community of researchers which submits solutions to organisations' problems. The crowd may also be anyone with internet access, such as Dell's online portal IdeaStorm, allowing people to submit ideas, and subsequently comment and vote on the ideas of others.

Internal crowdsourcing: Refers to the firm extending its problem-solving to a large and diverse group of self-selected contributors beyond the formal internal boundaries of a large firm; across business divisions, bridging geographic locations, levelling hierarchical structures (Modified definition of intra-corporate crowdsourcing, Villarroel & Reis, 2010)

The main difference compared to crowdsourcing is that the internal crowd is known to the company. The crowd can e.g. be all employees of the company, a certain division of the company, or extended to include partners and suppliers. The crowd is specifically used for e.g. problem solving or aggregating ideas for innovation purposes. It can be:

- Questions from management where the employees' aggregated answer will comprise of more knowledge than traditionally just asking selected few (See section 4.1).

- Finding documents and information relevant to a certain patent or technology, in order to obtain an understanding of the patent or technology landscape (See section 4.1).

- A portal where ideas are submitted and enhanced by others in the crowd. Thus creating a stock market for innovations, with the aim of seeding the best ideas to further pursue (See section 5.1).

1 Table of Contents

1 Introduction

This chapter aims to give a background to the chosen subject and outline the purpose of the research. The research question and sub questions will be presented together with the delimitations of the research.

1.1 Background

Innovation processes are becoming progressively more open and how they are carried out has shifted (Chesbrough, 2003). Subsequently companies have to explore several new paths when selecting innovation strategy. Chesbrough exemplifies this openness with indications of knowledge diffusion. The share of large company R&D spending dropped from over 70% to 41% from 1981 through 1999 (Chesbrough), showing that R&D activities are increasingly being carried out outside the walls of the multi-national companies. Crowdsourcing is one type of open innovation which allow for this inflow and outflow of knowledge in companies. Crowdsourcing as a concept was coined by Jeff Howe in his renowned Wired magazine article from 2006; *The Rise of Crowdsourcing* which led to the book *Crowdsourcing: Why the power of the crowd is driving the future of business* in 2009. Companies that emerged from the internet era were designed to the networked society, but traditional companies are now increasingly seeing the potential that the millions of connected individuals have (Howe, 2009). Crowdsourcing and open innovation can accelerate the traditional innovation processes, helping organisations find new solutions and opportunities to their key problems and challenges (About Us: InnoCentive). The Crowdsourcing industry report (2012) shows that the market is growing, an increase of 75% was seen 2011 over 2010, seen in fig.1. The report further show that large companies (Revenue over 1B $US) are early adopters of crowdsourcing, but there are still significant unexploited opportunities for it. The interest for crowdsourcing is expected to grow (See section 3.2).

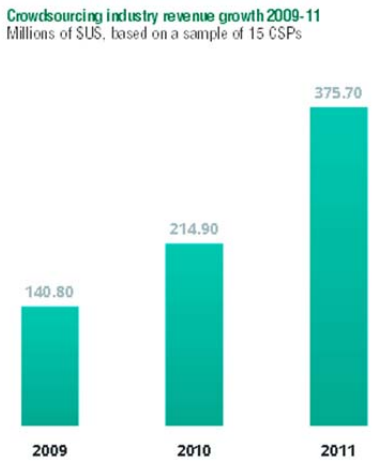

Fig. 1: Crowdsourcing industry revenue growth 2009 – 2011 in Millions of $US. Source: Crowdsourcing Industry report 2012

InnoCentive is one acknowledged example of a company utilising crowdsourcing to solve innovation problems; their crowd consist of 285 000 researchers from nearly 200 countries. These individuals provide ideas for solving e.g. business and technical problems that InnoCentives clients have. The problems are posted as contests with different complexity level on an online platform, where the winner gets a monetary reward ranging from 500 $US to 100 000+ $US (About Us: InnoCentive).

There are many advantages with using crowdsourcing for finding solutions to innovation problems in order to gain innovation momentum; the crowd can provide you with an abundance of ideas and novel solutions, as you pay for the solution and not the work. But crowdsourcing contests can be risky business; when they are poorly designed, too broadly scoped, or badly managed they can turn out to be unrewarding and expensive (Ideaconnection, 2012) and also present risk for intellectual property.

An alternative for companies that wants to reap the benefits of crowdsourcing but reduce the level of risk is to utilise its existing network through *internal crowdsourcing*. This is possible when the company has a large enough number of employees to display characteristics similar to a crowd, thus internal crowdsourcing is primarily beneficial for multi-national and multi-business companies. InnoCentive@Work deploys crowdsourcing platforms internally at companies, an innovation system which engages internal resources such as employees to generate ideas and solutions (Innocentive.com).

1.2 Purpose

The global economy is driving organisations to find solutions to problems both inside and outside the enterprise (About Us: InnoCentive), and more companies are turning to crowdsourcing (See section 1.1). Crowdsourcing companies have come to revolutionise business and have changed the interaction between businesses and the society (Howe, 2009). Crowdsourcing is rapidly growing and is progressively deployed also inside the company's own walls.

During the initial stages of the internship at Philips, it is identified that different crowdsourcing alternatives are available both internally and externally, and that these efforts are not widely known to all employees. Initial discussions with key persons within Intellectual Property & Standards as well as individuals working with Innovation confirm the importance of openness to complement internal efforts. The problem of an abundance of alternatives is identified by the author, and authenticated by the supervisors at IP&S to be an interesting and important research subject. The focus on comparing internal crowdsourcing and external crowdsourcing is further determined as these concepts are growing but not widely known or extensively researched. It is recognised that large companies such as Philips with 116 000 employees in over 60 countries (About Philips, 2013) has their knowledge and expertise, but also has the characteristics of a crowd. Thus, the level of complexity is also growing for the company when deciding between different crowdsourcing alternatives for innovation development. The purpose of this thesis is to provide an overview on what aspects to contemplate when considering different crowdsourcing alternatives: what are the strengths and weaknesses of the external crowd in relation to the internal crowd? The research aims to illuminate and compare the concepts and identify key differences through empirical research. The research further aims to provide companies with some considerations concerning crowdsourcing alternatives.

1.3 Research question

How does internal crowdsourcing differ from external crowdsourcing in relation to innovation development?

1.3.1 Sub questions

- What prerequisites can be identified for a prosperous crowdsourcing initiative?
- What benefits does internal crowdsourcing have in contrast to external crowdsourcing?
- What drawbacks does internal crowdsourcing have in contrast to external crowdsourcing?
- What recommendations can be made when selecting a strategy for an innovation problem or effort in relation to internal and external crowdsourcing?

1.3.2 Delimitations

The thesis subject was chosen solely by the author and is separated from the purpose and topic of the contemporaneously performed internship. The thesis shall therefore not be considered as suggestions aimed for Philips specifically, nor are the results directed in any way by Philips. The result are reflecting Philips' view as a large company when conducting interviews; however the analysis and result will be deducted from the complete picture given by the literature study, interviews with crowdsourcing companies, interview with a Business-to-Business (B2B) company and the interviews conducted within Philips.

The thesis will not compare the costs of implementing different crowdsourcing platforms or using crowdsourcing services

The thesis focuses on for-profit organisations that perform R&D in-house.

The thesis does not aim to define a certain size of company to evaluate, since this is highly contextual. The term "large company" in the thesis refers to a multi-national, multi-business company where internal crowdsourcing is most viable.

The term crowdsourcing includes a wide set of concepts such as e.g. micro-tasking, collaborative crowd efforts such as joint creation of e.g. Wikipedia and crowd funding. However, with the main question being focused on innovation development, the inherent implication of *crowdsourcing* in this thesis will be focused on the innovation aspects; problem solving and idea collection. Crowd funding, micro-tasking and joint creation of e.g. wikis will not be discussed.

2 Methodology

The methodology chapter describes the process of how the research question will be answered. It provides an outline to how the literature study, the empirical study and the analysis will be used as a foundation for answering the research question.

2.1 General methodology

A qualitative approach is chosen due to the infancy of the research area, and the literature chosen has been kept central to the crowdsourcing concept. Qualitative analysis in contrast to analysis of quantitative data does not have commonly established rules (Bryman & Bell, 2003). The qualitative approach with semi-structured open interviews will allow for a comprehension of different opinions of the chosen research area. Since the central part of crowdsourcing is the people in the crowd, capturing different views of the concept is considered vital in order to outline recommendations for internal usage.

A literature review is performed to introduce important concepts for crowdsourcing. The main purpose is to comprehend what is important for the different types, in order to create an interview template. The results will predominately be used in answering the first sub question about what prerequisites that can be identified for a prosperous crowdsourcing initiative.

Empirical data is collected in the form of interviews carried out with crowdsourcing companies that offer products and services for internal crowdsourcing, in order to obtain opinions and knowledge of working with crowdsourcing. Due to the infancy of the research area, discussions about the future for crowdsourcing are also considered to be important. Interviews are also held with persons working with innovation to comprehend if employees within a large company see internal crowdsourcing as a viable tool for them to use. The interviews collectively are held to predominantly answer sub question two and three regarding benefits and drawbacks internal crowdsourcing has in contrast to external crowdsourcing.

An analysis is performed to compare the literature with the empirical data. Investigating if there is correlation between what the literature and the interviews suggest will complement the empirical data in the analysis. Different models of crowdsourcing in relation to internal and external development are identified. Comparing the models in several areas will provide the basis to answer the last sub question regarding recommendations. The conclusion presents answers to the sub questions and the research question. The last subchapter provides suggestions for further research.

2.2 Literature study

The selection of literature is performed by a wide search at Chalmers library, Google Scholar and Google, complemented by suggested literature from supervisors.

Books and articles are reviewed to understand the concepts behind crowdsourcing, the power of crowd knowledge, etc. As the nature of crowdsourcing in general, and internal

crowdsourcing in particular is a new research area, a large portion of the information is also obtained through homepages, blogs, news articles, Google trends etc.

2.3 Empirical study

Semi-structured interviews with open questions are chosen due to the qualitative nature of the topic. A general outline is followed and the interviewees are encouraged to elaborate on areas where they have deeper knowledge. The open questions are preferable when new areas are to be researched, of which the researcher has limited knowledge (Bryman & Bell, 2003). Considering the infancy of the researched area, it is of importance that the interviewees have the space to elaborate depending on their involvement with internal crowdsourcing. Open questions will enable each respondent to answer in their individual words and their different views of concerns can be introduced (Bryman & Bell).

Interviews are both performed with crowdsourcing companies working with internal crowdsourcing, as well as employees within multi-national companies. In qualitative research, an interview has meaning to the researcher only in the context of other interviews and observations (Bryman & Bell, 2003), why interviews are held both with individuals who work with the subject, and those who do not. Interviews are held with Philips and Sandvik employees, to obtain the view of multi-national and multi-business companies on the subject. The purpose of obtaining opinions not only from employees currently working with crowdsourcing is to mitigate the risk of a biased result with overly positive responses. The interviews are recorded, transcribed and summarised before approval from each of the interviewees is requested. The raw data of the interviews are not included in the appendices due to the employee interviews containing confidential information. The interviews also go into various degrees of depth into the subject depending on the interviewee's familiarity with the subject.

2.4 Analysis and conclusion

An analysis is performed to compare the literature with the empirical data, to examine if there is correlation in what the findings suggest. Different models of crowdsourcing in relation to internal and external development are identified, and areas to consider in relation to these models lead to recommendations. The sub questions are answered, leading to answering the main research question which collectively represents the conclusion. A few suggestions for further research will open up for additional areas, addressed to expand the knowledge within the area of internal and external crowdsourcing.

2.5 Quality of research

In regards to the validity of the research, Lincoln and Guba (1985, cited by Bryman and Bell 2003) suggest that qualitative studies shall not be judged on the same criteria as within quantitative research. The trustworthiness of a research comprises of credibility, transferability, dependability and confirmability.

The credibility of the research is established through ensuring that the research is carried out with good practice, and that the participants in the research are allowed

confirmation of the results (Bryman & Bell, 2003). The participants are therefore asked to confirm the summarised interviews, and also allowed to provide clarifications or alter details for the results to be as representative of their views as possible. Respondent validation can thus confirm the validity of individual versions, and that the researcher has understood the respondents correctly (Bryman & Bell).To further increase validity of the results, multiple sources of information are used, referred to as triangulation by Bryman and Bell. In addition to the literature study, views are obtained from both people who are the potential users of crowdsourcing, as well as companies providing crowdsourcing services.

The transferability means to what degree the research can be transferred to other contexts. It is characteristic for qualitative research to study individuals sharing certain characteristics which provide depth rather than breadth; the findings are contextual and unique (Bryman & Bell, 2003). As Lincoln and Guba put it (1985, cited by Bryman and Bell 2003); findings “hold in some other context, or even in the same context at some other time, is an empirical issue”. The characteristic the interviewees share is working with innovation in a multi-national company, but their responses naturally reflect the industry and their position. The interviewees predominantly work for Philips due to the contemporaneously held internship and the facilitated access to interviewees. The result is therefore more contextual in nature than if all interviewees work in different companies. The result is intended to capture experience and knowledge that can be valuable for other multi-national companies facing the same issues. It is therefore important for the empirical research to include persons who work with the researched area and those who do not, and not work in the same geographical location. The risks of a biased result that only capture opinions of individuals who are positive towards these efforts are thus minimised. The research also aims to broaden the results by conducting an interview with an employee at a company with a different company profile.

Dependability means how reliable the results are. Guba and Lincoln (1985, cited by Bryman and Bell 2003) propose an auditing approach to establish this aspect of trustworthiness. This has however not become a popular within management and business, due to very large quantities of data it implies. The reliability of the results is instead reliant on the job positions held by the interviewees which indicates their degree of insight to the innovation process in the company.

Confirmability is related to ensuring that the researcher has not allowed personal values to affect the research and the results, while recognising that complete objectivity is impossible (Bryman & Bell, 2003). Because the researcher in this case does not have any affiliation to the researched area; the risk for personal values is minimal. With the summarised interview approval and external input from supervisors, the risk is reduced even further.

3 Literature study

The literature study introduces areas identified as important to understand the most vital mechanisms of crowdsourcing in relation to innovation development.

3.1 Innovation challenges

To comprehend some of the reasons why companies today need and use crowdsourcing, some of the challenges faced by modern businesses are briefly outlined. Due to the focus on innovation aspects of crowdsourcing, firstly definitions for innovation and open innovation are provided. Innovation is the process of creating and delivering new customer value in the market place (Carlson & Wilmot, 2006) Open Innovation means opening up the R&D department to external collaborations. The company should access technology and ideas when they need it; either from inside the company or created outside the company (Chesbrough, 2003).

Chesbrough (2003) propose that there is an apparent decline in the innovation capabilities of many leading companies, because of the fundamental change to how we innovate and bring new ideas to the market. A study among 260 innovation leaders show that the biggest constraint for companies to reach their innovation targets are that companies lack a well-articulated innovation strategy. The number two constraint is the absence of understanding the external environment (Capgemini Consulting, 2012) The lack of external understanding is according to Carlson & Wilmot (2006) the reason for why the lifetime of companies are declining; they simply cannot respond to new opportunities and change fast enough.

The traditional closed creation models have a difficulty completing knowledge intensive tasks when most of the needed knowledge resides outside the organisation (Lakhani & Panetta, 2007), and it limits the access to possible sources of information. Only focusing on today's products prevents detection of new customer needs, technologies and business models thus important opportunities are missed (Carlson & Wilmot, 2006). Howe (2009) cites Larry Huston, Procter & Gamble's former vice president of innovation and knowledge. "Everyone I talk to is facing a similar issue in regard to R&D. Every year research budgets increase at a faster rate than sales. The current R&D model is broken". Expertise and knowledge are still valuable but when linking and building upon it with knowledge and achievements of others the utility is multiplied (Chesbrough, 2003).

Organisations are often not able to articulate and define the core problems, and some companies even face problems truly identifying which problems are critical to their business strategy (Spradlin, 2012). In addition to keeping the internal knowledge, being able to identify and access external knowledge is increasingly important for people working within R&D (Chesbrough, 2003).

The innovation leadership study shows that the size of companies is correlated to their reported innovation success, suggesting that innovation is much easier to drive in small

organisations (Capgemini Consulting, 2012). What determines success is speed of innovation and new customer value created (Carlson & Wilmot, 2006). John Seely Brown, at Xerox Palo Alto Research Center explains that one major challenge for a successful innovation is that you often need both an innovative business model and an innovative product offering which is hard for large companies' R&D departments to learn. He further states that the previous model focusing on creativity within the firm has changed towards a networked reality allowing for the customers to come into the lab as coproducers (Chesbrough, 2003).

The innovation leadership study (Capgemini Consulting, 2012) provides the most important aspects for managers to consider of what drives successful innovation leadership. The five implications are presented below along with parts of the comments included in the study:

"1. The innovation function is in the spotlight to improve the organization's ability to achieve its innovation targets by formulating a well-articulated innovation strategy and improving its understanding of the external environment."

Having an innovation function in the company can have a positive effect when trying to overcome the two identified top constraints; absence of a well-articulated innovation strategy and lack of external understanding. The difficulty for anticipating technology and market trends is mentioned as one challenge for the innovation function.

"2. Traditional strategy development no longer suffices in the pursuit of sustainable growth under high uncertainty – there is a need to move strategy development to the outer peripheries of the company."

There is a need for a more bottom-up approach which focus on individuals as a source of competitive advantage. In order to understand the external environment, insights from management and the employees need to be captured. Combining formal mechanisms (strategy and governance) with informal ones (leadership and culture) will enable an agility towards the changing environment.

"3. Limited organizational design for innovation is impairing growth at large organizations."

There is correlation between formalized innovation governance and the company's innovation success rate. A well-designed governance of innovation should be able to balance both long-term and short-term innovation objectives.

"4. Real innovation leadership requires executives to reduce the level of disconnect between themselves and employees."

Executives are mainly driven by extrinsic motivational drivers. Employees are mainly driven by intrinsic motives such as innovation enthusiasm and team focus. This disconnect is more pronounced in large organisations than in smaller ones, because of the greater distance between executives and employees.

"5. Innovation culture is a highly important mechanism to enable agility and be able to survive in a continuous change environment."

Agility is indicated as one way to increase the understanding of the external environment. Being able to improvise can increase the level of responsiveness to a continuously changing world. Being quicker, reacting better to change, and also being able to work better with what you currently have can increase this improvising capacity.

3.2 Crowdsourcing

The term crowdsourcing originated in 2006 with the article in Wired magazine by Jeff Howe and although the phenomenon as such is not new; the internet has provided crowdsourcing with an infrastructure enabling it to truly prosper (Howe, 2009).The company today is no longer the traditional institution with employers having employees performing all the work, the crowd is increasingly involved with the processes in numerous ways (Howe) Crowdsourcing take many different forms and while the literature uses various categorisations, these are the three primary forms of crowdsourcing identified by Howe:

1. *The prediction market*, functions similar to a stock market where individuals open an account and buy and sell shares, such as the winner of a presidential contest.
2. *Crowdcasting* is essentially problem-solving, in which someone with a problem broadcasts it to a large, undefined network of potential solvers.
3. *Idea jam* is an online brainstorming session closely resembling crowdcasting, however with an undefined result. It is used to generate new ideas of any kind instead of solving a particular problem.

As the two latter categories crowdcasting and idea jam are more relevant in the innovation development context, the prediction market will not be examined further. Crowdcasting can be done by e.g. a company such as InnoCentive which is solving a problem defined by their clients (See section 1.1). Howe (2009) exemplifies idea jam with Dell's IdeaStorm, which attempts to capture the crowd's collective intelligence through an online portal, where everyone willing to submit a new innovation can post it and subsequently comment and vote on the ideas of others. IdeaStorm has to date over 18,926 submitted ideas and over 531 implemented ideas (Dell IdeaStorm)

The company has to be able to organise itself and mobilise people to work on the same thing, which foster expertise and knowledge rather than diversity and new ideas (Surowiecki, 2004). Therefore, a problem or idea will not be exposed to additional input and novel solutions when it is being kept within the company walls. A well-functioning crowd is diverse and exposes any given problem to individuals with different perspectives and skills; and the scale it can operate at exceeds any global company (Boudreau & Lakhani, 2013). Spradlin (2012) also emphasises that companies might not even tackle the right problems within the company; they are entranced with their usual way of working and end up treating the symptoms instead of focusing on finding the root cause.

One prominent crowdsourcing success is Linux, the operating system created by the computer hacker Linus Torvalds, which he openly distributed to the public. If programmers made improvements, they were encouraged to send them to Linus. This tactic proved highly successful, making the operating system the most important challenger to Microsoft (Surowiecki, 2004). Thousands of programmers have contributed with development and fixes, making Linux continuously better. The absence of a formal organisation enables programmers to work on what they are interested in; there are no organisational charts or managers giving order (Howe, 2009).

Some crowdsourcing companies strive to have a certain type of people in their crowd such as the researchers at InnoCentive, whereas other crowds consist of anybody with internet access willing to submit an idea to e.g. Dell's IdeaStorm. Howe (2006) suggests that the crowd consist of amateurs that suddenly have a market for their efforts which companies can utilise. Technological advancements have reduced the cost barriers traditionally separating amateurs from professionals. On the contrary, empirical research suggests crowds foremost consists of self-selected professionals rather than amateurs and hobbyists (Brabham, 2012). He further suggests that the label of amateur undermines the work performed by the crowd, and the expertise they can provide. According to the Crowdsourcing industry report (2012), the majority of crowdsourcing workers are in fact well-educated; almost 75% of the workforce has received a Bachelor, Master or Doctorate degree. User-developed products – which would constitute the work of amateurs – are not a new phenomenon and have been researched by Eric von Hippel for decades. Lead users are ahead of the majority of users and are first to detect important market trends, and research shows that products developed by them also appeal to other users as well (von Hippel, 2005).

Boudreau & Lakhani (2013) suggest using crowdcasting and innovation contests if you tackle a problem where it is not obvious what combination of skills or which technical approach will lead to the best solution for a problem. Dwayne Spradlin who works for InnoCentive confirms that the best solutions to complex problems often come from experts in other fields. In one case a cement industry chemist found a method for moving viscous spill oil, a challenge which had perplexed petroleum engineers for years (Spradlin, 2012).

Idea Jams enable a cost-effective possibility to receive innovation, and the company deploying it will also get goodwill and positive customer relations as a welcomed bonus (Howe, 2009). Brabham (2012) also emphasises the public relations aspect, having the consumers engaged in the brand in a more intimate way shows transparency and openness. All innovations provide intangible values to the customer such as experience, emotions, accessibility and identity (Carlson & Wilmot, 2006).

Google Trends, a tool which displays the popularity and interest of a search term over a period of time, is used to demonstrate the increasing interest for *crowdsourcing* (google.com/trends). The search interest started in 2006 when the term crowdsourcing was first coined, and is anticipated to continue to rise, as illustrated in fig. 2. When

looking at the search term *internal crowdsourcing* there is not enough data to display a trend line, further confirming its novelty.

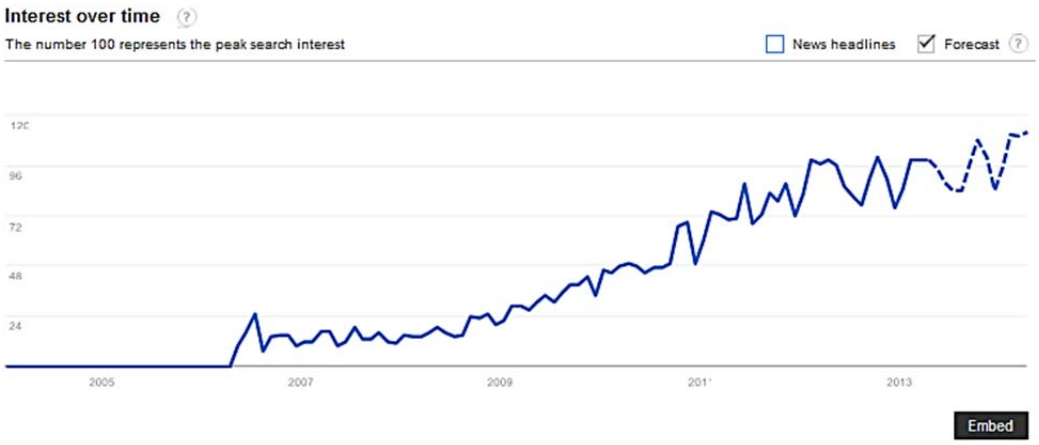

Fig. 2: Interest over time of Crowdsourcing Source: Google Trends

3.3 Internal crowdsourcing

Organisations are seeing the potential of utilising the wisdom of the crowd (see section 3.2) and applying it internally is an extension of the conventional usage. Rather than an external crowd unknown and undefined by the organisation, internal crowdsourcing is instead utilising the knowledge of individuals known to them, i.e. the employees and potentially extended to include e.g. collaborators or suppliers.

What is important to initially note is the difference between internal crowdsourcing and social network platforms on the intranet which are already well-established at many companies. Social network platforms are intended for people to share and connect to each other similar to Facebook, and although it can be used for answering questions posted by your peers, it is not intended for contribution to the innovation process. Internal crowdsourcing is specifically aiming at explicit problem solving related to the innovation development process, or in the creation process of new innovations. It is done systematically, and results are accumulated and reviewed by moderators and then utilised for a specific purpose. This is a fundamental prerequisite for it to function as internal crowdsourcing, a clear difference from the internal social network platform. It is easier to implement internal crowdsourcing in companies where social media acceptance is high (Yap, 2012), but the purpose of them differs substantially.

A firm studied by Villarroel & Reis (2010) uses an internal crowdosurcing (referred by them as intra-corporate crowdsourcing) platform which enables the employees to post their ideas, comment, improve or disprove ideas posted by others, and like a stock market buy and sell shares in an idea using a virtual currency. Their research focused on the innovation performance of the employees and the result suggested that innovation performance increased if employees were lower in the corporate hierarchy, and geographically distant from the corporate and innovation epicentres.

The capabilities of companies' internal resources have a propensity of being diminished in favour of the external crowd. Boudreau & Lakhani (2013) suggests that companies operate on traditional incentives such as salary and bonuses, and the employees' positions dictate their responsibilities and subsequently discourages them from seeking challenges. Given the right set of conditions, the crowd will almost always surpass the performance of any number of employees (Howe, 2009). Crowdsourcing attempts within companies are not considered to measure up to the external crowd by scholars such as Boudreau & Lakhani (2013); approaches such as idea marketplaces and idea jams lack the capabilities and fall short to the external crowd's full capacity. No company would pay salary to an employee floating around looking for challenges.

Villarroel & Reis (2010) explains that fims which implement online innovation platforms aim to access and accumulate ideas and knowledge from individuals, allowing them the possibility to make a contribution to the innovation process. And in stark contrast to Boudreau & Lakhani (2013) who believe people within a company are discouraged from seeking challenges, Yap (2012) says that internal crowdsourcing unveil innovations from the employees which otherwise would not be captured due to it being outside the scope of their job description. Carlson & Wilmot (2006) emphasises that every employee does in fact has the ability to innovate, and they must innovate for their company in order to stay competitive.

The individual's input is furthermore indicated to be important for the direction of the company. The complexity of companies' strategic decisions are substantial, and Surowiecki (2004) suggests that the more power you give to a single individual the greater risk of a bad decision. Companies can instead use methods of aggregating the collective wisdom to forecast future events which will dictate strategic directions. When developing an innovation strategy the people shall be the seen as the main source of competitive advantage; capturing their insights enables understanding of the external environment (Capgemini Consulting, 2012). Yap (2012) further suggests that using internal crowdsourcing can increase the quality of business decisions.

Even though internal crowdsourcing is not used to the same extent as external crowdsourcing, the usage is increasing (MissionMode, 2013). Further, these initiatives also can foster increased communal development, bridging hierarchy and distance that may led to the creation of a competitive advantage. (Villarroel & Reis, 2010)

3.4 Incentives

Crowdsourcing is dependent on an active and prosperous crowd (Howe, 2009) and how you incentivise people in crowds can vary greatly depending on the purpose it.

Individuals engage in crowdsourcing communities such as iStockphoto which crowdsource royalty-free stock images, (istockphoto.com), or Linux (See section 3.2) because the communities essentially give the individuals personal enjoyment and provides them with a common playground. Some individuals innovate for themselves even if the investment in time and materials exceeds the reward in product functionality.

These persons value the learning and enjoyment aspects derived from their participation in the innovation process (von Hippel, 2005).

Howe (2009) says that very few individuals will contribute with their time and enthusiasm to perform a task unless they feel that it will add some *meaning* in addition to the possibility of obtaining monetary reimbursements. Some literature suggests that it is in fact vital to incentivise people with a bounty such as cash, where other emphasises the creative individual's own drive to develop. Spradlin (2012) suggests incentives are needed to ensure peoples motivation when addressing a problem, for internal solvers it can be bonuses or promotions while it for external solvers often are cash. But Lakhani & Panetta (2007) points out that purely participating for the money clearly is not the case as crowdsourcing lack any guarantees of a direct financial reward. They further suggest that the role of economic motivations shall not be undermined, but it is in combination with the enjoyment, having a sense of identity and getting the social benefits of the community. Yap (2012) agrees that enjoyment is also important for internal crowdsourcing, because the experience is not part of the daily work. The scientific community however displays a more philanthropic view, where the technological and scientific progress is an incentive. Scientists want to solve problems and to be recognised rather than just earning money (Surowiecki, 2004).

Oldham and Hackman (1979, cited by Oldham and Hackman 2010) presented in their Job Characteristics Theory (JCT) that internal motivation to perform well were interrelated to the jobholder perceiving the work as meaningful, feeling responsible for outcomes, along with having knowledge of the results of their work. The focal attributes to perceiving the work as meaningful is skill variety, task identity, and task significance. Oldham and Hackman did not consider social factors as essential for the motivation of internal work in this theory, an aspect they now have reconsidered due to the changes in how work today are performed. Nowadays social interaction is a prominent aspect of work organisations and affects motivation to a great extent. They see that much more research is needed in this field, and motivational factor are of much greater complexity than they previously thought (Oldham & Hackman, 2010).

The two types of motivations often denoted in the literature on crowdsourcing are extrinsic and intrinsic motivation. Lakhani & Panetta (2007) note that research on open source software communities has shown that the motivation to participate broadly can be divided into extrinsic motivation, (rewards for performing a task) and intrinsic (valuing the task itself). They further make the point that the connection of enjoyment and the accomplishment of complex technical tasks for many people appear counterintuitive. Research findings, however, strongly suggest a mix of motivations and consequently having a system heavily emphasised on one aspect may limit the participation (Lakhani & Panetta).

Employees may wish to experience this type of intrinsic reward to enjoy the process of development itself, but constraints from their job position may offer little opportunity to do so (von Hippel, 2005). Yap (2012) suggests that incentives for internal crowdsourcing are individuals' motivation to improve the quality of their own working

environment, to share their views and suggestions with others. Von Hippel further suggests that if employees do not have the possibility to develop or feel in control of their job they may seek challenges outside of work; many programmers cite "control over my own work" as one reason they enjoy engaging in unpaid open source projects more than writing code for their employers.

3.5 Crowd intelligence

The main point of crowd intelligence is concisely articulated by Ghafele and Gilbert (2011): "The power of crowdsourcing lies in its ability to draw from a diverse intellectual background where networking technologies link the widest possible range of information, knowledge and expertise." Homogenous groups get more cohesive and members become more dependent on the group, falling into a certain pattern of thoughts and a sense of their group's superiority, a phenomenon called "groupthink" (Surowiecki, 2004), contrary to the crowd which will not be affected by the rest of the people in the group, thus ensuring diversity of opinion.

For companies, involving the crowd in the innovation process means to eliminate all preconceptions about who has the right or the best answer. The companies do not know who is submitting what solution, and the contribution is only judged by the solution itself. Surowiecki (2004) explains that intelligence alone is not enough for a good solution because it will narrow the possible solutions. If intelligence is resembled with a toolbox of skills, having people in a group with different tools means the whole group knows more and the collective performance will increase. Crowdsourcing implies that every individual has a more complex set of skills than what can be shown by education and qualification (Howe, 2009). This is also touched upon by von Hippel (2005) who exemplifies how user-innovators combine their unique set of skills to innovate; a mountain biker working within orthopaedic surgery could easily draw on his specific expertise and solution information to improve his biking equipment in a novel way.

As decentralisation will mean differentiation by default, this is discussed in relation to both types of crowdsourcing. For internal crowdsourcing as earlier noted by Villarroel & Reis (2010), employees was seen as having better innovation performance if they are geographically distant from the corporate headquarters and central innovation sites. Decentralisation is important for collective wisdom because it combines and aggregates diversity, specialisation and independence, which increases the information in the system as a whole (Surowiecki, 2004). Lakhani & Panetta (2007) also confirms that solutions to most problems received at InnoCentive comes from unanticipated sources, from unrelated technical fields that the client could not even envision possible. Howe (2009) suggests that a large and diverse labour force consistently will produce better solutions than a specialised work-force; a central principle of crowdsourcing. Open source software users are capable of developing complex products in a coordinated way without being geographically close to each other (von Hippel, 2005), thus collective wisdom and decentralisation are important success factors of Linux. Surowiecki suggest that the weakness of decentralisation is that many good solutions get stuck and knowledge does not get disseminated through the whole system. Thus the crowd need to

find a balance between making the individual knowledge collectively advantageous and still remain specialised in their field(Surowiecki), a point highly relevant to multi-national and multi-business companies.

Crowd intelligence also draws an easy parallel to the network effect. Shapiro & Varian (1999) suggest that the value of networks is dependant on the number of people connected to it with the value increasing as the network grows. If a small precentage of your company is connected to a certain service or platform, the value of it will be lower than if a high precentage is connected. That is applicable also for crowdsourcing as the crowd has to be of a certain size to make it advantegous.

One example of crowd intelligence is Hewlett-Packard, which experimented with a prediction market in the late 1990s to forecast the sales of printers. Employees were picked from different parts of the company to ensure respondent diversity, and over the course of three years these predictions outperformed the market's result 75% of the time (Surowiecki, 2004). Another illustrative example by Surowiecki is the scientific community, where the community as a whole decides whether or not a scientific hypothesis is valid and original. An idea only becomes the truth when the majority of the scientific community accepts it, making it profoundly different from the way markets and democracies work.

3.6 Crowd management

There are essential differences between managing an internal crowd and managing an external one. But fundamentally, Howe (2009) says that all crowdsourcing requires a close collaboration between the crowd and the individuals managing it, by providing rules and prerequisites it can operate under.

External crowdsourcing initially will imply work with preparation; matching your needs to the right form of crowdsourcing. Boudreau & Lakhani (2013) say that the starting point is to conclude that the company faces a challenge they cannot or should not solve internally. Critically evaluating and clearly formulating problems can help organisations create more innovative outcome, and ultimately drive business performance (Spradlin, 2012). Howe (2009) also attest to the preparation being of high importance, and the extent to which one can easily underestimate the work involved with a crowdsourcing effort. He was involved in a crowdsourced journalism project called Assignment Zero which underestimated the effort required to manage the crowd in an effective and productive way, and overestimated the self-organising ability of the crowd. The main reason companies reject crowds is that managers lack a clear understanding of when and how the crowd shall be used, and how to manage the crowdsourcing (Boudreau & Lakhani).

For internal crowdsourcing, companies need to have clear policies in soliciting ideas and how it plans to implement the suggestions into the business. You need to have a clear strategy of how the input will be moderated and decisions made, while also understand how your employee network behaves (Yap, 2012). Yap further suggests that without the right management of internal crowdsourcing efforts these initiatives can

degenerate into just loud brainstorming with self-proclaimed experts which might weaken and derail the process. Or groupthink can set in, which can result in less imaginative ideas for the sake of fostering group harmony.

External crowds are not reliant on a certain environment for their innovation efforts to flourish, as the individuals are self-selected in partaking in these efforts. But for internal crowdsourcing, the cultural aspect is especially important for engaging the employees, as the innovation climate in a company will affect to what degree they are willing to engage. The innovation leadership study showed that openness (to others' ideas, to change, to exchange) was the most important element for a culture that foster innovation. One respondent even said it was of greater importance than creativity, because people simply are not used to sharing knowledge with others (Capgemini Consulting, 2012). The openness aspect is also noted by Yap (2012), saying that internal crowdsourcing initiatives will unlikely be successful without a prior network of people able and willing to contribute their ideas, and that adoption of crowdsourcing will depend on the organisational culture and its maturity in social collaboration. Being able to regulate the interconnections to your network is also valuable (Shapiro & Varian, 1999). The company thus has better control over who is connected to the network in internal crowdsourcing, and the potential leakage of information or strategy is diminished.

Another aspect of managing crowdsourcing efforts is to recognise that many of the generated ideas and solutions are bound to fail. Howe (2009) does not conceal the fact that most of the submissions to crowdsourcing platforms will indeed not be of desired quality; in fact 90% will be useless. Lakhani & Panetta (2007) also notes that most attempts to solve science problems at InnoCentive will, like most other crowdsourcing efforts, fail. On a more positive note though, Howe point out that 10% is not garbage, and can in fact turn out to be real diamonds. He suggests letting the community regulate itself and seed the good from the bad. This can relief work off the moderators by having e.g. a voting mechanism to highlight the best ideas. The innovation leadership study also showed that many leaders within innovation do recognise the importance of innovation efforts consisting of both successes and failures (Capgemini Consulting, 2012). Ultimately, the eventual success of one great solution is not diminished by the failures, no matter how many unsuccessful solutions are submitted (Howe).

3.7 Intellectual property and regulations

When lowering the level of control the company has over its innovation efforts, one can understand that opening up for more opportunities will also mean increasing the risk of potential threats. As more crowdsourcing models are deployed, it becomes progressively more likely that crowdsourcing approaches will encounter problems relating to the law and intellectual property (Wolfson, 2012).

Wolfson (2012) brings up four main areas where crowdsourcing will intersect with jurisdiction in the future: employment law, inventorship under patent law, copyright law and data security. He argues that either old law will be applied to the problems that

crowdsourcing raises, or new laws made that can be enforced to directly regulate crowdsourcing activities, or that we will see a combination of both old and new law.

Problems for companies can arise if they for example are tempted to disclose information and data about itself and its users to enhance the quality of crowdsourced efforts and support the crowd's inventiveness. Netflix displayed user records to improve its movie recommendation algorithm, and faced legal issues when it turned out to be "surprisingly easy" to use the disclosed data to find the identities of the Netflix users (Wolfson, 2012).

Problems may also arise for e.g. the individuals who submit solutions to innovation challenges, if they are unaware of IP and do not read through the contracts beforehand on what they can and cannot reveal to the public on their submitted solution. Having the external crowd partake in the innovation process implies the necessity of the company adopting an altered attitude towards of openness and intellectual property (Lakhani & Panetta, 2007).

With the traditional road to innovation being performed by companies behind closed doors in order to prevent leakage of IP to the outside, Lakhani & Panetta (2007) notes that this clearly is not effective in a distributed innovation arrangement where a prerequisite is enabling the participation of many individuals. Further they clarify that InnoCentive works to generalise the problems of organisations (seekers) to prevent any company specific information of being revealed. All the involved parties are anonymous to one another which further mitigate the risk of revealing any proprietary knowledge. The IP of the winning solution is acquired by the seeker and the solver gets an agreed prize in return. InnoCentive further ensures that the seeker does not commence R&D activities on other reviewed ideas except the acquired winner through internal audits at the clients, thus also protecting the solutions of the non-winning solvers.

For internal crowdsourcing the potential intellectual property issues is evidently lower. Villarroel & Reis (2010) propose that implementing crowdsourcing internally at firms leverage upon the underutilised creative ability of the employees while maintaining control over the associated IP.

Crowdsourcing should however not only be regarded as posing a threat to the future of IP protection, because there are efforts through which the systems are also strengthened. One example is regarding our patent system. Howe (2009) notes that patent examiners are overworked and underpaid, and have only an average of 20 hours to review one patent. Within this context of a growing workload, new mechanisms for prior art search have evolved (Ghafele & Gibert, 2011). There has been a pilot run with companies such as Microsoft and General Electrics who participated in the peer-to-patent project where the public with their pool of different expertise helped search for prior art (Howe, 2009). Prior art are the relevant technology, documentation or published knowledge that preceded the subject of the patent application which can affect its patentability (Ghafele & Gibert, 2011), and with the overstrained patent system an inevitable consequence is that many patents today are of poor quality simply because of the limited data access.

Article One Partners is a crowdsourcing company (See section 4) which has the mission of strengthening the patent system by alleviating some of the heavy burden the patent offices have. “Patents are meant to be novel, non-obvious and useful. However, many patents are granted that should not have been issued. This happens simply because there is too much information for any patent office to review entirely” (About Us: Article One Partners) Their community of hundreds of researchers worldwide find documents that help strengthen the quality of legitimate patents and invalidate those that should never have been issued.

4 Crowdsourcing company interviews

Interviews are conducted with two companies which are working with internal crowdsourcing and external crowdsourcing. One of the interviews is conducted via telephone (Ivanov), and one is conducted in person (Butler). Aleksandar Ivanov is Managing Director at CrowdWorx.Clare Butler is General manager Europe at Article One Partners.

4.1 Introduction crowdsourcing companies

The crowdsourcing companies are working quite differently with crowdsourcing. CrowdWorx *"is the top Enterprise Social Decision Support tool worldwide. We serve clients in Europe and North America with the full range of Social Decision Support services, including Social Forecasting, Crowdsourcing, and Enterprise 2.0 portals"* (About Us: CrowdWorx) They mainly work with internal crowdsourcing.

Article One Partners is *"offering premium compensation, we incentivize our global researcher community to uncover key evidence. And when our global search does not uncover new patent validity evidence, patent claims for truly original innovations are intrinsically strengthened. In sum, better access to validity evidence means a stronger patent system."* (About Us: Article One Partners). Article One Partners do both external and internal crowdsourcing. Their focus is on external crowdsourcing but depending on the client's needs they also offer internal crowdsourcing. They currently have one large client within computer science which has the portal integrated in their system.

4.2 How they work with internal crowdsourcing

CrowdWorx are crowdsourcing the information needed for management decisions. If the company for example want to know if a new product will succeed in the market, it can be valuable to ask employees. They are not only consumers themselves, but they are also experts in the market and the product, they know the competition and they know the history of the market segment. They are a huge source of valuable information, in contrast to the consumer who will often not know themselves what they want. New products and new product ideas is just one example of the questions you can ask in CrowdWorx, you can ask employees about most successful sales tactics with consumers, let them predict actual sales numbers for the next quarters etc., essentially any types of questions that can be basis for management decisions for the company (Ivanov, 2013). Other areas are for example marketing, finance, strategy & competition, technology, economy. (Products CrowdWorx)

CrowdWorx prefers to integrate their system in to the existing intranet environment in order to avoid causing resistance, which is often the result of introducing something new. However it can also run as a full-functioning stand-alone portal if the client wishes. The notifications by the system about new topics or challenges are obtained via an automatic mail from the system, and a notification in the system. The frequency of usage for different companies ranges from some having a few rounds of questions a year, to other companies having new questions every week. In telecom or consumer

goods it is a higher frequency and a continuous process because of the quick business climate where new questions constantly arise (Ivanov, 2013).

Article One Partners work with crowdsourcing with their community of over 27 000 researchers worldwide, to help companies and law firms make informed decisions by finding patent information for them. The question is asked to the crowd, they self-select whether they want to answer that question or not. Once they answer, they form part of a study process where they submit results of so called “references” which are sent to the client in a secure portal. By supplying this information to the client, their picture of the available prior art increases substantially. These results help the client make informed strategic decisions throughout the patent lifecycle. The key success the community has is finding non-patent literature, documents that one will not find by merely searching in conventional databases (Butler, 2013).

Article One Partners has an online portal with one interface for the researchers and one for the clients, where each client has their own page which accumulates all their requests. There is also an app for the researchers, so they get immediate notice when something goes live on the system. Their client who utilises the platform for internal crowdsourcing has integrated the platform in their intranet and the crowd constitutes primarily of current employees and retirees from the company (Butler, 2013).

4.3 Incentives

Ivanov (2013) explains how CrowdWorx is working with a special incentive mechanism. This is different from how traditional survey companies work, which reward participation alone with e.g. a dollar for each answer. CrowdWorx is different because you get a reward (not necessarily money) if your answer is proven to be good; either proven to be accurate by comparing to the actual outcome, or if the CrowdWorx community consider it to be a good answer. Only then will you as a participant be rewarded. The result is that the participants will think carefully about which questions to answer, and only answer the topics they consider themselves knowledgeable within. The system and participants thus becomes self-selective.

Butler (2013) explains the vast majority of their crowd are in it for the money, and this incentive drives high quality results. The winning reference gets US$ 4000 –5000 which is very much money in some countries. The people within the community are very competitive, and if more people submit the same reference, the first one to submit it wins. But there are also individuals in the crowd who just are genuinely interested in their science or technology area and want to share that knowledge and understanding, but they are the exception. They just enjoy solving the problem, and they are motivated by sort of a higher power.

There are other mechanisms in place to incentivise the Article One Partners crowd; the community can receive additional rewards than for the winning reference. If your reference is valuable, you can receive the ”most valuable researcher” reward which also includes a smaller monetary compensation in addition of the recognition and encouragement. There is also interaction with the Article One Partners community-

team; the crowd gets training in how the reference should look like, and how they can think different in order to get to the answers quicker (Butler, 2013).

4.4 Crowd participation

Ivanov (2013) states that the number of participants is highly dependent on the topic. Within a company the response rate is higher than on a public portal, because you are more involved and want to contribute and support the company you work for. For a typical question within larger companies you most often get from 50 up to a couple of hundred answers. A minimum of 30 participants is a general rule of thumb for acquiring enough knowledge for a certain question (Ivanov, 2013).

Instead of using email when information sharing, you get the crowd effect when collecting all the insights together in the CrowdWorx system which is inherently different than doing it traditionally via conversations and email. If email works well for information sharing, you don't need the CrowdWorx system. But if it doesn't work, you need to reconsider. You might have a conversation in Outlook, but in the system it is different due to the aggregated information. At the end of each question CrowdWorx provides a quantitative answer in contrast to trail of email replies (Ivanov, 2013).

Butler (2013) thinks that you do have to have a base number for internal crowdsourcing to work. Purists would say three people are a crowd and that you could do internal crowdsourcing with these people. But on a practical level there are technology requirements having to be in place in order to enable the data collection and get all the benefits of fully working as a crowd. A platform enables the monitoring and assembling of data and results, and internally you do have to have a minimum number of employees and or ex-employees to make that viable and of desired quality. For a smaller organisation you exchange data in a different, less formal way. But if you are a multi-national, multi-jurisdictional organisation, you will have a platform to allow ideas and information to be submitted and exchanged. There should be a certain level of involvement to make it effective and get the true value and benefits, and perhaps that can be when you get to at least 500 people being involved (Butler, 2013).

Butler (2013) also discusses the 80/20 rule, saying that this is true within any process, any organisation, or anywhere you bring intellects together. 80% of the results are produced by 20% of the people, which apply to all types of crowdsourcing including Article One Partners. They rank and tier their researchers and it tends to be the top 20% that are producing 80% of the winning references. They are either very good at what they do, or they understand the question in a different way, finding something unique which benefits the client. Within any crowd you will always have an elite that will present themselves, and this applies to both internal and external crowdsourcing. An interesting observation regarding the 80/20 rule is that it is their clients who pick the winning reference. They do not know which researcher submitted what reference; they choose it blind based on which one they perceive to be the best. It is still a small population that is consistently winning (Butler, 2013).

4.5 Managing the crowd

Ivanov (2013) says that top management support is important, but that the management also has to build trust with the crowd. It does not happen immediately that management trust everything the crowd says when you start with the CrowdWorx system within a company; this trust has to be earned as well. Management can quickly build trust in the crowd by focussing on "quick wins". One client's Marketing Director who wanted to ensure a good marketing mix. He asked all types of questions about the company's own strengths, the competitors, which campaigns were most successful etc. He posted all these questions into the CrowdWorx system and got responses from their hundreds of smaller outlets throughout the country they operate in. By using the observations from all of those outlets, suddenly he had access to their collective knowledge which he simply could not access before. In addition, the CrowdWorx system provided him with a quantitative report based on the collective knowledge it had collected from the outlets.

How the success is being communicated is important according to CrowdWorx. Management gets the report but also has to be involved by communicating their gratitude and presenting success stories to the employees. The crowd can thus see how their knowledge is helping the company and that their opinion matters, feedback which consequently leads to further participation. Involving employees always require top management support. Ivanov (2013) has never seen a successful implementation where top management was not involved. The crowd doesn't come for free and top management has to talk about it, be supportive, and show their appreciation to the crowd.

Butler (2013) explains that there are several ingredients to ensure that the crowd are functioning well, but also states that it is vital to manage the crowd in the right way, to keep the crowd engaged while also giving them training and support. It is a two way process of keeping them engaged by ensuring high quality of the challenges offered to them, and simultaneously making sure they are being looked after. In addition to the training and awards (See section 4.3) the researcher tiers have different needs that have to be acknowledged. The top tier has to feel a certain level of quality for the challenges since they are the ones who submit most references. The researchers in the lower tiers simultaneously have to be educated so that they can reach the higher tiers.

4.6 Success measures

CrowdWorx aims to have quantitative measures of success by always integrating a couple of questions that gives hard facts, e.g. the success of a product or sales forecast, to enable comparison with the answer of the crowd. If the crowd exactly predicted what happened it would imply 100% accuracy rate and a perfect system. Ivanov (2013) points out that they have over 80% accuracy which is far superior to any expert insight or market research. This is the number that CrowdWorx uses to measure its success, and the companies in turn can for example make a cost-benefit analysis. One example is a global consumer goods client which is using their crowd's knowledge to better predict sales of new products; resulting in saving hundreds of million dollars in the North American region alone. Another client revealed in a press release that they saved 130

million dollars for employee ideas. Because they have a very open culture ideas are quickly exchanged and implemented as well. The implementation is essential; the best report is useless if you cannot implement it. If you want to be a successful crowdsourcing company, you have to implement the ideas. For other companies, the source of the benefits might come from entirely different places, so again it is very context dependant (Ivanov, 2013).

Butler (2013) explains that references are ranked using both Article One Partners' own rank, and against the key criteria the client has set. The ranking is a score between one and four, where four and three typically are the references which are shown to the client in the portal. During the process the study manager will manage the researchers to ensure that they understand what these good and excellent references looks like. Each researcher has also an assigned limit of references, depending on which tier they belong to. This ensures that it is not possible to spam the system.

In terms of the rewards, the client often chooses the winning reference, and Article One Partner also reward up to ten most valued references. They publish the aliases of the winners on the portal while the reference is never published or shared (Butler, 2013).

4.7 The differences between internal vs. external crowdsourcing

Ivanov (2013) points out that people within a big company are less defined than you would anticipate; the company they work for is the only thing they have in common. Thousands of people are diverse enough, and the self-selection mechanism of CrowdWorx ensures that you only do the tasks and topics you are really good in. It all depends on the question you ask, you may have all the expertise inside your company, or not. For some questions you may need to include additional resources such as your suppliers or even your customers into the system. For other questions which include confidential information you will keep in-house anyway, consequently the task and challenge determines how the crowd need to look like. For the types of management question that CrowdWorx is working with, the external answers are not as effective since the consumers are not involved enough in the questions to enable valid answers. When deciding with the client which crowd to ask, you will easily realise which questions can be asked internally and those more externally suitable. It is also quite different types of questions depending on the department that is asking those questions, e.g. from controlling, marketing or finance, etc. Inside each department you will have different types of questions suitable for different crowds.

Butler (2013) thinks that there definitely are different factors for internal crowdsourcing in comparison to external, because the monetary reward is not as great as it is with an external crowd. The internal crowdsourcing by its very nature is to function much more on an expert basis. The internal crowdsourcing tends to be for keeping institutional knowledge going, and allowing the company to use that to best effect. That is a much more altruistic way of finding information and data, and internal crowdsourcing is not necessarily driven by money. Whereas the reward can be completely different, there is also a different type of motivation than for the external crowd. The client using internal crowdsourcing aims to capture and build upon their knowledge, and those benefits are

only attainable from the internal crowd because the external crowd does not have that knowledge. This company has its specific technology area with all the history and knowledge; they are the experts and they will probably find relevant prior art faster than an external crowd. But the compromise is losing the potential wildcard that the external crowd can offer. Sometimes it is individuals from a different technology area who finds the winning reference because they look at the subject in a completely different way and see an intersection in the technology which is not obvious at first sight (Butler, 2013).

When you want a specific problem to be solved which is highly industry related or company specific; the internal crowd will hypothetically have a better understanding of the problem than the external crowd. But the brilliance of the external crowd is that it does not have any predeterminations or preconceived ideas, and sometimes that is the best way to get a problem solved. You can ask the crowd anything, the results you get will depend on how you frame the question (Butler, 2013).

4.8 Future for crowdsourcing

For crowdsourcing in general; Ivanov (2013) thinks that we will definitely see increasing acceptance in the future; because the evidence of the power of crowds is mounting so quickly that it cannot be overlooked – or questioned – anymore. Today we often see managers discarding crowdsourcing, because they are used to traditional tools, market research etc. that work well for them. But once they realise that crowdsourcing is the new form of market research which provides their competitors with superior results, they will have to seriously reconsider their position towards collective intelligence in general and crowdsourcing in particular.

Further Ivanov (2013) points out how he sees the future for CrowdWorx; the aforementioned acceptance is validated with an early indicator; partnerships. More consultancies and service providers are approaching CrowdWorx asking for partnership agreements, which is a signal of the coming changes in the market. And for CrowdWorx itself it means that their solutions have to be prepared to be marketed via implementation partners and resellers and not exclusively by them.

They are also one of the pioneers in becoming an integrated internal/external crowdsourcing firm. In the beginning, all crowdsourcing companies worked with just consumers and CrowdWorx were the “black sheep” which ventured to work with the collective intelligence of employees. After some clients requested a mixed employee/consumer crowd setup, CrowdWorx realised its large potential. They will soon offer clients the option of having mixed internal/external crowds on a case-by-case basis. They will still start with employees first because the “quick wins” can be obtained much faster and easier by using an internal crowd, which you have better degree of control of and access to. Once companies have built the capability of internal crowdsourcing they will be introduced to the next step (Ivanov, 2013).

Butler (2013) thinks that crowdsourcing can be used in many more ways in the future and give companies the ability to get to market in a whole new way, in collaboration with the customer. The crowd can be accessed as a huge database for all kind of

information, opinions etc. She does not see that having an open innovation strategy mean that you cannot protect innovations through patenting; it can definitely be combined. So the next evolution will be finding ways of using the crowd to innovate more effectively that also allows for protecting the IP. To see how the next generation of crowdsourcing will work is going to be fascinating, both the crowdsourcers and the crowd will be considerably savvier.

4.9 Regulations and IP

Ivanov (2013) thinks there is a possibility for two types of regulations: the first is domain specific regulations, e.g. when crowdsourcing touches tax advisory services, banking services etc. where regulation exists today. The second one is general labour laws regulations, e.g. when crowdsourcing becomes a mass phenomenon, i.e. if 10% of the global population being involved in crowdsourcing work.

The first type, the domain-specific regulations already exist. These regulations are there to protect the customers of those industries – sometimes they protect the industry itself from outside competition. But if the new offering is stronger and better than the old one, it will find its own ways to create a new industry. And this new industry will over time build its own regulations to make customers feel safe and to protect itself. The second type of regulation, labour laws, exists very broadly. The current labour laws are probably not directly applicable to crowdsourcing as this is a completely different way of working. Also the work force is global but nobody can setup globally accepted laws except the UN. Hence we might see regulation which targets the crowdsourcing companies in their country of residence. At the moment we are very far away from such a situation so in the next three to five years there will most likely not be any significant changes in regulation (Ivanov, 2013).

Governments are eventually going to realise the potential revenue stream from crowdsourcing, find a way to tax this, and it will become much more regulated. How this is going to work is uncertain, because there will be many cross ordering issues having to be dealt with; where was this sourced from, and who owns what. Some regulations will probably be enforced in the next five years (Butler, 2013).

Article One Partners already has regulations in place for their community in terms of tax regulations when they sign contracts stating how they should tax their money; they are informing the crowd about their obligations. This will become much more of a hot topic that needs to be addressed. Some additional complications which can occur are in countries having certain data protection regulations in place on how data can be transferred which can become an issue (Butler, 2013).

5 Employee interviews

The employee interviews are performed with individuals working with innovation and product development, see table 1. The aim is to obtain their opinions on internal crowdsourcing from the individual's perspective. The interview with Interviewee A is conducted in person. The other interviews are conducted via telephone due to the interviewees being situated in other locations. The interviews start broadly with questions regarding the innovation environment and its challenges when working in a global company. The concept of internal crowdsourcing is then described and discussed on different levels depending on their familiarity with the subject. Some interviewees work with internal crowdsourcing within Philips today whereas others do not come in contact with it, why more questions are asked to those working with internal crowdsourcing to enable more elaborated answers. The information is extended through an interview with an employee at Sandvik; to obtain a viewpoint from a multi-national multi-business company that does not have any sector within consumer products. Sandvik currently does not have any open innovation activities but are contemplating it for the future.

Table 1 Employee interviewees and their positions

Company	Interviewee	Company position
Philips	A	Innovation Site Manager
Philips	B	Senior Director, Innovation Lead
Philips	C	Director Technical Expert Group
Philips	D	Senior Program Manager, Open Innovation
Sandvik	E	Director of Technology, Research and Development

5.1 Introduction to current platforms

Philips is currently working with both internal and external crowdsourcing as a part of their innovation strategy. The internal crowdsourcing is an idea exchange portal in the Consumer Lifestyle sector (hereafter referred to as Idea Portal).The Idea Portal is functioning like an *idea jam* (see section 3.2). The ideas can be e.g. product ideas, feature enhancing ideas, or consumer insights. Other employees can improve the ideas, cast votes on what they presume as good ideas, and which ones are not as good. This allows for employees to partake in many steps of the process.

External crowdsourcing is done both via other crowdsourcing companies and through Philips' own portal Simply Innovate. Simply Innovate is providing external inventors, consumers and anyone having ideas relevant for Philips, with a channel in which they can submit their ideas in a standardised way. This is a platform running continuously where ideas are reviewed by Philips and sent to the right division on a regular basis to evaluate further.

Innovation Open was an innovation contest, functioning similarly to Simply Innovate but rather resembling a campaign which was running for five weeks. Ideas were reviewed by a specially allocated board and the winner received both innovation coaching and a cash prize.

5.2 Innovation challenges

The interviewees are pointing to challenges of the complex process of both creating truly good products and quickly bring them to the market. The customer focus is also heavily emphasised, knowing what the customer wants and being able to satisfy their needs. Being able to protect your ideas is also highlighted.

Interviewee D points out that staying at the forefront is most important, because the abundance of available tools today allows more people than in the past to be successful inventors and entrepreneurs. Further, with the landscape being of much greater complexity today than it was 20 years ago, having a good view on that landscape and being able to identify opportunities does take more work than in the past. The breakthrough innovations can come from a lot more places now, and you need to have an outlook to the greatest possible extent. Interviewee C points out that the key is to know what the consumer needs and how to fulfil that need in a competitive way. It is also a challenge to bring innovations to established core categories, to change the way the consumer sees the products.

While discussing drawbacks with being a large company, the slow decision making when multiple people are involved are articulated by interviewee A: “There are too many functions with different ideas that can slow you down, and the entrepreneurial companies are always faster than us”. Interviewee D says that changing towards a more open culture over a short time frame can be problematic as culture change happens over a longer period. The difficulties of getting everybody moving in the same direction was pointed out by another interviewee, simply posting something on the intranet and believe that the message goes through is not enough.

5.3 The innovation environment

Being open to the outside are pointed out by the interviewees when discussing important aspects for an effective and flourishing innovation environment. They emphasise the importance of collaboration and a good network both inside and outside the company. Establishing and following an effective strategy is also highlighted.

The interviewees emphasise the external awareness as being very important, staying on top of what is happening in the market. Interviewee D explains the active external networking strategy, saying that ”for our open innovation program, we have different types of scouting sources all over the world; technology scouts, innovation companies, technology brokers etc., and new ones emerging all the time. To be effective, we need to continually analyse to understand which are the most fruitful channels and maintain strong engagement with those.” Interviewee E expresses that because there is so much happening around us, you have to interact with the outside or you will miss these ideas.

The traditional R&D institution behind a company's closed doors will break up because it is too slow.

The inherent advantage of being a global company is the broad spectrum of competence and expertise, a point made by all of the interviewees. Interviewee D points out another advantage; the size of the company enables you to try many different things, especially when you have the budget and the resources to experiment.

5.4 Views on internal crowdsourcing

The interviewees express two main opinions regarding internal crowdsourcing. Some prefer direct contact via email over different types of platforms, because they simply do not have time for untargeted information. "It is a challenge for crowdsourcing to work if the habit is mostly email" as interviewee B expresses it, while interviewee A opinions that "I would like to see *[internal crowdsourcing]* work, I have not seen it succeed yet because it is difficult to keep alive" The risk of low participation on such a portal is pointed out by several interviewees as one of the major challenges.

The other opinion is more positive. "The Idea Portal has been operational for five years, and it runs well in organisations and groups where they acknowledge its importance" is described by interviewee C who is a moderator for the portal. It is not working as well in groups where management and employees did not fully embrace it. In the well-functioning groups they have dedicated time to present ideas from the system to senior management, and ending those meetings would signal that it is not important anymore.

The interviewees also discuss additional benefits with crowdsourcing other than only new innovations. Interviewee C says that the cultural aspects are as important as having the right systems and tools in place. If you only say that creativity is important but you do not live by it, the employees will feel the difference.

Further, Interviewee D explains that both internal and external crowdsourcing is positive from a brand and customer relations perspective: "There are intangibles from external open innovation events, such as doing an event that creates PR and buzz around our (Open) Innovation program that have value for the company, and drive traffic to the Simply Innovate site. If we get even one blockbuster product from the competition, then the investment was worth it."

For Sandvik which only works with B2B, interviewee E sees internal crowdsourcing as highly interesting since this form of connection does not currently exist within the company. The different R&D departments in the world are still quite separated. With 50 000 employees the difficulty is to find the right person having the knowledge you need. You email your existing network while a portal can help you capture and utilise new capabilities. There are at present no open innovation activities at Sandvik, but the interviewee is currently writing a business case about possibly integrating it. Doing so via a crowdsourcing company focusing on technology is stated as the most probable option. Currently no information can be publically disclosed because Sandvik is

operating in a highly specific area. There are concerns about revealing more information than what potentially can be collected.

Sandvik does have other ways to collect employee ideas. One example from the interviewee's R&D department is that the employees work 10% of their week on whatever they want, which is very important for their creativity. If the ideas are interesting and require further testing, they will be further developed in "sprints" with short milestones to see if there is anything to the idea or whether it shall be dropped. In this process external impulses are brought in; attending conferences, having University collaborations etc.

5.5 Using internal vs. external crowdsourcing

Interviewee B thinks it is better to first go to your own network because of the uncertain outcome of crowdsourcing. When having a more specific and targeted question an external crowdsourcing company could be useful. Interviewee A believes both types of crowdsourcing are more successful when activities having a start and an end, like the Innovation Open contest, whereas the continuous efforts and platforms fade away.

Interviewee C believes that you can crowdsource anything. Because every employee is also a customer, it can be everything from the smallest dissatisfier on a current product on the market, to the other end of the spectrum, a complete new vision on future benefits or consumer insights. What is available online, like Quirky and Kickstarter (See section 6.7) also proves that there are no limits to what you can crowdsource. The interviewee also denotes the biggest advantages for using internal crowdsourcing in comparison to external crowdsourcing; there are no issues with intellectual property. Every employee is also knowledgeable and experienced with the product, the market and the consumer. And the problem statement or consumer insight can be shared openly without any risk of the competition getting that information.

Interviewee D says that "both are important, both consist of an intelligent, motivated community. When we have done internal crowdsourcing activities we see how enthusiastic people are, working together solving a problem or challenge. We should not miss that opportunity. But we cannot only look within our own four walls; you never know where the next big success is going to come from".

Interviewee E thinks that it is easier for the crowd to innovate consumer products because it is easier to envision its usage, while within B2B the question can relate to e.g. a process or a part of a process. Thus it is more important for B2B companies to thoroughly describe what it is they really want, because of the restriction of not being able to try it as a consumer.

When discussing the next thing for crowdsourcing with Interviewee D, it is expressed that the importance of collaborative innovation will increase. Everyone will be allowed to be innovators; not just the people in research or innovation functions at companies. Internally there are different sophisticated platforms to use, and externally there are sites

like Quirky and Kickstarter that allow more people to create innovative products, and these trends will continue to develop.

5.6 Importance of incentives

The incentive question generates a broad spectrum of answers although the interviewees all acknowledge incentives as being important. Some of the interviewees think that people simply do not have the time for the untargeted things, while other interviewees think that being given the opportunity to realise your idea is the biggest incentive possible.

Interviewee B says that it is not a question of whether there is an incentive; it is about if people really think it is worth the time. If you call or email people directly they will reply and share their knowledge. Finding a person who has worked on this before will generate more. If they however need to go to a site and are asked to solve a problem in return for something, it is doubtable it would generate much response.

Interviewee D divergently does think it is easier to incentivise people within the company to engage in internal crowdsourcing, in contrast to external crowdsourcing. People have a loyalty and a desire for the company to do well; and within a company individuals are generally more intrinsically motivated than extrinsically. When running Innovation Open it was thus important to appeal to people with both intrinsic and extrinsic motivation to maximise the participation. So both types of incentives were offered to the winner; a cash prize and innovation coaching. Also along the same lines, interviewee C thinks that the biggest incentive you get as an employee is to finally see your products in the market.

Interviewee E does not think Sandvik can reward each idea if they were to deploy internal crowdsourcing. Within the company they have internal competitions, e.g. an innovation prize. The competitions are more about the honour than the monetary reward, the honour is very important and it does drive people.

5.7 Intellectual Property

The IP aspects are pointed out, which show a high awareness of its importance. It is discussed both in regards to building on the human capital through knowledge sharing, and the importance of protecting your products in order to avoid being copied and stay ahead of competition. Interviewee D and Interviewee E are both aware of the potential risks inherent with external collaborations and crowdsourcing.

Interviewee D says that luckily they have not yet experienced any problems with the IP when using external crowdsourcing. There is a high awareness of the potential problems and measures are taken to protect –to the greatest extent possible – both the company and the inventor. It is complex to be open enough to enable input from the outside without being exposed to any legal ambiguity.

Interviewee E talks about University collaboration projects they have at Sandvik and that it is evident that Universities increasingly understand the potential to make money on the IP. They want to take an increasingly bigger part of the IP which poses problems,

on one occasion there were arguments regarding the IP which resulted in Sandvik having to increase their payment in return for ownership of the entire project outcome. Although the Universities have become better in realising the value of the IP, they still lack structure to their working processes. This is in contrast to collaborating with other companies which are much better to ensure all the IP is secured and that everything is conducted correctly.

6 Analysis and discussion

The analysis has its origin in the comparison of literature and empirical findings while discussing its possible implications. Four models of crowdsourcing relating to internal and external aspects are presented. Collectively the analysis reaches conclusions which are presented in Section 7.

6.1 Identified crowdsourcing models

Different crowdsourcing models are identified during the literature and empirical study, and table 2 provides an overview of four main categorisations identified, called the Crowdsourcing Models in relation to Internal and External interaction (abbreviated *CMIE* for simplified reference). Article One Partners and CrowdWorx are placed in two boxes each because their offerings include both internal and external crowds. Their current focus is however different and their business model is built around one main crowd, thus their minor crowd focus are shown in brackets.

Table 2. Crowdsourcing Models in relation to Internal and External interaction (CMIE)

	Internal Crowdsourcing (IC)	External Crowdsourcing (EC)
Idea jam platform	1. IC internally initiated and driven **Philips' Idea Portal**	3. EC internally initiated and driven **Dell's IdeaStorm**
Crowdcasting platform	2. IC using service by crowdsourcing company **CrowdWorx,** [Article One Partners]	4. EC using service by crowdsourcing company **Article One Partners, InnoCentive,** [CrowdWorx]

1. The platform is organised by individuals within the company, using an internal crowd, e.g. Philips' Idea Portal

2. The platform is organised by a crowdsourcing company, using an internal crowd, e.g. CrowdWorx

3. The platform is organised by individuals within the company, using an external crowd, e.g. Dell's IdeaStorm

4. The platform is organised by a crowdsourcing company, using an external crowd, e.g. Article One Partners

6.2 Innovation challenges analysis

The literature on innovation challenges is consistent with the employee interviews; having an understanding for the external environment is vital. The innovation strategy and the cultural aspects are also confirmed by the empirical data.

The problem of big companies struggling with slow processes is profound and emphasised by both literature and empirical data. The company's size being correlated to speed of innovation is both seen in the literature and confirmed by the interviews. Improved informal mechanisms and connection to the external environment can reduce the traditional lead times. Regarding internal crowdsourcing, both the company interviews and employee interviews highlight the benefit of the crowd already being knowledgeable of the company, customer and market. This can entail more ideas and solutions from employees being viable to pursue with the current capabilities of the organisation. Internal crowdsourcing operates outside of the corporate hierarchy to enable a greater agility. The implication is that internal crowdsourcing can simultaneously enable long-term development and quicker, more exploratory mechanisms for innovation development.

The internal efforts will affect the innovation environment to a larger extent than external crowdsourcing. Internal crowdsourcing is therefore discussed in relation to the implications for enabling successful innovation leadership (See section 3.1):

"1. The innovation function is in the spotlight to improve the organization's ability to achieve its innovation targets by formulating a well-articulated innovation strategy and improving its understanding of the external environment."

As internal crowdsourcing should be considered a part of the innovation strategy, it can be a tool for enabling the tangibility of the innovation strategy throughout the organisation. The difficulty for anticipating technology and market trends are not directly addressed by internal crowdsourcing. If implementing any internal efforts, the company should advisably complement it with external input.

"2. Traditional strategy development no longer suffices in the pursuit of sustainable growth under high uncertainty – there is a need to move strategy development to the outer peripheries of the company."

Implementing internal crowdsourcing is in line with the focus on individuals as a source of competitive advantage. It can provide a concrete way to capture insights from employees, thereby improve the agility by having quicker mechanisms for different stages of innovation development. The gap between management and the employees can be decreased by management openly asking questions which enables the employees to take an increasingly larger strategy responsibility. Providing the employees with an outlet for their creativity can further empower them to be able to affect the strategy.

"3. Limited organizational design for innovation is impairing growth at large organizations."

Balancing the long-term and short-term innovation objectives can be facilitated by having both longer development projects alongside internal crowdsourcing platforms. It will also increase the number of employees who are able to contribute, providing the company with a large and diverse informal innovation department.

"4. Real innovation leadership requires executives to reduce the level of disconnect between themselves and employees."

One way to mitigate this disconnect is to install mechanisms that both appeal to employee motivation and provides proof of effectiveness to management. Management should understand what drives the employees in regards to intrinsic motivation. But having measurable results can aid when convincing management throughout the organisation that this can be highly useful. Idea jams can open up a dialogue where the employees have a platform to bring forward ideas. Crowdcasting can reduce disconnect when management see the larger potential of their employees by aggregating their dispersed knowledge.

"5. Innovation culture is a highly important mechanism to enable agility and be able to survive in a continuous change environment"

Internal crowdsourcing can help to reinforce and improve the innovation culture. It can increase the velocity and adaption to change. It can especially improve in the aspects of "working better with what you currently have" in the company as it captures underutilized resources. By providing these tools which are useful to both management and employees, the agility can be improved.

6.3 Incentive analysis

The literature and the empirical data pronounce two main types of motivation: intrinsic and extrinsic. While the Idea Portal is driven by motivating individuals intrinsically, the crowdsourcing companies are mainly motivating people extrinsically. The competing and gaming element is part of the companies' business model because it drives results and the reward is perceived to encourage participation and ensure quality of submissions. They do however incorporate mechanisms to encourage and recognise the individuals in the crowd, therefore having intrinsic elements built in. The conclusion is that crowdcasting and problem solving seem to benefit by motivating people extrinsically while idea jams can be successful with only intrinsic motivation. The incentive for engaging in an idea jam is rather connected to individuals' creativity and working environment, elevated by the social aspect. Dell's IdeaStorm is successful without providing extrinsic motivation; thus creative people will innovate given the right setting.

The employee interviews displayed dissimilar opinions concerning the incentive and motivation question. The conclusion of this indistinctness is consequently that it is a complex mechanism and people are indeed motivated differently. It also shows that the social collaboration concept is not adopted by all employees; thus one large barrier for internal crowdsourcing is overcoming resistance when implementing it. The literature shows that the social aspects of motivation are increasingly more important, and knowing the level of maturity your employees have towards social platforms is thus considered important. The empirical data confirms this through the telecom industry having higher usage of the CrowdWorx platform compared to other industries.

Many interviewees touched upon the perceived time constraint in their daily work; so companies implementing internal crowdsourcing should advisably allow and encourage these activities to be part of the daily operation. The innovation strategy can thereby be further visible in the entire organisation. The employees can get a greater sense of independence if they receive the message of the innovativeness being an integral part of their job description. It may increase the motivation by having higher skill variety, task identity, and task significance while adding the important social aspect.

The scientists as described in the literature often enjoy the problem-solving aspect for the process itself, further confirmed by the empirical data. For companies having a large R&D department, this aspect is worth considering when framing a problem internally. It should advisably be perceived by scientists as scientifically relevant, and adding an element of recognition can increase the likelihood for them to participate. The contest Innovation Open was consciously aiming to motivate both intrinsically and extrinsically; corroborating with the literature. Developing a system which complies with multiple motivations is thus advisable in order to maximise participation.

6.4 Crowd intelligence analysis

The marketing manager exemplified by CrowdWorx confirms what the literature suggests; much good knowledge never gets disseminated through the system. Internal crowdsourcing enables the dissemination – and more importantly –the aggregation of that knowledge. If the question is never asked, the answer will not be retrieved. The complex skills set of individuals thereby enable knowledge dissemination without preconceptions of a person's experience or position diminishing the contribution.

Decentralisation is integral of being a multi-national company and suggested by the literature as important for crowdsourcing. The empirical data confirms that employees in large companies indeed are quite separated from their colleagues in other departments, functions and locations. Traditionally you only reach out to your own network. The company interviews suggest that employees are more diverse than one might originally think; thus internal crowdsourcing can in fact be equivalent to an external crowd, only smaller. The literature suggests that innovation performance increases when the contributors are further away from the innovation epicentre, enabling decentralisation to be utilised as a pronounced advantage for large companies.

The most prominent benefit with external crowdsourcing is evident by both literature and empirical data; greater probability to obtain radically new solutions which otherwise never would be considered. With that said, using external technological solutions and frequently crowdsourcing may imply a risk for the organisation. If the company gets too dispersed and unfocused in regards to its core business, it will not build on internal knowledge and foster expertise to the same extent. As the literature emphasises the importance of an innovation strategy, it should be in line with the direction of the company. Fostering institutionalised knowledge is still an important factor that should not be forgotten in the pursuit of ground-breaking innovation, because it might obstruct planning future strategy.

6.5 Crowd management

The literature suggests that it is important to have close collaboration between the crowd and the ones managing it, which is corroborating with the empirical findings. The Idea Portal is functioning best in groups with visible management support with allocated time. This may seem obvious, but with an abundance of attention-seeking initiatives available, it will not suffice to simply provide a portal hoping it will catch on. It has to become a prioritized point on the agenda to get real leverage in the organisation.

The initial step of knowing how to use the crowd is by establishing what questions the company should ask, to find the weak spots and greatest improvement areas. It seems an obvious point, but the company often does not tackle the root problem and instead treat the symptoms as shown by the literature. Using a crowdsourcing company may be beneficial as an external party can look at the needs of the company objectively. The interviewed crowdsourcing companies both have an iterative process together with their clients. Article One Partners is constantly working with question refinement during the process as well as educating the crowd how to improve their answers. CrowdWorx is pairing their client's questions to the right crowd and are moving further towards mixed crowds to improve the assertion of the best possible result.

The literature suggests that most submissions are of undesired quality, something the crowdsourcing companies are actively trying to reduce by having certain mechanisms installed. Incentivising the right people to participate helps managing the submissions and minimises low quality. CrowdWorx has the incentive system with both reward and punishment, and Article One Partners has the limited number of allowed references a researcher can submit in different tiers. It can be easier to manage the internal crowd because there will be less submissions and no spam, which is always a risk with externally accessible portals. The percentage of useless contributions is also likely lower since employees are hired for their competence and many individuals have well-developed problem solving skills.

The literature further proposes that letting the crowd self-regulate will relief work from moderators. This will not always be viable as shown by the empirical findings. For user generated ideas like for the Idea Portal the involvement and enhancement of other's ideas is a central part. It works in favour for both the employees being involved as well as increasing quality and work self-regulatory. For Article One Partners and CrowdWorx there are other mechanisms in place to determine the quality of submissions because it simply is not feasible to let the crowd decide what a good answer is. Nor is it possible for InnoCentive due to secrecy towards the clients; the crowd cannot know what the solution is being used for. Conclusively, self-regulation is not a viable option for all crowds but internally it may be easier to install.

6.6 Intellectual Property analysis

Using internal resources presents many advantages related to the IP aspects compared to using external ones. The literature and empirical data presents current laws which intersect with crowdsourcing, but legal risks are dramatically reduced when utilising internal crowdsourcing. The ideas and solutions collected in-house will automatically

belong to the employer, and employees submitting it will likely have a better understanding of novelty and secrecy than those in an external crowd.

When prior art to a patent or patent application is found, the knowledge of the patent portfolio's strengths and weaknesses is improved. Innovation development is not only idea generation or innovation challenges; the protection part of the innovation is equally important. High IP awareness can affect the direction and have implications for innovation focus. Preventing some patent applications from being sent to the patent office can prove highly valuable. As the literature show many granted patents do not meet the criteria for being granted and overloaded patent examiners do not find all relevant information. Finding prior art itself can empower the company and relieves some of the burden on patent offices. The knowledge may otherwise be revealed in a later stage when the company is heavily invested in the patent or product. The conviction in the IP can also be strengthened if no prior art is found and provide indications for which areas to focus on in the future. The internal crowd can provide patent and technology expertise, whereas the external crowd can provide the wildcards, serving different purposes depending on the company's profile.

The additional intangibles obtained are different for internal and external crowdsourcing; there are inherent immaterial benefits with both approaches shown in literature and in empirical data. External crowdsourcing can generate good PR and create a greater intimacy with the customer by enabling new communication and increasing their involvement. It can also create higher brand recognition and loyalty, enabling more customer experiences such as accessibility. Internal crowdsourcing enhances the innovation culture and builds on the human capital. Both types of crowdsourcing can increase the agility of the company by increasing the potential innovation sources, either informal mechanisms or external contact. The weakness of being a slow-moving large company and instead be turned it into an advantage.

6.7 Comparing internal and external crowdsourcing

Crowdsourcing literature proposes that innovations developed inside the company falls short of the full capacity of the crowd, while internal crowdsourcing proponents displays a strong belief in the own employees and their ability to innovate. Together with the empirical data, the conclusion is that different crowds indisputably serve different purposes. Scouting for different possibilities in parallel with the continuous efforts of the internal crowd appears to be an advantageous option for large companies. The traditional R&D activities can co-exist with crowdsourcing activities, if companies know when to use it and do it effectively. Through co-existence, companies can move further towards a progressive innovation culture, while simultaneously having the vital connection with the external environment.

The statement of internal crowdsourcing building and capitalising on the institutional knowledge was conveyed both in the literature and further confirmed by the company interviews. The external crowd does not have the same boundaries to preserve the knowledge and make it constructive. The crowd in some instances cannot for secrecy reasons partake in the processes, like with InnoCentive. With Dell's IdeaStorm, the

crowd functions as a community but they do not collectively get more knowledgeable. External crowdsourcing is therefore momentary and does not add value over time to the crowd itself. In contrast, even if a submission in the Idea Portal does not proceed into a project the individuals involved obtain knowledge and appreciation which is further fed back to the company. The conclusion is that the value for the crowd itself is higher for the internal crowd. Improving the innovation environment can enhance the visibility of the innovation culture towards the employees. Internal crowdsourcing can create an additional layer of the innovation lifecycle, unbound by hierarchy or position. This goes beyond the internal social network sites as it adds meaning to the innovation culture, and not just the social culture. The internal crowdsourcing can also encourage people to bring forward ideas otherwise not expressed, which can reduce risk of groupthink.

If the crowd consists of amateurs or professionals is debated in the literature. Because everyone has a complex skillset as suggested by the literature, it can be the combination of skills that produce the best solution. This is confirmed by the empirical data as the crowd of Article One Partners includes individuals who are simply good at fining information, and not professionals in the traditional meaning. With their client's internal crowd, the employees and ex-employees are used specifically for their expertise and the professionalism is unquestionable, but good solutions may still come from unanticipated individuals. The Idea Portal also attains submissions from professionals, but ideas may be outside of their job description. The literature shows that lead users, which would be considered amateurs, often are better than companies at developing products for themselves and other consumers. It is conclusively not particularly relevant to determine the professional level of a crowd if both creates desirable results. It is certainly advisable to consider some preferred characteristics of the crowd to maximise the results obtained; without narrowing the crowd too much.

The employees confirm a significant constraint with the internal portals; an overflow of information and time-pressure may hinder internal crowdsourcing from obtaining a big enough user base and to keep it alive. External crowdsourcing have a much larger potential user base, and will result in more diverse ideas and solutions with the possibility of a wildcard. The indication of potential new market trends and customer needs is also attainable in a more pronounced way with the external crowd. The literature points to external idea jams as especially cost-effective, collecting ideas with little effort. This is not the case for the internal crowd, since it has to be deployed, managed and moderated, and the employees use the portal during their working hours. This can be viewed by managers as costly thus creating additional resistance, but innovation has to be seen in a longer perspective and as a part of the strategy. While the literature proposes that internal crowdsourcing would mean an employee floating around looking for challenges, it misses the mark in two aspects. The first point is that the employees should view the crowdsourcing contribution as value adding, and an integral part of the innovation strategy of the firm. The second point is that it will obviously not be a full time job, and the involvement will vary depending on the current workload and availability to participate.

The empirical data shows that certain companies operating in highly specific industries are not yet ready to expose parts of the business to external collaborations. In these companies an internal platform is conclusively the only viable crodsoucing option until the organisation is ready to combine internal R&D with open innovation efforts.

A comparison is performed of the CMIE (See section 6.6) in order to outline the main identified differences (see Appendix 1). It does not cover all aspects that needs consideration, but outlines the areas in relation to innovation development considered in the context of this research. The areas are: Level of external input, Main incentives, Managing the crowd (Level of management from the own company), Self-managing crowd (Whether or not the crowd influence the process and relief work from moderators), Intangibles, IP, Innovation Culture, Wildcard/ highly innovative solution probability, Engaging employees.

6.8 Future of crowdsourcing

Crowdsourcing will continue to expand as indicated by both literature and empirical findings, and it cannot be overlooked. Companies are increasingly seeing it as a viable business tool as it can give instantaneous feedback from both internal and external resources. The internet enables high collaboration with the customer, as seen through the many new crowdsourcing initiatives. As displayed in the CMIE, Article One Partners and CrowdWorx are moving more towards both internal crowds as well as external crowds indicates that these mixed models will continue to grow in the future. This is in line with the findings showing the importance of seeing potential with both resource bases. Having more flexible models in relation to internal and external interaction will demand an ever more sophisticated approach from companies.

Quirky and Kickstarter was mentioned by two interviewees. Quirky is a crowdsourcing company working with collaborative product development (Quirky website). General Electrics (G.E.) recently announced their collaboration with Quirky; publicly sharing their patents and encouraging the Quirky inventor community to expand and elaborate on them. “There are a host of consumer applications that we haven’t had the ability to focus on,” said Beth Comstock, G.E. chief marketing officer. “That just isn’t our core business.” (Brustein, 2013) Kickstarter is a crowdfunding company, where project creators of e.g. media, design, and technology can receive money from the crowd to realise their project (About Kickstarter). These new business models show that the line between company and customer are becoming increasingly blurred, and that the control over the market is now more than ever in the hand of the crowd. As seen in the case of G.E., it further solidifies that staying true to your innovation and corporate strategy is imperative. They instead utilize crowdsourcing to enable complementary offers and products, retrieving PR and brand recognition as a supplementary bonus.

7 Conclusion

The sub questions will first be addressed in order to collectively answer the main research question in section 7.2.

7.1 Answers to sub questions

- *What prerequisites can be identified for a prosperous crowdsourcing initiative?*

The identified main aspects are: Clear motives, a vibrant community, clear boundary conditions, engaged moderators, transparency towards management, crowd specific incentives, and awareness of the IP.

- *What benefits does internal crowdsourcing have in contrast to external crowdsourcing?*

It keeps the institutionalised knowledge inside the company and enables aggregation of it which increases the knowledge in the system as a whole.

It takes advantage of the decentralisation and diversity of a large organisation and enables the company to work better with their existing resources.

It decreases disconnect between management and employees and enables an increased agility and improvisation ability by establishing an informal innovation department.

It lets people collaboratively innovate and foster an innovation culture and enables long-term and short-term projects to work in parallel.

It provides the company with a crowd which has knowledge about the company, market, customer and an interest for the company's prosperity.

It provides employees with an outlet to be creative outside the boundaries of their job and can increase a sense of control over their own time.

It can intrinsically motivate employees by combining the increased sense of influence over the company's innovation efforts with the imperative social aspect.

It is less invasive than external crowdsourcing in regards to the IP situation and can enable the traditional company not yet having OI capabilities to reap crowdsourcing benefits without the risks of exposing any confidential information.

It is easy to add self-regulatory mechanisms to relief work of moderators as the proprietary and secrecy aspect is not compromised

- *What drawbacks does internal crowdsourcing have in contrast to external crowdsourcing?*

It does not have as many wildcards. When a problem is highly complex with an undefined technical solution, using the external crowd can provide an expansive viewpoint with solutions from unanticipated areas.

It has a limited user-base compared to the potential size of the external crowd.

It will take longer time to implement, and risk resistance from both management as costly and from employees as time wasting. External crowdsourcing can be a quicker and more cost-effective way to introduce new ideas and solutions into the company.

It does not provide as broad external understanding: external crowdsourcing gives a better insight to what is happening in the market and in the minds of customers.

It does not generate the external PR, brand recognition and customer intimacy as obtained with external crowdsourcing.

- *What recommendations can be made when selecting a strategy for an innovation problem or effort in relation to internal and external crowdsourcing?*

Consider the innovation need: With the abundance of crowdsourcing alternatives available a thorough investigation of the company is advised in order to establish how crowdsourcing can be most beneficial.

Consider the crowd: After identifying the need, will it mostly benefit from radical solutions or is customer and market knowledge important? Knowing the desired characteristics of the crowd and providing the right incentives for that crowd is crucial.

Consider the external connection: Consider how the vital external input can best be obtained and utilised, by reviewing the current situation. Looking at the different intangibles obtained with each approach can aid in determining how it can be obtained.

Consider the company's social collaboration receptiveness: Companies in highly specific areas which are reliant mostly on traditional R&D models may not be ready to adopt external crowdsourcing. Internal crowdsourcing can enable advantages that are otherwise unattainable.

Consider the company's IP situation: Internal crowdsourcing is a less intrusive way to utilise the wisdom of the crowd. For areas which are highly secret, internal crowdsourcing poses less of an issue to the intellectual property aspect.

In addition to these considerations, reviewing the comparison in Appendix 1 can assist in the initial steps when considering which strategy to use to best meet the company's innovation need.

7.2 Answer to research question

- *How does internal crowdsourcing differ from external crowdsourcing in relation to innovation development?*

Conclusively, it offers both benefits and drawbacks in comparison with external crowdsourcing. The main differences are identified to be related to innovation strategy and culture, incentives, intangible benefits and IP.

The main identified benefits are that it captures underutilised resources and aggregates innovation insights from employees. It offers a possibility for social collaboration and enables an agile innovation department unbound by hierarchy or position. It can enhance the innovation culture and increase the transparency between management and employees. It can empower the employees to contribute to the strategic development and decision-making by management. Whereas external crowdsourcing offers the outward connection which provides novel solutions; internal crowdsourcing enables nurturing and utilising the existing resources which provides knowledge and expertise. It can take the disadvantage of being a slow-moving large company and turn it into an advantage. It enables the company to reap benefits of crowdsourcing without exposing it to IP and regulatory issues inherent with opening up the company to external participation. It can be easier to manage and moderate. It should be considered as a long-term innovation effort, and complemented with openness to the outside. It enables short-term idea and knowledge exchange which can lead to new innovations.

Internal crowdsourcing are not intended to replace external crowdsourcing, rather be considered as a tool and a way to make innovation culture enhanced, and innovation strategy transparent towards the employees within the company. Internal crowdsourcing can capture, build and capitalise on the internal innovation capabilities and knowledge. Through recognising the potential benefits, implementing and sustaining it properly, internal crowdsourcing can become a building block in the innovation strategy.

The main identified drawbacks include less wildcards. I can encounter resistance both from employees and management when implementing. It has a limited user-base compared to the potential external crowd, and external crowdsourcing can be both quicker and more cost-effective. Lastly, internal crowdsourcing does not generate the PR, brand recognition and customer intimacy the external efforts offer.

7.3 Further research

As this area is new and unexplored much additional research is needed. Obtaining data from a larger number of companies would provide a more quantitative data-set, which would broaden the understanding of usage in different industries and companies.

Expanding on the comparison of different crowdsourcing models can enable the creation of a tool that captures more aspects for the company to consider when approaching internal and external crowdsourcing. Further categorising types of problems for a more comprehensive overview would certainly be beneficial.

Further investigating a specific problem or idea and letting the internal crowd and external crowd simultaneously work on it, unaware of each other, could provide an overview of the strong and weak points of both approaches. Adding a cost-benefit analysis could also be advisable to extend the research.

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Appendix 1

Comparison of identified crowdsourcing models (continuation of next page)

Internal/ External CS type with regards to internal	1. Internal crowdsourcing platform internally initiated	2. Internal Crowdsourcing using internal platform	3. External crowdsourcing platform internally initiated	4. External crowdsourcing using external platform	
Examples of platform	*Philips' Idea Portal*	*CrowdWorx*	*Dell's IdeaStorm*	*Article One Partners*	*InnoCentive*
Areas to consider for the MNC					
Level of external input	Low, input through employees' external input	Low, input through employees' external input	High	High	High
Main incentives	Only intrinsic motivation	Mainly extrinsic motivation (minor level of intrinsic motivation)	Only intrinsic motivation	Mainly extrinsic motivation (medium level of intrinsic motivation)	Mainly extrinsic motivation (medium level of intrinsic motivation)
Managing the crowd (Level of management from the own company)	Medium - High, all responsibility with own company but lower moderation than DI	Medium, responsibility on crowdsourcing company but some managing from own company may be necessary	High, all responsibility with own company	Low, responsibility on crowdsourcing company	Low, responsibility on crowdsourcing company
Self-managing crowd (Whether or not the crowd influence the process, and relief work from moderators)	High level of self-managing crowd. Spam-likelihood low	Self-selecting mechanism in place, but not self-managing crowd	Medium level of self-management, comments are encouraged but spam-likelihood high	Self-selecting mechanism in place, but not self-managing crowd	No self-managing crowd, would violate secrecy policy
Intangibles	Empowering employees, capturing and aggregating ideas, social collaboration and innovation culture	empowering employees, capturing and aggregating knowledge	Good PR, higher customer intimacy, transparency to the public, aggregating the voice of the customer	Strategically improved knowledge over IP portfolio	Good PR of being an innovative company

IP	High control over IP (e.g. patentable products)	High control over IP (e.g. trade secrets being asked questions about)	Low probability over protecting ideas	High level of control over who has access to what patent information	Medium control, depend on framing of problem and origin of solutions
Innovation Culture	Highly beneficial for internal innovation culture	Somewhat beneficial for internal innovation culture depending on questions asked, increases transparency	May improve innovation culture if it affects internal way of working	Little impact on innovation culture	May improve innovation culture if it affects internal way of working
Wildcard/ highly innovative solution probability	Low - medium	Low - medium	Medium	Very high	Very high
Engaging employees	High engagement	High engagement	Low - medium engagement, depends on how ideas are being further worked on	Low engagement	Low - medium engagement, depends on how ideas are being further worked on